PG No. 2 C_{i} $\bar{1}$ [triclinic] (lgs basis)

bra: $= \langle s,\uparrow| \, , \langle s,\downarrow|$
ket: $= |s,\uparrow\rangle \, , |s,\downarrow\rangle$

Table 1: (s,s) block.

No.	multipole	matrix
1	symmetry	1
	$\mathbb{Q}_0^{(a)}(A_g)$	$\begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \end{bmatrix}$
2	symmetry	x
	$\mathbb{M}_1^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} & 0 \end{bmatrix}$
3	symmetry	y
	$\mathbb{M}_1^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{2} \\ \frac{\sqrt{2}i}{2} & 0 \end{bmatrix}$
4	symmetry	z
	$\mathbb{M}_1^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & -\frac{\sqrt{2}}{2} \end{bmatrix}$

bra: $= \langle s,\uparrow| \, , \langle s,\downarrow| \, , \langle p_x,\uparrow| \, , \langle p_x,\downarrow| \, , \langle p_y,\uparrow| \, , \langle p_y,\downarrow| \, , \langle p_z,\uparrow| \, , \langle p_z,\downarrow|$
ket: $= |p_x,\uparrow\rangle \, , |p_x,\downarrow\rangle \, , |p_y,\uparrow\rangle \, , |p_y,\downarrow\rangle \, , |p_z,\uparrow\rangle \, , |p_z,\downarrow\rangle$

Table 2: (s,p) block.

No.	multipole	matrix
5	symmetry	x
	$\mathbb{Q}_1^{(a)}(A_u,1)$	$\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
6	symmetry	y
	$\mathbb{Q}_1^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$

continued ...

Table 2

No.	multipole	matrix
7	symmetry	z
	$\mathbb{Q}_1^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \end{bmatrix}$
8	symmetry	x
	$\mathbb{Q}_1^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
9	symmetry	y
	$\mathbb{Q}_1^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
10	symmetry	z
	$\mathbb{Q}_1^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
11	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \end{bmatrix}$
12	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
13	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
14	symmetry	$\sqrt{3}xz$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
15	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
16	symmetry	1

continued ...

Table 2

No.	multipole	matrix
	$\mathbb{G}_0^{(1,1;a)}(A_u)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$
17	symmetry	x
	$\mathbb{T}_1^{(a)}(A_u,1)$	$\begin{bmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
18	symmetry	y
	$\mathbb{T}_1^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$
19	symmetry	z
	$\mathbb{T}_1^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$
20	symmetry	x
	$\mathbb{T}_1^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
21	symmetry	y
	$\mathbb{T}_1^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
22	symmetry	z
	$\mathbb{T}_1^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
23	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_2^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{6} & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$
24	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_2^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
25	symmetry	$\sqrt{3}yz$

continued ...

Table 2

No.	multipole	matrix
	$\mathbb{M}_2^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
26	symmetry	$\sqrt{3}xz$
	$\mathbb{M}_2^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
27	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_2^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
28	symmetry	1
	$\mathbb{M}_0^{(1,1;a)}(A_u)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} \end{bmatrix}$

bra: $= \langle s,\uparrow|, \langle s,\downarrow|$

ket: $= |d_v,\uparrow\rangle, |d_v,\downarrow\rangle, |d_{xy},\uparrow\rangle, |d_{xy},\downarrow\rangle, |d_{xz},\uparrow\rangle, |d_{xz},\downarrow\rangle, |d_{yz},\uparrow\rangle, |d_{yz},\downarrow\rangle, |d_u,\uparrow\rangle, |d_u,\downarrow\rangle$

Table 3: (s,d) block.

No.	multipole	matrix
29	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{Q}_2^{(a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \end{bmatrix}$
30	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_2^{(a)}(A_g,2)$	$\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
31	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_2^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$
32	symmetry	$\sqrt{3}xz$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
33	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_2^{(a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
34	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{Q}_2^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
35	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_2^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$
36	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_2^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
37	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_2^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & \frac{\sqrt{2}}{4} \\ \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
38	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_2^{(1,0;a)}(A_g,5)$	$\begin{bmatrix} \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$
39	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_3^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
40	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{3\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ \frac{3\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \end{bmatrix}$
41	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{G}_3^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{15}}{20} \\ \frac{3\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{15}}{20} & 0 \end{bmatrix}$
42	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{15}i}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{10} \end{bmatrix}$
43	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{i}{4} & 0 \end{bmatrix}$
44	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{1}{4} \\ \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & -\frac{1}{4} & 0 \end{bmatrix}$
45	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$
46	symmetry	x
	$\mathbb{G}_1^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{30}}{20} & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \end{bmatrix}$
47	symmetry	y
	$\mathbb{G}_1^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{10}}{20} \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{10}}{20} & 0 \end{bmatrix}$
48	symmetry	z
	$\mathbb{G}_1^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{30}}{20} & \frac{\sqrt{10}i}{10} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{10}i}{10} \end{bmatrix}$
49	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{T}_2^{(a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$
50	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{T}_2^{(a)}(A_g,2)$	$\begin{bmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
51	symmetry	$\sqrt{3}yz$
	$\mathbb{T}_2^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$
52	symmetry	$\sqrt{3}xz$
	$\mathbb{T}_2^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
53	symmetry	$\sqrt{3}xy$
	$\mathbb{T}_2^{(a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
54	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{T}_2^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
55	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}_2^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$
56	symmetry	$\sqrt{3}yz$
	$\mathbb{T}_2^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$
57	symmetry	$\sqrt{3}xz$
	$\mathbb{T}_2^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$
58	symmetry	$\sqrt{3}xy$
	$\mathbb{T}_2^{(1,0;a)}(A_g,5)$	$\begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$
59	symmetry	$\sqrt{15}xyz$

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$
60	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{3\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ \frac{3\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \end{bmatrix}$
61	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & \frac{3\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{3\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{15}i}{20} & 0 \end{bmatrix}$
62	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{15}}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{15}}{10} \end{bmatrix}$
63	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ -\frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{1}{4} & 0 \end{bmatrix}$
64	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{i}{4} \\ -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{i}{4} & 0 \end{bmatrix}$
65	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
66	symmetry	x
	$\mathbb{M}_1^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \end{bmatrix}$
67	symmetry	y
	$\mathbb{M}_1^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{10}i}{20} \\ -\frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & -\frac{\sqrt{10}i}{20} & 0 \end{bmatrix}$
68	symmetry	z

continued ...

Table 3

No.	multipole	matrix
	$\mathbb{M}_1^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{10}}{10} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{10}}{10} \end{bmatrix}$

bra: $= \langle s,\uparrow|, \langle s,\downarrow|$
ket: $= |f_2,\uparrow\rangle, |f_2,\downarrow\rangle, |f_1,\uparrow\rangle, |f_1,\downarrow\rangle, |f_{bz},\uparrow\rangle, |f_{bz},\downarrow\rangle, |f_3,\uparrow\rangle, |f_3,\downarrow\rangle, |f_{3x},\uparrow\rangle, |f_{3x},\downarrow\rangle, |f_{3y},\uparrow\rangle, |f_{3y},\downarrow\rangle, |f_{az},\uparrow\rangle, |f_{az},\downarrow\rangle$

Table 4: (s,f) block.

No.	multipole	matrix
69	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_3^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
70	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
71	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 \end{bmatrix}$
72	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \end{bmatrix}$
73	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,5)$	$\begin{bmatrix} -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
74	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{8} & 0 & 0 & 0 \end{bmatrix}$
75	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
76	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 \\ -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 \end{bmatrix}$
77	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & -\frac{\sqrt{3}}{8} \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{16} & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & \frac{\sqrt{3}}{8} & 0 \end{bmatrix}$
78	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$
79	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
80	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & -\frac{\sqrt{3}}{24} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & \frac{\sqrt{5}}{8} & 0 \end{bmatrix}$
81	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,6)$	$\begin{bmatrix} -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} \\ 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 \end{bmatrix}$
82	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 \\ \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 \end{bmatrix}$
83	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$
84	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}i}{24} & 0 & \frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{42} & 0 \\ -\frac{\sqrt{42}i}{24} & 0 & -\frac{\sqrt{42}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{42} \end{bmatrix}$
85	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \\ \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 \end{bmatrix}$
86	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{16} & \frac{\sqrt{5}}{8} & 0 \end{bmatrix}$
87	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 \end{bmatrix}$
88	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
89	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{14}i}{16} & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{16} & -\frac{3\sqrt{21}}{56} & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{112} & \frac{\sqrt{35}}{56} & 0 \end{bmatrix}$
90	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,8)$	$\begin{bmatrix} -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & \frac{\sqrt{21}}{14} & -\frac{\sqrt{210}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & \frac{\sqrt{14}i}{16} & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & \frac{\sqrt{210}i}{112} & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 \end{bmatrix}$
91	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,9)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 \\ -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & -\frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 \end{bmatrix}$
92	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & \frac{\sqrt{14}}{14} & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{14} \end{bmatrix}$
93	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{G}_2^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{28} & 0 & \frac{\sqrt{70}}{28} & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ \frac{\sqrt{70}i}{28} & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
94	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_2^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{21} & \frac{\sqrt{7}}{14} & 0 \end{bmatrix}$
95	symmetry	$\sqrt{3}xz$
	$\mathbb{G}_2^{(1,1;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{42}i}{21} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \end{bmatrix}$
96	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(1,1;a)}(A_u,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{70}}{28} & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \\ \frac{\sqrt{70}}{28} & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
97	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_3^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
98	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
99	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 \end{bmatrix}$
100	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$
101	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,5)$	$\begin{bmatrix} -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
102	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{T}_3^{(a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{8} & 0 & 0 \end{bmatrix}$
103	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
104	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_3^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 \end{bmatrix}$
105	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{16} & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & -\frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$
106	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} -\frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} \\ 0 & \frac{\sqrt{30}}{16} & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & \frac{\sqrt{3}}{8} & 0 \end{bmatrix}$
107	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
108	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & \frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & -\frac{\sqrt{5}i}{8} & 0 \end{bmatrix}$
109	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,6)$	$\begin{bmatrix} -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & \frac{\sqrt{3}i}{6} & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 \end{bmatrix}$
110	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,7)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 \\ -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 \end{bmatrix}$
111	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{6} \end{bmatrix}$
112	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}}{24} & 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & \frac{\sqrt{105}}{42} & 0 \\ -\frac{\sqrt{42}}{24} & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{42} \end{bmatrix}$
113	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 \\ \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 \end{bmatrix}$
114	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & 0 & 0 & \frac{\sqrt{2}}{16} & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{16} & -\frac{\sqrt{5}i}{8} & 0 \end{bmatrix}$
115	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} \\ 0 & \frac{\sqrt{2}}{16} & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & \frac{\sqrt{5}}{8} & 0 \end{bmatrix}$
116	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
117	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & \frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{16} & \frac{3\sqrt{21}i}{56} & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{112} & -\frac{\sqrt{35}i}{56} & 0 \end{bmatrix}$
118	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,8)$	$\begin{bmatrix} -\frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & -\frac{\sqrt{21}i}{14} & -\frac{\sqrt{210}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & \frac{\sqrt{14}}{16} & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & \frac{\sqrt{210}}{112} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 \end{bmatrix}$
119	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,9)$	$\begin{bmatrix} 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \\ \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & \frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 \end{bmatrix}$
120	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 4

No.	multipole	matrix
	$\mathbb{M}_2^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & -\frac{\sqrt{14}i}{14} & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & -\frac{\sqrt{21}}{14} \end{bmatrix}$
121	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_2^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}}{28} & 0 & -\frac{\sqrt{70}i}{28} & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \\ \frac{\sqrt{70}}{28} & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
122	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_2^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{21} & -\frac{\sqrt{7}i}{14} & 0 \end{bmatrix}$
123	symmetry	$\sqrt{3}xz$
	$\mathbb{M}_2^{(1,1;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & -\frac{\sqrt{105}i}{42} & \frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{21} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \end{bmatrix}$
124	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_2^{(1,1;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{28} & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 \\ -\frac{\sqrt{70}i}{28} & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$

bra: $= \langle p_x,\uparrow|\,,\langle p_x,\downarrow|\,,\langle p_y,\uparrow|\,,\langle p_y,\downarrow|\,,\langle p_z,\uparrow|\,,\langle p_z,\downarrow|$
ket: $= |p_x,\uparrow\rangle\,,|p_x,\downarrow\rangle\,,|p_y,\uparrow\rangle\,,|p_y,\downarrow\rangle\,,|p_z,\uparrow\rangle\,,|p_z,\downarrow\rangle$

Table 5: (p,p) block.

No.	multipole	matrix
125	symmetry	1
	$\mathbb{Q}_0^{(a)}(A_g)$	$\begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{bmatrix}$

continued ...

Table 5

No.	multipole	matrix
126	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{Q}_2^{(a)}(A_g,1)$	$\begin{bmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} \end{bmatrix}$
127	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_2^{(a)}(A_g,2)$	$\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
128	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_2^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$
129	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_2^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
130	symmetry	$\sqrt{3}xy$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
131	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$
132	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$
133	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
134	symmetry	$\sqrt{3}xz$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$
135	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
136	symmetry	1
	$\mathbb{Q}_0^{(1,1;a)}(A_g)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
137	symmetry	x
	$\mathbb{G}_1^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
138	symmetry	y

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{G}_1^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$
139	symmetry	z
	$\mathbb{G}_1^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
140	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{T}_2^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$
141	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}_2^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$
142	symmetry	$\sqrt{3}yz$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \end{bmatrix}$
143	symmetry	$\sqrt{3}xz$
	$\mathbb{T}_2^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$
144	symmetry	$\sqrt{3}xy$
	$\mathbb{T}_2^{(1,0;a)}(A_g,5)$	$\begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$
145	symmetry	x
	$\mathbb{M}_1^{(a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$
146	symmetry	y

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{M}_1^{(a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$
147	symmetry	z
	$\mathbb{M}_1^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
148	symmetry	x
	$\mathbb{M}_1^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{bmatrix}$
149	symmetry	y
	$\mathbb{M}_1^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$
150	symmetry	z

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{M}_1^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$
151	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$
152	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{5}}{5} & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{5}}{10} & 0 \\ \frac{\sqrt{5}}{5} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
153	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{5} & -\frac{\sqrt{5}}{10} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$
154	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{5} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{5} \end{bmatrix}$
155	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \end{bmatrix}$
156	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$
157	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$
158	symmetry	x

continued ...

Table 5

No.	multipole	matrix
	$\mathbb{M}_1^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}}{15} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{15} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 \end{bmatrix}$
159	symmetry	y
	$\mathbb{M}_1^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{15} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{30}i}{30} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & -\frac{\sqrt{30}i}{30} & 0 \end{bmatrix}$
160	symmetry	z
	$\mathbb{M}_1^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} -\frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{30} & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \end{bmatrix}$

bra: $= \langle p_x,\uparrow|\,,\langle p_x,\downarrow|\,,\langle p_y,\uparrow|\,,\langle p_y,\downarrow|\,,\langle p_z,\uparrow|\,,\langle p_z,\downarrow|$
ket: $= |d_v,\uparrow\rangle\,,|d_v,\downarrow\rangle\,,|d_{xy},\uparrow\rangle\,,|d_{xy},\downarrow\rangle\,,|d_{xz},\uparrow\rangle\,,|d_{xz},\downarrow\rangle\,,|d_{yz},\uparrow\rangle\,,|d_{yz},\downarrow\rangle\,,|d_u,\uparrow\rangle\,,|d_u,\downarrow\rangle$

Table 6: (p,d) block.

No.	multipole	matrix
161	symmetry	x

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_1^{(a)}(A_u,1)$	$\begin{bmatrix} \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} \\ 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
162	symmetry	y
	$\mathbb{Q}_1^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \end{bmatrix}$
163	symmetry	z
	$\mathbb{Q}_1^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \end{bmatrix}$
164	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_3^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
165	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_u,2)$	$\begin{bmatrix} \frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 \end{bmatrix}$
166	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \\ 0 & -\frac{3\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \end{bmatrix}$
167	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} \end{bmatrix}$
168	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,5)$	$\begin{bmatrix} -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \end{bmatrix}$
169	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 \\ 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \end{bmatrix}$
170	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
171	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ \frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ -\frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 \end{bmatrix}$
172	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{30}}{60} & \frac{\sqrt{10}i}{20} & 0 \\ 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 \end{bmatrix}$
173	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{20} & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{10}i}{20} \\ 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 \end{bmatrix}$
174	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{10}}{20} \\ \frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & \frac{\sqrt{10}}{20} & 0 \\ 0 & -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} \\ -\frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 \end{bmatrix}$
175	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & -\frac{\sqrt{2}}{6} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{6} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 \end{bmatrix}$
176	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{6}i}{12} & 0 \\ 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}}{6} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{2}}{6} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{6} & 0 & -\frac{\sqrt{2}}{12} & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{6} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
177	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ \frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ \frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 \end{bmatrix}$
178	symmetry	x
	$\mathbb{Q}_1^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & \frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
179	symmetry	y
	$\mathbb{Q}_1^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$
180	symmetry	z
	$\mathbb{Q}_1^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 \end{bmatrix}$
181	symmetry	$\sqrt{15}xyz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{i}{12} & 0 & -\frac{1}{6} & \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ -\frac{i}{12} & 0 & \frac{1}{6} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & -\frac{1}{12} & 0 & \frac{i}{6} & 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{\sqrt{3}}{12} \\ \frac{1}{12} & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & \frac{i}{6} & -\frac{\sqrt{3}}{12} & 0 \\ \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 \\ 0 & -\frac{i}{6} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 & 0 \end{bmatrix}$
182	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 \\ -\frac{7\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & \frac{\sqrt{5}i}{40} & 0 \\ 0 & \frac{7\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & -\frac{\sqrt{5}i}{40} \\ 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & -\frac{3\sqrt{5}}{40} \\ -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} & \frac{3\sqrt{5}}{40} & 0 \end{bmatrix}$
183	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} -\frac{7\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 \\ 0 & \frac{7\sqrt{15}i}{120} & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{40} \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{40} \\ \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & \frac{3\sqrt{5}i}{40} & 0 \end{bmatrix}$
184	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ -\frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & \frac{\sqrt{15}i}{60} & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ \frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 \end{bmatrix}$
185	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{6} & -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 \\ \frac{5i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{12} & \frac{\sqrt{3}i}{24} & 0 \\ 0 & -\frac{5i}{24} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{12} & 0 & 0 & -\frac{\sqrt{3}i}{24} \\ 0 & \frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & \frac{i}{12} & 0 & 0 & -\frac{\sqrt{3}}{8} \\ -\frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{i}{12} & \frac{\sqrt{3}}{8} & 0 \end{bmatrix}$
186	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,6)$	$\begin{bmatrix} -\frac{5i}{24} & 0 & 0 & 0 & 0 & \frac{i}{12} & 0 & -\frac{1}{6} & \frac{\sqrt{3}i}{24} & 0 \\ 0 & \frac{5i}{24} & 0 & 0 & \frac{i}{12} & 0 & \frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}i}{24} \\ 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{6} & \frac{1}{6} & 0 & \frac{i}{6} & 0 & 0 & 0 \\ 0 & -\frac{i}{24} & 0 & -\frac{1}{6} & \frac{i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} \\ -\frac{i}{24} & 0 & \frac{1}{6} & 0 & 0 & -\frac{i}{12} & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$
187	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,7)$	$\begin{bmatrix} 0 & -\frac{1}{6} & 0 & \frac{i}{12} & 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{\sqrt{3}}{12} \\ \frac{1}{6} & 0 & \frac{i}{12} & 0 & 0 & 0 & 0 & \frac{i}{6} & -\frac{\sqrt{3}}{12} & 0 \\ 0 & \frac{i}{6} & 0 & \frac{1}{12} & -\frac{i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ \frac{i}{6} & 0 & -\frac{1}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{1}{6} & 0 & \frac{i}{6} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{6} & -\frac{1}{6} & 0 & \frac{i}{6} & 0 & 0 & 0 \end{bmatrix}$
188	symmetry	x
	$\mathbb{Q}_1^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{20} & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \end{bmatrix}$
189	symmetry	y

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{Q}_1^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{10} & \frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
190	symmetry	z
	$\mathbb{Q}_1^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 \end{bmatrix}$
191	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_2^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
192	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_2^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
193	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_2^{(a)}(A_u,3)$	$\begin{bmatrix} -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
194	symmetry	$\sqrt{3}xz$
	$\mathbb{G}_2^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 \end{bmatrix}$
195	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
196	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} \\ -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{15}}{60} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & -\frac{\sqrt{15}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & \frac{\sqrt{15}i}{15} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{15} \end{bmatrix}$
197	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_2^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \end{bmatrix}$
198	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
199	symmetry	$\sqrt{3}xz$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$
200	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 \end{bmatrix}$
201	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{30} & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{5}}{20} \\ \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & \frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & -\frac{\sqrt{15}}{30} & \frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{5}i}{10} \end{bmatrix}$
202	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{21} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} \\ -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{7}}{28} \\ -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{7}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & \frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{14} \end{bmatrix}$
203	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 \\ 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{21}}{28} \\ -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{21}}{28} & 0 \\ -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \end{bmatrix}$
204	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & -\frac{\sqrt{3}i}{8} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & -\frac{\sqrt{3}}{8} \\ \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & \frac{\sqrt{3}}{8} & 0 \end{bmatrix}$
205	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{8} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$
206	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
207	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{28} & -\frac{\sqrt{21}i}{56} & 0 \\ 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{21}i}{56} \\ 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{56} \\ -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{21}}{56} & 0 \end{bmatrix}$
208	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,8)$	$\begin{bmatrix} -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{21}i}{56} & 0 \\ 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{21}i}{56} \\ 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{56} \\ -\frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{21}i}{56} & 0 \end{bmatrix}$
209	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_u,9)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{21}}{28} \\ 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} \\ 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \end{bmatrix}$
210	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_2^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & -\frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ \frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 \end{bmatrix}$
211	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_2^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{i}{12} & 0 & -\frac{1}{12} & -\frac{i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ \frac{i}{12} & 0 & \frac{1}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & \frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ -\frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 & 0 & 0 & -\frac{i}{6} & \frac{\sqrt{3}}{12} & 0 \\ \frac{i}{3} & 0 & 0 & 0 & 0 & -\frac{i}{12} & 0 & \frac{1}{12} & 0 & 0 \\ 0 & -\frac{i}{3} & 0 & 0 & -\frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & 0 \end{bmatrix}$
212	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_2^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{i}{12} & 0 & 0 & -\frac{1}{12} & 0 & \frac{i}{3} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{12} & \frac{1}{12} & 0 & \frac{i}{3} & 0 & 0 & 0 \\ \frac{i}{12} & 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{12} & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & -\frac{i}{12} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{12} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & \frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & \frac{i}{12} & 0 & 0 & 0 \\ -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{i}{12} & 0 & 0 \end{bmatrix}$
213	symmetry	$\sqrt{3}xz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_2^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} -\frac{i}{12} & 0 & 0 & 0 & 0 & \frac{i}{12} & 0 & -\frac{1}{6} & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & \frac{i}{12} & 0 & 0 & \frac{i}{12} & 0 & \frac{1}{6} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & -\frac{i}{12} & 0 & 0 & \frac{1}{3} & 0 & -\frac{i}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{12} & -\frac{1}{3} & 0 & -\frac{i}{12} & 0 & 0 & 0 \\ 0 & -\frac{i}{6} & 0 & -\frac{1}{6} & \frac{i}{12} & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 & -\frac{i}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
214	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{\sqrt{3}}{12} \\ -\frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 & 0 & 0 & \frac{i}{6} & -\frac{\sqrt{3}}{12} & 0 \\ 0 & -\frac{i}{12} & 0 & \frac{1}{12} & -\frac{i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ -\frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & \frac{i}{3} & 0 & 0 & -\frac{1}{12} & 0 & -\frac{i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{3} & \frac{1}{12} & 0 & -\frac{i}{12} & 0 & 0 & 0 \end{bmatrix}$
215	symmetry	1
	$\mathbb{G}_0^{(1,1;a)}(A_u)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} \\ \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{60} \\ \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & \frac{\sqrt{30}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & \frac{\sqrt{30}i}{30} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{30} \end{bmatrix}$
216	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{210} & 0 & -\frac{\sqrt{105}}{210} & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} \\ -\frac{\sqrt{105}i}{210} & 0 & \frac{\sqrt{105}}{210} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 \\ 0 & \frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{210} & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & \frac{\sqrt{35}}{35} \\ -\frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & -\frac{\sqrt{35}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{105}i}{105} & 0 & \frac{2\sqrt{105}}{105} & \frac{3\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{105}i}{105} & 0 & -\frac{2\sqrt{105}}{105} & 0 & 0 & -\frac{3\sqrt{35}i}{70} \end{bmatrix}$
217	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{G}_2^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{4\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{30} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{210} \\ \frac{4\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{30} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 \\ 0 & \frac{4\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{30} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{105}}{210} \\ -\frac{4\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & -\frac{\sqrt{105}}{210} & 0 \\ \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{105} & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & 0 \end{bmatrix}$
218	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_2^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{105} & \frac{\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 \\ \frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{4\sqrt{35}}{105} & \frac{2\sqrt{105}i}{105} & 0 \\ 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & -\frac{2\sqrt{105}i}{105} \\ 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & -\frac{\sqrt{105}}{70} \\ \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}i}{105} & \frac{\sqrt{105}}{70} & 0 \end{bmatrix}$
219	symmetry	$\sqrt{3}xz$
	$\mathbb{G}_2^{(1,1;a)}(A_u,4)$	$\begin{bmatrix} -\frac{\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & \frac{4\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{42} & \frac{2\sqrt{105}i}{105} & 0 \\ 0 & \frac{\sqrt{35}i}{105} & 0 & 0 & \frac{4\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{2\sqrt{105}i}{105} \\ 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{105} & -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & \frac{4\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} \\ \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{4\sqrt{35}i}{105} & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 \end{bmatrix}$
220	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(1,1;a)}(A_u,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{35}}{30} & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{105}}{210} \\ \frac{\sqrt{35}}{30} & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{105}}{210} & 0 \\ 0 & \frac{\sqrt{35}i}{30} & 0 & \frac{4\sqrt{35}}{105} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{210} \\ \frac{\sqrt{35}i}{30} & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 \\ 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 & 0 \end{bmatrix}$
221	symmetry	x

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_1^{(a)}(A_u,1)$	$\begin{bmatrix} \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
222	symmetry	y
	$\mathbb{T}_1^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \end{bmatrix}$
223	symmetry	z
	$\mathbb{T}_1^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} \end{bmatrix}$
224	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_3^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
225	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(a)}(A_u,2)$	$\begin{bmatrix} \frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & \frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \end{bmatrix}$
226	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \end{bmatrix}$
227	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} \end{bmatrix}$
228	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,5)$	$\begin{bmatrix} -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \end{bmatrix}$
229	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \end{bmatrix}$
230	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
231	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_3^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{6}i}{12} & 0 \\ \frac{\sqrt{2}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 \end{bmatrix}$
232	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{T}_3^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{60} & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{60} & -\frac{\sqrt{10}}{20} & 0 \\ 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{10}}{20} \\ 0 & \frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \end{bmatrix}$
233	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{20} & \frac{\sqrt{10}}{20} & 0 \\ 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{10}}{20} \\ 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{30} & 0 & -\frac{\sqrt{30}i}{20} & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 \end{bmatrix}$
234	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}_3^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{10}i}{20} \\ \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & \frac{\sqrt{10}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{60} & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} \\ \frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{60} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 \end{bmatrix}$
235	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{T}_3^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{12} & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{6}}{12} & 0 \\ 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & -\frac{\sqrt{2}i}{6} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{6} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 \end{bmatrix}$
236	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{T}_3^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{6}}{12} & 0 \\ 0 & \frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{12} & -\frac{\sqrt{2}i}{6} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{6} & 0 & -\frac{\sqrt{2}i}{12} & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{6} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
237	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ \frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{6}i}{12} & 0 \\ 0 & -\frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{6} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{6} & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 \end{bmatrix}$
238	symmetry	x
	$\mathbb{T}_1^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{20} & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & \frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & \frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$
239	symmetry	y
	$\mathbb{T}_1^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
240	symmetry	z
	$\mathbb{T}_1^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \end{bmatrix}$
241	symmetry	$\sqrt{15}xyz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{1}{12} & 0 & \frac{i}{6} & \frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ -\frac{1}{12} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & \frac{i}{12} & 0 & \frac{1}{6} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ -\frac{i}{12} & 0 & \frac{1}{6} & 0 & 0 & 0 & 0 & \frac{1}{6} & \frac{\sqrt{3}i}{12} & 0 \\ \frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 \\ 0 & -\frac{1}{6} & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{6} & 0 & 0 & 0 \end{bmatrix}$
242	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 \\ -\frac{7\sqrt{15}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & \frac{\sqrt{5}}{40} & 0 \\ 0 & \frac{7\sqrt{15}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & -\frac{\sqrt{5}}{40} \\ 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & \frac{3\sqrt{5}i}{40} \\ \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & -\frac{3\sqrt{5}i}{40} & 0 \end{bmatrix}$
243	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} -\frac{7\sqrt{15}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 \\ 0 & \frac{7\sqrt{15}}{120} & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{40} \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} \\ \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 \end{bmatrix}$
244	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ \frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & \frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ \frac{\sqrt{15}}{60} & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 \end{bmatrix}$
245	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_3^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & \frac{1}{6} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{6} & \frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 & 0 \\ \frac{5}{24} & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{12} & \frac{\sqrt{3}}{24} & 0 \\ 0 & -\frac{5}{24} & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{12} & 0 & 0 & -\frac{\sqrt{3}}{24} \\ 0 & -\frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{1}{12} & 0 & 0 & \frac{\sqrt{3}i}{8} \\ \frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{1}{12} & -\frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$
246	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,6)$	$\begin{bmatrix} -\frac{5}{24} & 0 & 0 & 0 & 0 & \frac{1}{12} & 0 & \frac{i}{6} & \frac{\sqrt{3}}{24} & 0 \\ 0 & \frac{5}{24} & 0 & 0 & \frac{1}{12} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{3}}{24} \\ 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{6} & -\frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 & 0 \\ 0 & -\frac{1}{24} & 0 & \frac{i}{6} & \frac{1}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} \\ -\frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{1}{12} & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 \end{bmatrix}$
247	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,7)$	$\begin{bmatrix} 0 & \frac{i}{6} & 0 & \frac{1}{12} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ -\frac{i}{6} & 0 & \frac{1}{12} & 0 & 0 & 0 & 0 & \frac{1}{6} & \frac{\sqrt{3}i}{12} & 0 \\ 0 & \frac{1}{6} & 0 & -\frac{i}{12} & -\frac{1}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ \frac{1}{6} & 0 & \frac{i}{12} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{6} & \frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 & 0 \end{bmatrix}$
248	symmetry	x
	$\mathbb{T}_1^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{20} & \frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \end{bmatrix}$
249	symmetry	y

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{T}_1^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{15}}{20} \\ 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
250	symmetry	z
	$\mathbb{T}_1^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 \end{bmatrix}$
251	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_2^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
252	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_2^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
253	symmetry	$\sqrt{3}yz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_2^{(a)}(A_u,3)$	$\begin{bmatrix} \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
254	symmetry	$\sqrt{3}xz$
	$\mathbb{M}_2^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 \end{bmatrix}$
255	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_2^{(a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
256	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_2^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}}{60} & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{60} \\ \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{15}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{15}}{15} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{15} \end{bmatrix}$
257	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_2^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \end{bmatrix}$
258	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_2^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{5}}{20} & 0 \\ 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & \frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$
259	symmetry	$\sqrt{3}xz$
	$\mathbb{M}_2^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \end{bmatrix}$
260	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_2^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \end{bmatrix}$
261	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{30} & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & \frac{\sqrt{15}i}{30} & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{5}}{10} \end{bmatrix}$
262	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{21} & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{7}i}{28} \\ \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{7}}{14} \end{bmatrix}$
263	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{28} & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \end{bmatrix}$
264	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & -\frac{\sqrt{3}}{8} & 0 \\ 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & \frac{\sqrt{3}}{8} \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & -\frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$
265	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & \frac{\sqrt{3}}{8} & 0 \\ 0 & \frac{1}{8} & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{8} & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & \frac{\sqrt{3}}{8} & 0 \end{bmatrix}$
266	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
267	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{28} & -\frac{\sqrt{21}}{56} & 0 \\ 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{21}}{56} \\ 0 & -\frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{21}i}{56} \\ \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & -\frac{\sqrt{21}i}{56} & 0 \end{bmatrix}$
268	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,8)$	$\begin{bmatrix} -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{21}}{56} & 0 \\ 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{21}}{56} \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{56} \\ -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{21}}{56} & 0 \end{bmatrix}$
269	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_u,9)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} \\ 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \end{bmatrix}$
270	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_2^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 \end{bmatrix}$
271	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_2^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & -\frac{1}{12} & 0 & -\frac{i}{12} & \frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ -\frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & \frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ -\frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & 0 & 0 & \frac{1}{6} & \frac{\sqrt{3}i}{12} & 0 \\ -\frac{1}{3} & 0 & 0 & 0 & 0 & \frac{1}{12} & 0 & \frac{i}{12} & 0 & 0 \\ 0 & \frac{1}{3} & 0 & 0 & \frac{1}{12} & 0 & -\frac{i}{12} & 0 & 0 & 0 \end{bmatrix}$
272	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_2^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & \frac{1}{12} & 0 & 0 & -\frac{i}{12} & 0 & -\frac{1}{3} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{12} & \frac{i}{12} & 0 & -\frac{1}{3} & 0 & 0 & 0 \\ -\frac{1}{12} & 0 & 0 & 0 & 0 & \frac{1}{6} & 0 & \frac{i}{12} & \frac{\sqrt{3}}{12} & 0 \\ 0 & \frac{1}{12} & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{12} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & \frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 & -\frac{1}{12} & 0 & 0 & 0 \\ -\frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 & 0 & 0 & \frac{1}{12} & 0 & 0 \end{bmatrix}$
273	symmetry	$\sqrt{3}xz$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_2^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} \frac{1}{12} & 0 & 0 & 0 & 0 & -\frac{1}{12} & 0 & -\frac{i}{6} & \frac{\sqrt{3}}{12} & 0 \\ 0 & -\frac{1}{12} & 0 & 0 & -\frac{1}{12} & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & 0 & \frac{1}{12} & 0 & 0 & \frac{i}{3} & 0 & \frac{1}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{12} & -\frac{i}{3} & 0 & \frac{1}{12} & 0 & 0 & 0 \\ 0 & \frac{1}{6} & 0 & -\frac{i}{6} & -\frac{1}{12} & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{6} & 0 & \frac{i}{6} & 0 & 0 & \frac{1}{12} & 0 & 0 & 0 & 0 \end{bmatrix}$
274	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_2^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ -\frac{i}{12} & 0 & -\frac{1}{12} & 0 & 0 & 0 & 0 & -\frac{1}{6} & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & \frac{1}{12} & 0 & \frac{i}{12} & \frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ \frac{1}{12} & 0 & -\frac{i}{12} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & -\frac{1}{3} & 0 & 0 & -\frac{i}{12} & 0 & \frac{1}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{3} & \frac{i}{12} & 0 & \frac{1}{12} & 0 & 0 & 0 \end{bmatrix}$
275	symmetry	1
	$\mathbb{M}_0^{(1,1;a)}(A_u)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} \\ \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{30}i}{60} \\ -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & -\frac{\sqrt{30}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & \frac{\sqrt{30}}{30} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} \end{bmatrix}$
276	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_2^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{210} & 0 & \frac{\sqrt{105}i}{210} & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} \\ -\frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{210} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 \\ 0 & -\frac{\sqrt{105}i}{210} & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{35}i}{35} \\ \frac{\sqrt{105}i}{210} & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & \frac{\sqrt{35}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{105}}{105} & 0 & -\frac{2\sqrt{105}i}{105} & \frac{3\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{105}}{105} & 0 & \frac{2\sqrt{105}i}{105} & 0 & 0 & -\frac{3\sqrt{35}}{70} \end{bmatrix}$
277	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 6

No.	multipole	matrix
	$\mathbb{M}_2^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{4\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{30} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} \\ \frac{4\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{30} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 \\ 0 & -\frac{4\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{30} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{105}i}{210} \\ \frac{4\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{105}i}{210} & 0 \\ \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{105} & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{105} & 0 & 0 & 0 \end{bmatrix}$
278	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_2^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{105} & -\frac{\sqrt{35}i}{105} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 \\ \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{4\sqrt{35}i}{105} & \frac{2\sqrt{105}}{105} & 0 \\ 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & -\frac{2\sqrt{105}}{105} \\ 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{105}i}{70} \\ -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}}{105} & -\frac{\sqrt{105}i}{70} & 0 \end{bmatrix}$
279	symmetry	$\sqrt{3}xz$
	$\mathbb{M}_2^{(1,1;a)}(A_u,4)$	$\begin{bmatrix} -\frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & \frac{4\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{42} & \frac{2\sqrt{105}}{105} & 0 \\ 0 & \frac{\sqrt{35}}{105} & 0 & 0 & \frac{4\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{2\sqrt{105}}{105} \\ 0 & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{105} & \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & \frac{4\sqrt{35}}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} \\ \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 \end{bmatrix}$
280	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_2^{(1,1;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{35}i}{30} & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{105}i}{210} \\ -\frac{\sqrt{35}i}{30} & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{105}i}{210} & 0 \\ 0 & \frac{\sqrt{35}}{30} & 0 & -\frac{4\sqrt{35}i}{105} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} \\ \frac{\sqrt{35}}{30} & 0 & \frac{4\sqrt{35}i}{105} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 \\ 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & 0 \end{bmatrix}$

bra: $= \langle p_x,\uparrow|\,,\langle p_x,\downarrow|\,,\langle p_y,\uparrow|\,,\langle p_y,\downarrow|\,,\langle p_z,\uparrow|\,,\langle p_z,\downarrow|$

ket: $= |f_2,\uparrow\rangle\,,|f_2,\downarrow\rangle\,,|f_1,\uparrow\rangle\,,|f_1,\downarrow\rangle\,,|f_{bz},\uparrow\rangle\,,|f_{bz},\downarrow\rangle\,,|f_3,\uparrow\rangle\,,|f_3,\downarrow\rangle\,,|f_{3x},\uparrow\rangle\,,|f_{3x},\downarrow\rangle\,,|f_{3y},\uparrow\rangle\,,|f_{3y},\downarrow\rangle\,,|f_{az},\uparrow\rangle\,,|f_{az},\downarrow\rangle$

Table 7: (p,f) block.

No.	multipole	matrix
281	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{Q}_2^{(a)}(A_g,1)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&\frac{\sqrt{14}}{14}&0&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&\frac{\sqrt{14}}{14}&0&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{14}}{14}&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{14}}{14}&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{21}}{14}&0\\ 0&0&0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{21}}{14} \end{bmatrix}$
282	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_2^{(a)}(A_g,2)$	$\begin{bmatrix} \frac{\sqrt{70}}{28}&0&0&0&0&0&0&0&-\frac{\sqrt{42}}{84}&0&0&0&0&0\\ 0&\frac{\sqrt{70}}{28}&0&0&0&0&0&0&0&-\frac{\sqrt{42}}{84}&0&0&0&0\\ 0&0&\frac{\sqrt{70}}{28}&0&0&0&0&0&0&0&\frac{\sqrt{42}}{84}&0&0&0\\ 0&0&0&\frac{\sqrt{70}}{28}&0&0&0&0&0&0&0&\frac{\sqrt{42}}{84}&0&0\\ 0&0&0&0&\frac{\sqrt{105}}{42}&0&0&0&0&0&0&0&0&0\\ 0&0&0&0&0&\frac{\sqrt{105}}{42}&0&0&0&0&0&0&0&0 \end{bmatrix}$
283	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_2^{(a)}(A_g,3)$	$\begin{bmatrix} 0&0&0&0&0&0&\frac{\sqrt{105}}{42}&0&0&0&0&0&0&0\\ 0&0&0&0&0&0&0&\frac{\sqrt{105}}{42}&0&0&0&0&0&0\\ 0&0&0&0&-\frac{\sqrt{105}}{42}&0&0&0&0&0&0&0&-\frac{\sqrt{7}}{14}&0\\ 0&0&0&0&0&-\frac{\sqrt{105}}{42}&0&0&0&0&0&0&0&-\frac{\sqrt{7}}{14}\\ 0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{42}}{21}&0&0&0\\ 0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{42}}{21}&0&0 \end{bmatrix}$
284	symmetry	$\sqrt{3}xz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_g,4)$	$\begin{bmatrix} 0&0&0&0&\frac{\sqrt{105}}{42}&0&0&0&0&0&0&0&-\frac{\sqrt{7}}{14}&0 \\ 0&0&0&0&0&\frac{\sqrt{105}}{42}&0&0&0&0&0&0&0&-\frac{\sqrt{7}}{14} \\ 0&0&0&0&0&0&\frac{\sqrt{105}}{42}&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&\frac{\sqrt{105}}{42}&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&\frac{\sqrt{42}}{21}&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&\frac{\sqrt{42}}{21}&0&0&0&0 \end{bmatrix}$
285	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_2^{(a)}(A_g,5)$	$\begin{bmatrix} 0&0&\frac{\sqrt{70}}{28}&0&0&0&0&0&0&0&-\frac{\sqrt{42}}{84}&0&0&0 \\ 0&0&0&\frac{\sqrt{70}}{28}&0&0&0&0&0&0&0&-\frac{\sqrt{42}}{84}&0&0 \\ -\frac{\sqrt{70}}{28}&0&0&0&0&0&0&0&-\frac{\sqrt{42}}{84}&0&0&0&0&0 \\ 0&-\frac{\sqrt{70}}{28}&0&0&0&0&0&0&0&-\frac{\sqrt{42}}{84}&0&0&0&0 \\ 0&0&0&0&0&0&\frac{\sqrt{105}}{42}&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&\frac{\sqrt{105}}{42}&0&0&0&0&0&0 \end{bmatrix}$
286	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{Q}_4^{(a)}(A_g,1)$	$\begin{bmatrix} \frac{\sqrt{30}}{24}&0&0&0&0&0&0&0&-\frac{\sqrt{2}}{8}&0&0&0&0&0 \\ 0&\frac{\sqrt{30}}{24}&0&0&0&0&0&0&0&-\frac{\sqrt{2}}{8}&0&0&0&0 \\ 0&0&-\frac{\sqrt{30}}{24}&0&0&0&0&0&0&0&-\frac{\sqrt{2}}{8}&0&0&0 \\ 0&0&0&-\frac{\sqrt{30}}{24}&0&0&0&0&0&0&0&-\frac{\sqrt{2}}{8}&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{3}}{6}&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{3}}{6} \end{bmatrix}$
287	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{Q}_4^{(a)}(A_g,2)$	$\begin{bmatrix} -\frac{\sqrt{42}}{24}&0&0&0&0&0&0&0&-\frac{\sqrt{70}}{56}&0&0&0&0&0 \\ 0&-\frac{\sqrt{42}}{24}&0&0&0&0&0&0&0&-\frac{\sqrt{70}}{56}&0&0&0&0 \\ 0&0&\frac{\sqrt{42}}{24}&0&0&0&0&0&0&0&-\frac{\sqrt{70}}{56}&0&0&0 \\ 0&0&0&\frac{\sqrt{42}}{24}&0&0&0&0&0&0&0&-\frac{\sqrt{70}}{56}&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{105}}{42}&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{105}}{42} \end{bmatrix}$
288	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,3)$	$\begin{bmatrix} \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
289	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{Q}_4^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 \end{bmatrix}$
290	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{Q}_4^{(a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
291	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{Q}_4^{(a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
292	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 \end{bmatrix}$
293	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{Q}_4^{(a)}(A_g,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
294	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{Q}_4^{(a)}(A_g,9)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 \\ \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
295	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{1}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{1}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & \frac{i}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & \frac{i}{8} & 0 \\ 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 \\ -\frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 \end{bmatrix}$
296	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & \frac{\sqrt{35}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{28} & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 \\ 0 & -\frac{\sqrt{14}}{16} & 0 & -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 \\ \frac{\sqrt{14}}{16} & 0 & -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 & 0 \end{bmatrix}$
297	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{56} & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{28} & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} \\ 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 \\ 0 & -\frac{\sqrt{42}}{112} & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 \\ \frac{\sqrt{42}}{112} & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 \end{bmatrix}$
298	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}}{32} & -\frac{3i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & -\frac{\sqrt{15}i}{16} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & \frac{3i}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}i}{16} \\ 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 \end{bmatrix}$
299	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & \frac{3i}{16} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{32} & 0 & 0 & -\frac{\sqrt{15}i}{16} & 0 \\ -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & -\frac{3i}{16} & 0 & 0 & \frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{16} \\ 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 \end{bmatrix}$
300	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{8} & 0 & \frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{8} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
301	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{3\sqrt{42}}{224} & \frac{\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{224} & -\frac{\sqrt{105}i}{112} & 0 \\ \frac{\sqrt{42}i}{56} & 0 & \frac{3\sqrt{42}}{224} & 0 & 0 & -\frac{\sqrt{7}i}{112} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}i}{112} \\ 0 & \frac{3\sqrt{42}}{224} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{5\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 \\ -\frac{3\sqrt{42}}{224} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & \frac{5\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & \frac{\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{32} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{70}i}{224} & 0 & 0 & 0 & 0 \end{bmatrix}$
302	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,8)$	$\begin{bmatrix} 0 & \frac{\sqrt{42}}{56} & 0 & \frac{3\sqrt{42}i}{224} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 \\ -\frac{\sqrt{42}}{56} & 0 & \frac{3\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & -\frac{\sqrt{70}}{56} & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{42}i}{224} & 0 & \frac{\sqrt{42}}{56} & \frac{\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{224} & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{112} & 0 \\ -\frac{3\sqrt{42}i}{224} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{112} & 0 & 0 & \frac{\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{112} \\ 0 & 0 & -\frac{\sqrt{42}i}{32} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{70}i}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{32} & \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{224} & 0 & 0 \end{bmatrix}$
303	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,9)$	$\begin{bmatrix} \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & \frac{\sqrt{105}}{56} & 0 \\ 0 & \frac{\sqrt{42}i}{112} & 0 & \frac{\sqrt{42}}{112} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 \\ \frac{\sqrt{42}i}{112} & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
304	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 \end{bmatrix}$
305	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_2^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{42} & \frac{\sqrt{42}}{84} & 0 \\ \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & \frac{\sqrt{7}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} \\ 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & \frac{\sqrt{7}}{21} & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{42} & -\frac{\sqrt{7}}{21} & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 & 0 \end{bmatrix}$
306	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_2^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & \frac{\sqrt{7}}{84} & -\frac{\sqrt{42}i}{84} & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & -\frac{\sqrt{7}}{84} & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{7}}{84} & 0 & -\frac{\sqrt{7}i}{12} & 0 & 0 \\ -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & -\frac{\sqrt{7}}{84} & 0 & -\frac{\sqrt{7}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & \frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 \end{bmatrix}$
307	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_2^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{7}}{12} & 0 & -\frac{\sqrt{7}i}{84} & 0 & 0 \\ \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & -\frac{\sqrt{7}}{12} & 0 & -\frac{\sqrt{7}i}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{84} & 0 & \frac{5\sqrt{7}}{84} & \frac{\sqrt{42}i}{84} & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{7}i}{84} & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{84} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 & \frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{21} & -\frac{\sqrt{42}}{28} & 0 \end{bmatrix}$
308	symmetry	$\sqrt{3}xy$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,0;a)}(A_g,5)$	$\begin{bmatrix} \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & -\frac{\sqrt{7}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & \frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{42} & \frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & \frac{\sqrt{7}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & 0 \end{bmatrix}$
309	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{Q}_4^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \\ 0 & \frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 \\ -\frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 \end{bmatrix}$
310	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{Q}_4^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}i}{60} & 0 & 0 & -\frac{\sqrt{35}}{280} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{168} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{60} & \frac{\sqrt{35}}{280} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 \\ \frac{\sqrt{210}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{280} & 0 & \frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}i}{168} \\ 0 & -\frac{\sqrt{210}i}{60} & 0 & 0 & -\frac{\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 \\ 0 & -\frac{\sqrt{210}}{240} & 0 & -\frac{\sqrt{210}i}{240} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 & \frac{5\sqrt{14}i}{112} & 0 & 0 \\ \frac{\sqrt{210}}{240} & 0 & -\frac{\sqrt{210}i}{240} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{112} & 0 & \frac{5\sqrt{14}i}{112} & 0 & 0 & 0 \end{bmatrix}$
311	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{Q}_4^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{280} & -\frac{\sqrt{105}}{56} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & \frac{3\sqrt{7}}{56} & 0 \\ \frac{\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & -\frac{\sqrt{105}}{140} & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} \\ 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 \\ 0 & \frac{\sqrt{70}}{80} & 0 & -\frac{\sqrt{70}i}{80} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & -\frac{3\sqrt{42}i}{112} & 0 & 0 \\ -\frac{\sqrt{70}}{80} & 0 & -\frac{\sqrt{70}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & \frac{3\sqrt{42}}{112} & 0 & -\frac{3\sqrt{42}i}{112} & 0 & 0 & 0 \end{bmatrix}$
312	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
313	$\mathbb{Q}_4^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}}{160} & -\frac{\sqrt{15}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{32} & -\frac{i}{16} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{160} & 0 & 0 & \frac{\sqrt{15}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & \frac{i}{16} \\ 0 & \frac{3\sqrt{10}}{160} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 \\ -\frac{3\sqrt{10}}{160} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & -\frac{\sqrt{6}}{32} & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 \\ -\frac{3\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{40} & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & \frac{3\sqrt{10}i}{160} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & \frac{i}{4} & 0 \end{bmatrix}$
314	$\mathbb{Q}_4^{(1,0;a)}(A_g,5)$	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{10}}{40} & 0 & -\frac{3\sqrt{10}i}{160} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & -\frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 \\ -\frac{\sqrt{10}}{40} & 0 & -\frac{3\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & \frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{160} & 0 & 0 & \frac{\sqrt{15}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{i}{16} & 0 \\ -\frac{\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{80} & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{i}{16} \\ 0 & 0 & \frac{3\sqrt{10}i}{160} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & \frac{1}{4} \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{160} & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & -\frac{1}{4} & 0 \end{bmatrix}$
315	$\mathbb{Q}_4^{(1,0;a)}(A_g,6)$	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\begin{bmatrix} \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
316	$\mathbb{Q}_4^{(1,0;a)}(A_g,7)$	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$ $\begin{bmatrix} 0 & -\frac{3\sqrt{70}i}{280} & 0 & -\frac{19\sqrt{70}}{1120} & \frac{11\sqrt{105}i}{560} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{5\sqrt{42}}{224} & -\frac{\sqrt{7}i}{112} & 0 \\ -\frac{3\sqrt{70}i}{280} & 0 & \frac{19\sqrt{70}}{1120} & 0 & 0 & -\frac{11\sqrt{105}i}{560} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{5\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}i}{112} \\ 0 & -\frac{9\sqrt{70}}{1120} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & \frac{5\sqrt{42}}{224} & 0 & 0 & 0 & 0 \\ \frac{9\sqrt{70}}{1120} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & -\frac{5\sqrt{42}}{224} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{70}i}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{56} & -\frac{\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & -\frac{3\sqrt{70}i}{160} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 \end{bmatrix}$
317	$\mathbb{Q}_4^{(1,0;a)}(A_g,8)$	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,0;a)}(A_g,8)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}}{70} & 0 & -\frac{9\sqrt{70}i}{1120} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & 0 \\ -\frac{\sqrt{70}}{70} & 0 & -\frac{9\sqrt{70}i}{1120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & 0 & 0 \\ 0 & -\frac{19\sqrt{70}i}{1120} & 0 & -\frac{3\sqrt{70}}{280} & \frac{11\sqrt{105}i}{560} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & \frac{\sqrt{42}}{56} & \frac{\sqrt{7}i}{112} & 0 \\ -\frac{19\sqrt{70}i}{1120} & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & -\frac{11\sqrt{105}i}{560} & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{112} \\ 0 & 0 & \frac{3\sqrt{70}i}{160} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{42}i}{224} & 0 & 0 & -\frac{\sqrt{7}}{28} \\ 0 & 0 & 0 & -\frac{3\sqrt{70}i}{160} & \frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{224} & \frac{\sqrt{7}}{28} & 0 \end{bmatrix}$
317	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{Q}_4^{(1,0;a)}(A_g,9)$	$\begin{bmatrix} -\frac{\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} \\ 0 & \frac{\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{280} & \frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & -\frac{3\sqrt{7}}{56} & 0 \\ 0 & -\frac{\sqrt{70}i}{80} & 0 & -\frac{\sqrt{70}}{80} & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{112} & 0 & \frac{3\sqrt{42}}{112} & 0 & 0 \\ -\frac{\sqrt{70}i}{80} & 0 & \frac{\sqrt{70}}{80} & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{3\sqrt{42}i}{112} & 0 & -\frac{3\sqrt{42}}{112} & 0 & 0 & 0 \end{bmatrix}$
318	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{Q}_2^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
319	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_2^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & -\frac{\sqrt{21}}{84} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{84} & -\frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 \\ 0 & -\frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 \\ \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 & 0 \end{bmatrix}$
320	symmetry	$\sqrt{3}yz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & \frac{11\sqrt{14}}{168} & \frac{\sqrt{21}i}{21} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & -\frac{11\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 \\ \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 \end{bmatrix}$
321	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_2^{(1,1;a)}(A_g,4)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & -\frac{5\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{14}i}{168} & 0 & -\frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{21} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{11\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & 0 \end{bmatrix}$
322	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_2^{(1,1;a)}(A_g,5)$	$\begin{bmatrix} \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{42} & \frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & -\frac{\sqrt{21}}{84} & 0 \\ 0 & -\frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{168} & 0 & 0 \\ -\frac{\sqrt{210}i}{56} & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 \end{bmatrix}$
323	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_3^{(a)}(A_g,1)$	$\begin{bmatrix} -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
324	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} \\ 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 \end{bmatrix}$
325	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{G}_3^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
326	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{G}_3^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
327	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{G}_3^{(a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 \end{bmatrix}$
328	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 \end{bmatrix}$
329	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_3^{(a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 \\ -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
330	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_3^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & \frac{\sqrt{21}}{42} & 0 \\ -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 \end{bmatrix}$
331	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{420} & \frac{\sqrt{35}i}{70} & 0 \\ \frac{3\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{3\sqrt{210}i}{280} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ 0 & \frac{\sqrt{14}}{28} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 \\ -\frac{\sqrt{14}}{28} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & -\frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{42} & -\frac{\sqrt{210}i}{105} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 \end{bmatrix}$
332	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 \\ \frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{3\sqrt{14}}{56} & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{420} & 0 & -\frac{3\sqrt{210}}{280} & \frac{\sqrt{35}i}{70} & 0 \\ \frac{\sqrt{14}i}{28} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{420} & 0 & \frac{3\sqrt{210}}{280} & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{3\sqrt{35}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{105} & \frac{3\sqrt{35}}{140} & 0 \end{bmatrix}$
333	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{70} & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & \frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{70} & -\frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & -\frac{\sqrt{210}}{105} & \frac{3\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & -\frac{3\sqrt{35}i}{70} \end{bmatrix}$
334	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{84} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{84} & \frac{\sqrt{21}i}{42} & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{24} & 0 & 0 \\ \frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 \end{bmatrix}$
335	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{G}_3^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 \\ \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{168} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & \frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{42} & 0 \\ \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & \frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{21} & -\frac{\sqrt{21}}{28} & 0 \end{bmatrix}$
336	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & -\frac{\sqrt{14}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 \end{bmatrix}$
337	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
	$\mathbb{G}_5^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
338	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$
	$\mathbb{G}_5^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{12} & 0 \\ -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & -\frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ \frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 \end{bmatrix}$
339	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$
	$\mathbb{G}_5^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & \frac{5\sqrt{14}i}{84} & 0 & -\frac{5\sqrt{14}}{112} & -\frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{336} & \frac{\sqrt{35}i}{56} & 0 \\ \frac{5\sqrt{14}i}{84} & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{336} & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & -\frac{13\sqrt{14}}{336} & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 \\ \frac{13\sqrt{14}}{336} & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & -\frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 \\ -\frac{\sqrt{14}i}{48} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{84} & \frac{\sqrt{210}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} \\ 0 & \frac{\sqrt{14}i}{48} & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 \end{bmatrix}$
340	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_5^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & \frac{5\sqrt{14}}{112} & 0 & \frac{13\sqrt{14}i}{336} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 \\ -\frac{5\sqrt{14}}{112} & 0 & \frac{13\sqrt{14}i}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & -\frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{14}i}{112} & 0 & -\frac{5\sqrt{14}}{84} & \frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{336} & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{56} & 0 \\ \frac{5\sqrt{14}i}{112} & 0 & \frac{5\sqrt{14}}{84} & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & 0 & \frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & 0 & \frac{\sqrt{14}i}{48} & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{210}i}{112} & 0 & 0 & \frac{\sqrt{35}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{48} & -\frac{5\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{112} & -\frac{\sqrt{35}}{56} & 0 \end{bmatrix}$
341	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$
	$\mathbb{G}_5^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & \frac{\sqrt{35}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{21} \end{bmatrix}$
342	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$
	$\mathbb{G}_5^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{80} & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & \frac{i}{8} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{80} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{i}{8} \\ 0 & -\frac{3\sqrt{10}}{80} & 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ \frac{3\sqrt{10}}{80} & 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ \frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{20} & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{i}{8} \\ 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{i}{8} & 0 \end{bmatrix}$
343	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$
	$\mathbb{G}_5^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}}{80} & 0 & \frac{3\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ -\frac{\sqrt{10}}{80} & 0 & \frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{i}{8} & 0 \\ \frac{\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{i}{8} \\ 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & \frac{1}{8} \\ 0 & 0 & 0 & \frac{3\sqrt{10}i}{80} & \frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & -\frac{1}{8} & 0 \end{bmatrix}$
344	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_5^{(1,-1;a)}(A_g,8)$	$\begin{bmatrix} \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
345	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$
	$\mathbb{G}_5^{(1,-1;a)}(A_g,9)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{30} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ -\frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \end{bmatrix}$
346	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$
	$\mathbb{G}_5^{(1,-1;a)}(A_g,10)$	$\begin{bmatrix} 0 & \frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{40} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{3}i}{12} & 0 \\ \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{12} & 0 \end{bmatrix}$
347	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{G}_5^{(1,-1;a)}(A_g,11)$	$\begin{bmatrix} -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{12} & 0 \\ 0 & -\frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{120} & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ -\frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 \end{bmatrix}$
348	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{1}{24} & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & \frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & -\frac{1}{24} & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & -\frac{\sqrt{15}}{24} & 0 \\ \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{24} & 0 & \frac{1}{6} & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \\ 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 \\ -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{i}{6} & \frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 \end{bmatrix}$
349	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{G}_3^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & -\frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{96} & \frac{i}{16} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & -\frac{i}{16} \\ 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{11\sqrt{6}}{96} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & \frac{11\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & -\frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 \end{bmatrix}$
350	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{G}_3^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{6}i}{96} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{11\sqrt{6}i}{96} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & \frac{i}{16} & 0 \\ \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{48} & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & -\frac{i}{16} \\ 0 & 0 & -\frac{3\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 \end{bmatrix}$
351	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{G}_3^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 \end{bmatrix}$
352	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & \frac{7i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & \frac{5\sqrt{10}}{96} & \frac{\sqrt{15}i}{48} & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{96} & 0 & 0 & -\frac{7i}{48} & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{5\sqrt{10}}{96} & 0 & 0 & -\frac{\sqrt{15}i}{48} \\ 0 & \frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{i}{24} & 0 & 0 & -\frac{7\sqrt{10}}{96} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 \\ -\frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{24} & \frac{7\sqrt{10}}{96} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 \\ -\frac{3\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{24} & -\frac{\sqrt{10}i}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{6}i}{32} & 0 & 0 & \frac{i}{6} & 0 & -\frac{1}{24} & 0 & 0 & \frac{\sqrt{10}i}{96} & 0 & 0 & 0 & 0 \end{bmatrix}$
353	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{G}_3^{(1,0;a)}(A_g,6)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & \frac{i}{24} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & \frac{7\sqrt{10}i}{96} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & -\frac{i}{24} & \frac{\sqrt{10}}{24} & 0 & \frac{7\sqrt{10}i}{96} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{96} & 0 & -\frac{\sqrt{6}}{24} & \frac{7i}{48} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{10}i}{96} & 0 & \frac{\sqrt{10}}{24} & -\frac{\sqrt{15}i}{48} & 0 \\ -\frac{\sqrt{6}i}{96} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & -\frac{7i}{48} & 0 & 0 & -\frac{5\sqrt{10}i}{96} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{15}i}{48} \\ 0 & 0 & -\frac{3\sqrt{6}i}{32} & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 & \frac{\sqrt{10}i}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{6}i}{32} & -\frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{96} & 0 & 0 \end{bmatrix}$
354	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_3^{(1,0;a)}(A_g,7)$	$\begin{bmatrix} -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & -\frac{1}{24} & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{24} & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{1}{6} & 0 & \frac{i}{24} & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & -\frac{1}{6} & 0 & \frac{i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & \frac{\sqrt{15}}{24} & 0 \\ 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 \\ -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & -\frac{\sqrt{10}}{48} & 0 & 0 & 0 \end{bmatrix}$
355	symmetry	x
	$\mathbb{G}_1^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & -\frac{\sqrt{210}i}{140} & 0 \\ \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 \\ \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \end{bmatrix}$
356	symmetry	y

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_1^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 \\ \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & -\frac{3\sqrt{35}}{140} & -\frac{\sqrt{210}i}{140} & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & \frac{3\sqrt{35}}{140} & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{210}}{140} & 0 \end{bmatrix}$
357	symmetry	z
	$\mathbb{G}_1^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & \frac{\sqrt{35}}{35} & \frac{\sqrt{210}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}i}{70} \end{bmatrix}$
358	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_3^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & \frac{\sqrt{105}}{168} & 0 \\ \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 \\ 0 & -\frac{\sqrt{42}}{48} & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 \\ \frac{\sqrt{42}}{48} & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 \end{bmatrix}$
359	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{G}_3^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{42} & 0 & \frac{5\sqrt{70}}{224} & \frac{5\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & -\frac{5\sqrt{42}}{672} & -\frac{5\sqrt{7}i}{112} & 0 \\ \frac{\sqrt{70}i}{42} & 0 & -\frac{5\sqrt{70}}{224} & 0 & 0 & -\frac{5\sqrt{105}i}{336} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & \frac{5\sqrt{42}}{672} & 0 & 0 & \frac{5\sqrt{7}i}{112} \\ 0 & \frac{13\sqrt{70}}{672} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{5\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 \\ -\frac{13\sqrt{70}}{672} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & \frac{5\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 \\ \frac{\sqrt{70}i}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{168} & -\frac{5\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & -\frac{\sqrt{70}i}{96} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & \frac{5\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 \end{bmatrix}$
360	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}}{56} & 0 & -\frac{13\sqrt{70}i}{672} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{672} & 0 & 0 \\ -\frac{\sqrt{70}}{56} & 0 & -\frac{13\sqrt{70}i}{672} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & -\frac{\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{672} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{70}i}{224} & 0 & -\frac{\sqrt{70}}{42} & -\frac{5\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{672} & 0 & -\frac{\sqrt{42}}{42} & -\frac{5\sqrt{7}i}{112} & 0 \\ -\frac{5\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & \frac{5\sqrt{105}i}{336} & 0 & 0 & -\frac{5\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & \frac{5\sqrt{7}i}{112} \\ 0 & 0 & -\frac{\sqrt{70}i}{96} & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}}{28} \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{96} & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{224} & -\frac{\sqrt{7}}{28} & 0 \end{bmatrix}$
361	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{G}_3^{(1,1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{5\sqrt{7}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & \frac{5\sqrt{7}}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & -\frac{5\sqrt{7}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & \frac{5\sqrt{42}}{168} & \frac{2\sqrt{7}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & -\frac{2\sqrt{7}i}{21} \end{bmatrix}$
362	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{G}_3^{(1,1;a)}(A_g,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{11\sqrt{42}}{672} & -\frac{\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{3\sqrt{70}}{224} & -\frac{5\sqrt{105}i}{336} & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & \frac{11\sqrt{42}}{672} & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & \frac{5\sqrt{105}i}{336} \\ 0 & -\frac{17\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 \\ \frac{17\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & \frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & -\frac{5\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} \\ 0 & \frac{\sqrt{42}i}{96} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 \end{bmatrix}$
363	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{G}_3^{(1,1;a)}(A_g,6)$	$\begin{bmatrix} 0 & \frac{\sqrt{42}}{42} & 0 & -\frac{17\sqrt{42}i}{672} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 \\ -\frac{\sqrt{42}}{42} & 0 & -\frac{17\sqrt{42}i}{672} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 & 0 \\ 0 & -\frac{11\sqrt{42}i}{672} & 0 & -\frac{\sqrt{42}}{56} & -\frac{\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & \frac{5\sqrt{105}i}{336} & 0 \\ -\frac{11\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{5\sqrt{105}i}{336} \\ 0 & 0 & -\frac{\sqrt{42}i}{96} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 & -\frac{\sqrt{105}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{96} & \frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{70}i}{224} & \frac{\sqrt{105}}{84} & 0 \end{bmatrix}$
364	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{G}_3^{(1,1;a)}(A_g,7)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & -\frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{168} & 0 \\ 0 & \frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 \\ \frac{\sqrt{42}i}{48} & 0 & -\frac{\sqrt{42}}{48} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
365	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{T}_2^{(a)}(A_g,1)$	$\begin{bmatrix} 0&0&0&0&0&0&0&0&\frac{\sqrt{14}i}{14}&0&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&\frac{\sqrt{14}i}{14}&0&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{14}i}{14}&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{14}i}{14}&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{21}i}{14}&0 \\ 0&0&0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{21}i}{14} \end{bmatrix}$
366	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}_2^{(a)}(A_g,2)$	$\begin{bmatrix} \frac{\sqrt{70}i}{28}&0&0&0&0&0&0&0&-\frac{\sqrt{42}i}{84}&0&0&0&0&0 \\ 0&\frac{\sqrt{70}i}{28}&0&0&0&0&0&0&0&-\frac{\sqrt{42}i}{84}&0&0&0&0 \\ 0&0&\frac{\sqrt{70}i}{28}&0&0&0&0&0&0&0&\frac{\sqrt{42}i}{84}&0&0&0 \\ 0&0&0&\frac{\sqrt{70}i}{28}&0&0&0&0&0&0&0&\frac{\sqrt{42}i}{84}&0&0 \\ 0&0&0&0&\frac{\sqrt{105}i}{42}&0&0&0&0&0&0&0&0&0 \\ 0&0&0&0&0&\frac{\sqrt{105}i}{42}&0&0&0&0&0&0&0&0 \end{bmatrix}$
367	symmetry	$\sqrt{3}yz$
	$\mathbb{T}_2^{(a)}(A_g,3)$	$\begin{bmatrix} 0&0&0&0&0&0&\frac{\sqrt{105}i}{42}&0&0&0&0&0&0&0 \\ 0&0&0&0&0&0&0&\frac{\sqrt{105}i}{42}&0&0&0&0&0&0 \\ 0&0&0&0&-\frac{\sqrt{105}i}{42}&0&0&0&0&0&0&0&-\frac{\sqrt{7}i}{14}&0 \\ 0&0&0&0&0&-\frac{\sqrt{105}i}{42}&0&0&0&0&0&0&0&-\frac{\sqrt{7}i}{14} \\ 0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{42}i}{21}&0&0&0 \\ 0&0&0&0&0&0&0&0&0&0&0&\frac{\sqrt{42}i}{21}&0&0 \end{bmatrix}$
368	symmetry	$\sqrt{3}xz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_2^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 \end{bmatrix}$
369	symmetry	$\sqrt{3}xy$
	$\mathbb{T}_2^{(a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \\ -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
370	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{T}_4^{(a)}(A_g,1)$	$\begin{bmatrix} \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \end{bmatrix}$
371	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{T}_4^{(a)}(A_g,2)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} \end{bmatrix}$
372	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(a)}(A_g,3)$	$\begin{bmatrix} \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
373	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{T}_4^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} \\ 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{16} & 0 & 0 \end{bmatrix}$
374	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{T}_4^{(a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
375	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{T}_4^{(a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
376	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & 0 & \frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 \end{bmatrix}$
377	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{T}_4^{(a)}(A_g,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
378	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{T}_4^{(a)}(A_g,9)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 \\ \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
379	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{T}_4^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{i}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & \frac{i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{1}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{1}{8} & 0 \\ 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 \\ -\frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & 0 \end{bmatrix}$
380	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{168} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & -\frac{\sqrt{21}i}{28} & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 \\ 0 & -\frac{\sqrt{14}i}{16} & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 \\ \frac{\sqrt{14}i}{16} & 0 & \frac{\sqrt{14}}{16} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 \end{bmatrix}$
381	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{T}_4^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{105}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{56} & -\frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & -\frac{\sqrt{105}i}{56} & 0 \\ \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} \\ 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 \\ 0 & -\frac{\sqrt{42}i}{112} & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 \\ \frac{\sqrt{42}i}{112} & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
382	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{T}_4^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & \frac{3}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{32} & \frac{\sqrt{15}}{16} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{3}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{32} & 0 & 0 & -\frac{\sqrt{15}}{16} \\ 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 \end{bmatrix}$
383	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{T}_4^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{32} & 0 & 0 & -\frac{3}{16} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}}{16} & 0 \\ \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 & -\frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} \\ 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 \end{bmatrix}$
384	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{8} & 0 & \frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{8} & 0 & -\frac{\sqrt{6}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
385	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$
	$\mathbb{T}_4^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{3\sqrt{42}i}{224} & -\frac{\sqrt{7}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{224} & \frac{\sqrt{105}}{112} & 0 \\ -\frac{\sqrt{42}}{56} & 0 & \frac{3\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}}{112} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{224} & 0 & 0 & -\frac{\sqrt{105}}{112} \\ 0 & \frac{3\sqrt{42}i}{224} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{5\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 \\ -\frac{3\sqrt{42}i}{224} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} & \frac{5\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ \frac{\sqrt{42}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{3\sqrt{7}i}{56} & -\frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{32} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 \end{bmatrix}$
386	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{T}_4^{(1,-1;a)}(A_g,8)$	$\begin{bmatrix} 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{3\sqrt{42}}{224} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{5\sqrt{70}}{224} & 0 & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & -\frac{3\sqrt{42}}{224} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & -\frac{\sqrt{70}i}{56} & 0 & -\frac{5\sqrt{70}}{224} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{42}}{224} & 0 & \frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{112} & 0 \\ \frac{3\sqrt{42}}{224} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{112} & 0 & 0 & -\frac{\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{112} \\ 0 & 0 & \frac{\sqrt{42}}{32} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{32} & \frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{224} & 0 & 0 \end{bmatrix}$
387	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{T}_4^{(1,-1;a)}(A_g,9)$	$\begin{bmatrix} -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{56} & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} \\ 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{56} & -\frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{56} & 0 \\ 0 & -\frac{\sqrt{42}}{112} & 0 & \frac{\sqrt{42}i}{112} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 \\ -\frac{\sqrt{42}}{112} & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 \end{bmatrix}$
388	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 \end{bmatrix}$
389	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}_2^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{105}}{42} & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & -\frac{\sqrt{42}i}{84} & 0 \\ \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{21} & 0 & \frac{\sqrt{7}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{42} & \frac{\sqrt{7}i}{21} & 0 & \frac{\sqrt{7}}{21} & 0 & 0 & 0 \end{bmatrix}$
390	symmetry	$\sqrt{3}yz$
	$\mathbb{T}_2^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & -\frac{\sqrt{7}i}{84} & -\frac{\sqrt{42}}{84} & 0 \\ -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & \frac{\sqrt{7}i}{84} & 0 & 0 & \frac{\sqrt{42}}{84} \\ 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}i}{84} & 0 & -\frac{\sqrt{7}}{12} & 0 & 0 \\ \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & \frac{\sqrt{7}i}{84} & 0 & -\frac{\sqrt{7}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & \frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 \end{bmatrix}$
391	symmetry	$\sqrt{3}xz$
	$\mathbb{T}_2^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}i}{12} & 0 & -\frac{\sqrt{7}}{84} & 0 & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & \frac{\sqrt{7}i}{12} & 0 & -\frac{\sqrt{7}}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{84} & 0 & -\frac{5\sqrt{7}i}{84} & \frac{\sqrt{42}}{84} & 0 \\ -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}}{84} & 0 & \frac{5\sqrt{7}i}{84} & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & -\frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{21} & \frac{\sqrt{42}i}{28} & 0 \end{bmatrix}$
392	symmetry	$\sqrt{3}xy$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_g,5)$	$\begin{bmatrix} \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & -\frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} \\ 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & -\frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & -\frac{\sqrt{42}i}{84} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & -\frac{\sqrt{7}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{42} & 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 & 0 \end{bmatrix}$
393	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 \\ -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 \\ 0 & -\frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 \\ \frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 \end{bmatrix}$
394	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}}{60} & 0 & 0 & \frac{\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}i}{168} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{60} & -\frac{\sqrt{35}i}{280} & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 \\ \frac{\sqrt{210}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{280} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{168} \\ 0 & -\frac{\sqrt{210}}{60} & 0 & 0 & -\frac{\sqrt{35}}{280} & 0 & \frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 \\ 0 & \frac{\sqrt{210}i}{240} & 0 & -\frac{\sqrt{210}}{240} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{112} & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 \\ -\frac{\sqrt{210}i}{240} & 0 & -\frac{\sqrt{210}}{240} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{112} & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & 0 \end{bmatrix}$
395	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}}{280} & \frac{\sqrt{105}i}{56} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & -\frac{3\sqrt{7}i}{56} & 0 \\ \frac{\sqrt{70}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & \frac{\sqrt{105}i}{140} & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 \\ 0 & -\frac{\sqrt{70}i}{80} & 0 & -\frac{\sqrt{70}}{80} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & \frac{3\sqrt{42}i}{112} & 0 & -\frac{3\sqrt{42}}{112} & 0 & 0 \\ \frac{\sqrt{70}i}{80} & 0 & -\frac{\sqrt{70}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & -\frac{3\sqrt{42}i}{112} & 0 & -\frac{3\sqrt{42}}{112} & 0 & 0 & 0 \end{bmatrix}$
396	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{160} & -\frac{\sqrt{15}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{32} & -\frac{1}{16} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{160} & 0 & 0 & \frac{\sqrt{15}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & \frac{1}{16} \\ 0 & -\frac{3\sqrt{10}i}{160} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 \\ \frac{3\sqrt{10}i}{160} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & \frac{\sqrt{6}i}{32} & 0 & -\frac{\sqrt{6}}{8} & 0 & 0 & 0 \\ -\frac{3\sqrt{10}}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{40} & -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & \frac{3\sqrt{10}}{160} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & \frac{1}{4} & 0 \end{bmatrix}$
397	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}i}{40} & 0 & -\frac{3\sqrt{10}}{160} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & \frac{\sqrt{6}i}{8} & 0 & \frac{\sqrt{6}}{32} & 0 & 0 \\ \frac{\sqrt{10}i}{40} & 0 & -\frac{3\sqrt{10}}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & -\frac{\sqrt{6}i}{8} & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{160} & 0 & 0 & \frac{\sqrt{15}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & -\frac{1}{16} & 0 \\ -\frac{\sqrt{10}}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{80} & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{1}{16} \\ 0 & 0 & \frac{3\sqrt{10}}{160} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & -\frac{i}{4} \\ 0 & 0 & 0 & -\frac{3\sqrt{10}}{160} & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{32} & \frac{i}{4} & 0 \end{bmatrix}$
398	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,6)$	$\begin{bmatrix} \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
399	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,7)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{70}}{280} & 0 & \frac{19\sqrt{70}i}{1120} & \frac{11\sqrt{105}}{560} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{5\sqrt{42}i}{224} & -\frac{\sqrt{7}}{112} & 0 \\ -\frac{3\sqrt{70}}{280} & 0 & -\frac{19\sqrt{70}i}{1120} & 0 & 0 & -\frac{11\sqrt{105}}{560} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{5\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}}{112} \\ 0 & \frac{9\sqrt{70}i}{1120} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & -\frac{5\sqrt{42}i}{224} & 0 & 0 & 0 & 0 \\ -\frac{9\sqrt{70}i}{1120} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & \frac{5\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{70}}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & -\frac{\sqrt{42}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} \\ 0 & -\frac{3\sqrt{70}}{160} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 \end{bmatrix}$
400	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,8)$	$\begin{bmatrix} 0 & -\frac{\sqrt{70}i}{70} & 0 & -\frac{9\sqrt{70}}{1120} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{224} & 0 & 0 \\ \frac{\sqrt{70}i}{70} & 0 & -\frac{9\sqrt{70}}{1120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & -\frac{5\sqrt{42}}{224} & 0 & 0 & 0 \\ 0 & -\frac{19\sqrt{70}}{1120} & 0 & \frac{3\sqrt{70}i}{280} & \frac{11\sqrt{105}}{560} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{224} & 0 & -\frac{\sqrt{42}i}{56} & \frac{\sqrt{7}}{112} & 0 \\ -\frac{19\sqrt{70}}{1120} & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & -\frac{11\sqrt{105}}{560} & 0 & 0 & -\frac{5\sqrt{42}}{224} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}}{112} \\ 0 & 0 & \frac{3\sqrt{70}}{160} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & 0 & 0 & -\frac{3\sqrt{70}}{160} & -\frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{224} & -\frac{\sqrt{7}i}{28} & 0 \end{bmatrix}$
401	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,9)$	$\begin{bmatrix} -\frac{\sqrt{70}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & \frac{\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{3\sqrt{7}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}}{280} & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & \frac{3\sqrt{7}i}{56} & 0 \\ 0 & -\frac{\sqrt{70}}{80} & 0 & \frac{\sqrt{70}i}{80} & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & -\frac{3\sqrt{42}i}{112} & 0 & 0 \\ -\frac{\sqrt{70}}{80} & 0 & -\frac{\sqrt{70}i}{80} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & \frac{3\sqrt{42}i}{112} & 0 & 0 & 0 \end{bmatrix}$
402	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{T}_2^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
403	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}_2^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{84} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{84} & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 \\ 0 & -\frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 \\ \frac{\sqrt{210}i}{56} & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 \end{bmatrix}$
404	symmetry	$\sqrt{3}yz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{T}_2^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & \frac{11\sqrt{14}i}{168} & -\frac{\sqrt{21}}{21} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & -\frac{11\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 \end{bmatrix}$
405	symmetry	$\sqrt{3}xz$
	$\mathbb{T}_2^{(1,1;a)}(A_g,4)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{168} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & -\frac{5\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{168} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{11\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & \frac{\sqrt{21}}{21} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{11\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & -\frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & 0 \end{bmatrix}$
406	symmetry	$\sqrt{3}xy$
	$\mathbb{T}_2^{(1,1;a)}(A_g,5)$	$\begin{bmatrix} -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{42} & -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & \frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}}{168} & -\frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{84} & 0 \\ 0 & \frac{\sqrt{210}}{56} & 0 & -\frac{\sqrt{210}i}{56} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 \\ \frac{\sqrt{210}}{56} & 0 & \frac{\sqrt{210}i}{56} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 \end{bmatrix}$
407	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_3^{(a)}(A_g,1)$	$\begin{bmatrix} \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
408	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 \end{bmatrix}$
409	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{M}_3^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
410	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_3^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
411	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{M}_3^{(a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 \end{bmatrix}$
412	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 \end{bmatrix}$
413	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_3^{(a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
414	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & -\frac{\sqrt{21}i}{42} & 0 \\ -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & \frac{\sqrt{14}i}{21} & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & 0 \end{bmatrix}$
415	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{3\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{28} & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & -\frac{\sqrt{210}i}{420} & \frac{\sqrt{35}}{70} & 0 \\ \frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & -\frac{\sqrt{35}}{70} \\ 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 \\ \frac{\sqrt{14}i}{28} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{42} & -\frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 \end{bmatrix}$
416	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & \frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{420} & 0 & 0 \\ -\frac{3\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & -\frac{\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{420} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{28} & 0 & \frac{3\sqrt{14}i}{56} & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{420} & 0 & \frac{3\sqrt{210}i}{280} & \frac{\sqrt{35}}{70} & 0 \\ \frac{\sqrt{14}}{28} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{420} & 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & -\frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & 0 & \frac{3\sqrt{35}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{105} & -\frac{3\sqrt{35}i}{140} & 0 \end{bmatrix}$
417	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} & \frac{\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & \frac{\sqrt{210}i}{105} & \frac{3\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & -\frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{3\sqrt{35}}{70} \end{bmatrix}$
418	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{84} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{84} & \frac{\sqrt{21}}{42} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & \frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{24} & 0 & 0 \\ -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \end{bmatrix}$
419	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{24} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & \frac{\sqrt{14}i}{24} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & -\frac{5\sqrt{14}i}{168} & -\frac{\sqrt{21}}{42} & 0 \\ \frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & 0 & -\frac{\sqrt{21}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{21} & \frac{\sqrt{21}i}{28} & 0 \end{bmatrix}$
420	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & \frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{21} & 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 \end{bmatrix}$
421	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
422	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{3}i}{12} & 0 \\ -\frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & \frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ -\frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 \end{bmatrix}$
423	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & \frac{5\sqrt{14}}{84} & 0 & \frac{5\sqrt{14}i}{112} & -\frac{5\sqrt{21}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{336} & \frac{\sqrt{35}}{56} & 0 \\ \frac{5\sqrt{14}}{84} & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & \frac{13\sqrt{14}i}{336} & 0 & -\frac{5\sqrt{14}}{112} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 \\ -\frac{13\sqrt{14}i}{336} & 0 & -\frac{5\sqrt{14}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & \frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 \\ -\frac{\sqrt{14}}{48} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & -\frac{\sqrt{21}i}{84} & \frac{\sqrt{210}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{56} \\ 0 & \frac{\sqrt{14}}{48} & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{210}}{112} & 0 & 0 & \frac{\sqrt{35}}{56} & 0 \end{bmatrix}$
424	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & -\frac{5\sqrt{14}i}{112} & 0 & \frac{13\sqrt{14}}{336} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 \\ \frac{5\sqrt{14}i}{112} & 0 & \frac{13\sqrt{14}}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & \frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{14}}{112} & 0 & \frac{5\sqrt{14}i}{84} & \frac{5\sqrt{21}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{84} & \frac{\sqrt{35}}{56} & 0 \\ \frac{5\sqrt{14}}{112} & 0 & -\frac{5\sqrt{14}i}{84} & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 & \frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & 0 & \frac{\sqrt{14}}{48} & 0 & 0 & -\frac{5\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{210}}{112} & 0 & 0 & -\frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{48} & \frac{5\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{112} & \frac{\sqrt{35}i}{56} & 0 \end{bmatrix}$
425	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & \frac{\sqrt{35}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{21} \end{bmatrix}$
426	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}i}{80} & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & \frac{1}{8} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{1}{8} \\ 0 & \frac{3\sqrt{10}i}{80} & 0 & -\frac{\sqrt{10}}{80} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ -\frac{3\sqrt{10}i}{80} & 0 & -\frac{\sqrt{10}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ \frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{20} & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & \frac{1}{8} \\ 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & \frac{1}{8} & 0 \end{bmatrix}$
427	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}i}{80} & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ \frac{\sqrt{10}i}{80} & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{80} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & \frac{1}{8} & 0 \\ \frac{\sqrt{10}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & -\frac{1}{8} \\ 0 & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{i}{8} \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{80} & -\frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & \frac{i}{8} & 0 \end{bmatrix}$
428	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,8)$	$\begin{bmatrix} \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{20} & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
429	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,9)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{30}i}{30} & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ -\frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & \frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \end{bmatrix}$
430	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,10)$	$\begin{bmatrix} 0 & -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{40} & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & -\frac{\sqrt{3}}{12} & 0 \\ \frac{\sqrt{30}}{30} & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{120} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{3}i}{12} & 0 \end{bmatrix}$
431	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,11)$	$\begin{bmatrix} -\frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & \frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{120} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{3}i}{12} & 0 \\ 0 & -\frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{120} & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \\ -\frac{\sqrt{30}}{120} & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 \end{bmatrix}$
432	symmetry	$\sqrt{15}xyz$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & -\frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & -\frac{\sqrt{15}i}{24} & 0 \\ -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & \frac{1}{24} & 0 & \frac{i}{6} & \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 \\ 0 & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 \\ -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & \frac{1}{6} & \frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 \end{bmatrix}$
433	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{M}_3^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & \frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{96} & -\frac{1}{16} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & \frac{1}{16} \\ 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & -\frac{11\sqrt{6}i}{96} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & \frac{11\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & \frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 \end{bmatrix}$
434	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{M}_3^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{11\sqrt{6}}{96} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & \frac{11\sqrt{6}}{96} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & -\frac{1}{16} & 0 \\ -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{48} & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & \frac{1}{16} \\ 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{6}}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}}{32} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 \end{bmatrix}$
435	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_3^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 \end{bmatrix}$
436	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,0;a)}(A_g,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{96} & -\frac{7}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & \frac{5\sqrt{10}i}{96} & -\frac{\sqrt{15}}{48} & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & \frac{7}{48} & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & -\frac{5\sqrt{10}i}{96} & 0 & 0 & \frac{\sqrt{15}}{48} \\ 0 & \frac{\sqrt{6}i}{96} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{1}{24} & 0 & 0 & -\frac{7\sqrt{10}i}{96} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 \\ -\frac{\sqrt{6}i}{96} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & -\frac{1}{24} & \frac{7\sqrt{10}i}{96} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 \\ \frac{3\sqrt{6}}{32} & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{24} & \frac{\sqrt{10}}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{6}}{32} & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 & -\frac{\sqrt{10}}{96} & 0 & 0 & 0 & 0 \end{bmatrix}$
437	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{M}_3^{(1,0;a)}(A_g,6)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & -\frac{1}{24} & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{7\sqrt{10}}{96} & 0 & 0 \\ \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & \frac{1}{24} & \frac{\sqrt{10}i}{24} & 0 & -\frac{7\sqrt{10}}{96} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & -\frac{7}{48} & 0 & 0 & 0 & 0 & \frac{5\sqrt{10}}{96} & 0 & \frac{\sqrt{10}i}{24} & \frac{\sqrt{15}}{48} & 0 \\ \frac{\sqrt{6}}{96} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & \frac{7}{48} & 0 & 0 & \frac{5\sqrt{10}}{96} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & -\frac{\sqrt{15}}{48} \\ 0 & 0 & \frac{3\sqrt{6}}{32} & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{24} & 0 & 0 & -\frac{\sqrt{10}}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{6}}{32} & -\frac{i}{6} & 0 & \frac{1}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{96} & 0 & 0 \end{bmatrix}$
438	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_3^{(1,0;a)}(A_g,7)$	$\begin{bmatrix} \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{24} & \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{24} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{i}{6} & 0 & -\frac{1}{24} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & -\frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & -\frac{i}{6} & 0 & -\frac{1}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & \frac{\sqrt{15}i}{24} & 0 \\ 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & -\frac{1}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{48} & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 \\ \frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 \end{bmatrix}$
439	symmetry	x
	$\mathbb{M}_1^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & -\frac{\sqrt{210}}{140} & 0 \\ \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & \frac{\sqrt{210}}{140} \\ 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \end{bmatrix}$
440	symmetry	y

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_1^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & \frac{3\sqrt{35}i}{140} & -\frac{\sqrt{210}}{140} & 0 \\ -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & -\frac{3\sqrt{35}i}{140} & 0 & 0 & \frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & -\frac{\sqrt{210}i}{140} & 0 \end{bmatrix}$
441	symmetry	z
	$\mathbb{M}_1^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{210}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}}{70} \end{bmatrix}$
442	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_3^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{105}i}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{168} & -\frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & -\frac{\sqrt{105}i}{168} & 0 \\ \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} \\ 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 \\ 0 & \frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 \\ -\frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
443	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{M}_3^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}}{42} & 0 & -\frac{5\sqrt{70}i}{224} & \frac{5\sqrt{105}}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & \frac{5\sqrt{42}i}{672} & -\frac{5\sqrt{7}}{112} & 0 \\ \frac{\sqrt{70}}{42} & 0 & \frac{5\sqrt{70}i}{224} & 0 & 0 & -\frac{5\sqrt{105}}{336} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & -\frac{5\sqrt{42}i}{672} & 0 & 0 & \frac{5\sqrt{7}}{112} \\ 0 & -\frac{13\sqrt{70}i}{672} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{5\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 \\ \frac{13\sqrt{70}i}{672} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & -\frac{5\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 \\ \frac{\sqrt{70}}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{168} & -\frac{5\sqrt{42}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} \\ 0 & -\frac{\sqrt{70}}{96} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{5\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 \end{bmatrix}$
444	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{13\sqrt{70}}{672} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{672} & 0 & 0 \\ \frac{\sqrt{70}i}{56} & 0 & -\frac{13\sqrt{70}}{672} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & \frac{\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{672} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{42} & -\frac{5\sqrt{105}}{336} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{42} & -\frac{5\sqrt{7}}{112} & 0 \\ -\frac{5\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & \frac{5\sqrt{105}}{336} & 0 & 0 & -\frac{5\sqrt{42}}{672} & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & \frac{5\sqrt{7}}{112} \\ 0 & 0 & -\frac{\sqrt{70}}{96} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & -\frac{5\sqrt{42}}{224} & 0 & 0 & -\frac{\sqrt{7}i}{28} \\ 0 & 0 & 0 & \frac{\sqrt{70}}{96} & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{224} & \frac{\sqrt{7}i}{28} & 0 \end{bmatrix}$
445	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_3^{(1,1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{168} & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & -\frac{5\sqrt{7}i}{84} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & \frac{5\sqrt{7}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{168} & \frac{2\sqrt{7}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & -\frac{2\sqrt{7}}{21} \end{bmatrix}$
446	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{M}_3^{(1,1;a)}(A_g,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{11\sqrt{42}i}{672} & -\frac{\sqrt{7}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{3\sqrt{70}i}{224} & -\frac{5\sqrt{105}}{336} & 0 \\ -\frac{\sqrt{42}}{56} & 0 & -\frac{11\sqrt{42}i}{672} & 0 & 0 & \frac{\sqrt{7}}{112} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{3\sqrt{70}i}{224} & 0 & 0 & \frac{5\sqrt{105}}{336} \\ 0 & \frac{17\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 & 0 & 0 \\ -\frac{17\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} & -\frac{3\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & -\frac{5\sqrt{70}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} \\ 0 & \frac{\sqrt{42}}{96} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{5\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}}{84} & 0 \end{bmatrix}$
447	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{M}_3^{(1,1;a)}(A_g,6)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}i}{42} & 0 & -\frac{17\sqrt{42}}{672} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 \\ \frac{\sqrt{42}i}{42} & 0 & -\frac{17\sqrt{42}}{672} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & 0 \\ 0 & -\frac{11\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{112} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{56} & \frac{5\sqrt{105}}{336} & 0 \\ -\frac{11\sqrt{42}}{672} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{112} & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{5\sqrt{105}}{336} \\ 0 & 0 & -\frac{\sqrt{42}}{96} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{5\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{96} & -\frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{70}}{224} & -\frac{\sqrt{105}i}{84} & 0 \end{bmatrix}$
448	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 7

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,7)$	$\begin{bmatrix} -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} \\ 0 & \frac{\sqrt{42}}{168} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{168} & \frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{168} & 0 \\ 0 & \frac{\sqrt{42}}{48} & 0 & -\frac{\sqrt{42}i}{48} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 \\ \frac{\sqrt{42}}{48} & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 \end{bmatrix}$

bra: $= \langle d_v,\uparrow|\,,\langle d_v,\downarrow|\,,\langle d_{xy},\uparrow|\,,\langle d_{xy},\downarrow|\,,\langle d_{xz},\uparrow|\,,\langle d_{xz},\downarrow|\,,\langle d_{yz},\uparrow|\,,\langle d_{yz},\downarrow|\,,\langle d_u,\uparrow|\,,\langle d_u,\downarrow|$
ket: $= |d_v,\uparrow\rangle\,,|d_v,\downarrow\rangle\,,|d_{xy},\uparrow\rangle\,,|d_{xy},\downarrow\rangle\,,|d_{xz},\uparrow\rangle\,,|d_{xz},\downarrow\rangle\,,|d_{yz},\uparrow\rangle\,,|d_{yz},\downarrow\rangle\,,|d_u,\uparrow\rangle\,,|d_u,\downarrow\rangle$

Table 8: (d,d) block.

No.	multipole	matrix
449	symmetry	1
	$\mathbb{Q}_0^{(a)}(A_g)$	$\begin{bmatrix} \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \end{bmatrix}$
450	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_g,1)$	$\begin{bmatrix} -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} \end{bmatrix}$
451	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_2^{(a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 \\ -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
452	symmetry	$\sqrt{3}yz$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \end{bmatrix}$
453	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_2^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
454	symmetry	$\sqrt{3}xy$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
455	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{Q}_4^{(a)}(A_g,1)$	$\begin{bmatrix} \frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{10} \end{bmatrix}$
456	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,2)$	$\begin{bmatrix} -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{2\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{2\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} \end{bmatrix}$
457	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{Q}_4^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
458	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 \\ 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{4} & 0 & 0 \end{bmatrix}$
459	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{Q}_4^{(a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{4} & 0 \\ 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
460	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
461	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$
	$\mathbb{Q}_4^{(a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \\ 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \end{bmatrix}$
462	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 \\ -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \\ 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \end{bmatrix}$
463	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{Q}_4^{(a)}(A_g,9)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{7} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
464	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}i}{15} & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{15} & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{15} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 & -\frac{\sqrt{10}}{20} \\ -\frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} & \frac{\sqrt{10}}{20} & 0 \\ 0 & \frac{\sqrt{30}i}{60} & 0 & \frac{\sqrt{30}}{60} & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} \\ \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \end{bmatrix}$
465	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} \\ -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ -\frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \end{bmatrix}$
466	symmetry	$\sqrt{3}yz$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
467	symmetry	$\sqrt{3}xz$
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 \end{bmatrix}$
468	symmetry	$\sqrt{3}xy$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ -\frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} \\ \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 \end{bmatrix}$
469	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & \frac{\sqrt{15}}{60} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{60} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}}{60} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & \frac{\sqrt{5}}{20} & 0 \\ 0 & \frac{\sqrt{15}i}{60} & 0 & -\frac{\sqrt{15}}{15} & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}i}{60} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \end{bmatrix}$
470	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & \frac{5\sqrt{21}i}{84} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & -\frac{5\sqrt{21}}{84} & 0 & \frac{5\sqrt{21}i}{84} & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{7}}{28} \\ \frac{5\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & \frac{\sqrt{7}}{28} & 0 \\ 0 & -\frac{5\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ -\frac{5\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 \end{bmatrix}$
471	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{14} \\ 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} \\ -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} \\ -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 \end{bmatrix}$
472	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{1}{8} & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & \frac{\sqrt{3}}{8} \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & -\frac{\sqrt{3}}{8} & 0 \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & -\frac{\sqrt{3}i}{8} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & 0 & -\frac{i}{4} & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{4} & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
473	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 \\ 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 \\ 0 & -\frac{i}{8} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 \\ 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ \frac{i}{8} & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 \\ 0 & -\frac{i}{8} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 \end{bmatrix}$
474	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
475	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{7}}{56} & \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} \\ 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 \\ 0 & \frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{3\sqrt{21}}{56} \\ -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & \frac{3\sqrt{21}}{56} & 0 \\ -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & -\frac{\sqrt{21}i}{56} & 0 \\ 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{21}i}{56} \\ 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{14} & 0 & \frac{3\sqrt{21}}{56} & \frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{14} & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & -\frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$
476	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,8)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{21}}{14} \\ 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & -\frac{\sqrt{21}}{14} & 0 \\ 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} \\ \frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{56} & 0 \\ 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{56} \\ 0 & -\frac{\sqrt{21}}{14} & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & -\frac{\sqrt{21}i}{56} & 0 & 0 & 0 \\ \frac{\sqrt{21}}{14} & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{56} & 0 & 0 \end{bmatrix}$
477	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,9)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{14} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} \\ \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} \\ -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 \\ -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \end{bmatrix}$
478	symmetry	1

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_0^{(1,1;a)}(A_g)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & -\frac{\sqrt{15}}{30} & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & \frac{\sqrt{15}}{30} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{30} & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & \frac{\sqrt{5}}{10} \\ \frac{\sqrt{15}}{30} & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} & -\frac{\sqrt{5}}{10} & 0 \\ 0 & -\frac{\sqrt{15}i}{30} & 0 & -\frac{\sqrt{15}}{30} & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ -\frac{\sqrt{15}i}{30} & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 \end{bmatrix}$
479	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{Q}_2^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & \frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 \\ -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & \frac{\sqrt{35}}{35} \\ -\frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & -\frac{\sqrt{35}}{35} & 0 \\ 0 & \frac{\sqrt{105}i}{70} & 0 & \frac{\sqrt{105}}{70} & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} \\ \frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 \end{bmatrix}$
480	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{70} & 0 & -\frac{3\sqrt{35}}{70} & -\frac{\sqrt{105}i}{42} & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{70} & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{105}i}{42} \\ 0 & -\frac{\sqrt{35}}{35} & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} \\ \frac{\sqrt{35}}{35} & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 \\ 0 & \frac{\sqrt{35}i}{35} & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} \\ \frac{\sqrt{35}i}{35} & 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{210} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & \frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{210} & 0 & 0 & 0 \end{bmatrix}$
481	symmetry	$\sqrt{3}yz$
	$\mathbb{Q}_2^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} \\ 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 \\ 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & \frac{\sqrt{105}}{42} \\ -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & -\frac{\sqrt{105}}{42} & 0 \\ \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & \frac{2\sqrt{105}i}{105} & 0 \\ 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{2\sqrt{105}i}{105} \\ 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{42} & 0 & -\frac{\sqrt{105}}{42} & -\frac{2\sqrt{105}i}{105} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{2\sqrt{105}i}{105} & 0 & 0 & 0 & 0 \end{bmatrix}$
482	symmetry	$\sqrt{3}xz$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & \frac{\sqrt{105}}{42} \\ 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & -\frac{\sqrt{105}}{42} & 0 \\ 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 \\ \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{2\sqrt{105}i}{105} & 0 \\ 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & \frac{2\sqrt{105}i}{105} \\ 0 & -\frac{\sqrt{105}}{42} & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & \frac{2\sqrt{105}i}{105} & 0 & 0 & 0 \\ \frac{\sqrt{105}}{42} & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{105}i}{105} & 0 & 0 \end{bmatrix}$
483	symmetry	$\sqrt{3}xy$
	$\mathbb{Q}_2^{(1,1;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 & \frac{3\sqrt{35}}{70} & \frac{\sqrt{105}i}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 & -\frac{3\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{210} \\ -\frac{3\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 \\ 0 & -\frac{3\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} \\ \frac{3\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 \\ -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & \frac{\sqrt{105}}{210} & 0 & 0 & 0 \end{bmatrix}$
484	symmetry	x

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{G}_1^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & -\frac{\sqrt{30}i}{20} & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{30}i}{20} \\ 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
485	symmetry	y
	$\mathbb{G}_1^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 \end{bmatrix}$
486	symmetry	z

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{G}_1^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} \\ -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \end{bmatrix}$
487	symmetry	$\sqrt{15}xyz$
	$\mathbb{G}_3^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \\ 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 \end{bmatrix}$
488	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & -\frac{3\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & \frac{3\sqrt{15}i}{40} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{8} \\ -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & \frac{\sqrt{5}}{8} & 0 \\ \frac{3\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & \frac{\sqrt{5}i}{40} & 0 \\ 0 & -\frac{3\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{40} \\ 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{8} & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & \frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 \end{bmatrix}$
489	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{G}_3^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & \frac{3\sqrt{15}i}{40} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}i}{40} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} \\ -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ -\frac{3\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{40} & 0 \\ 0 & \frac{3\sqrt{15}i}{40} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{40} & 0 & 0 \end{bmatrix}$
490	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} \\ \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 \end{bmatrix}$
491	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{G}_3^{(1,0;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{1}{8} & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{i}{8} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & -\frac{\sqrt{3}}{24} \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & \frac{\sqrt{3}}{24} & 0 \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & \frac{\sqrt{3}i}{24} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & -\frac{\sqrt{3}i}{24} \\ 0 & 0 & \frac{i}{4} & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{4} & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{24} & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$
492	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{i}{8} & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{8} & \frac{\sqrt{3}}{6} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} \\ \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 \\ 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 \\ 0 & \frac{i}{8} & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} \\ 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 \end{bmatrix}$
493	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{G}_3^{(1,0;a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \\ 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 \end{bmatrix}$
494	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} \\ -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} \\ -\frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 \end{bmatrix}$
495	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{T}_2^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{42}}{21} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{21} \\ 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{42}i}{84} \\ \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & \frac{\sqrt{42}i}{84} & 0 \\ 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} \\ -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & \frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & \frac{\sqrt{42}}{21} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{21} & \frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
496	symmetry	$\sqrt{3}yz$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{14} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} \\ \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & \frac{\sqrt{42}i}{42} & 0 \\ \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & \frac{\sqrt{14}i}{28} & \frac{\sqrt{42}}{84} & 0 \\ 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{42} & 0 & -\frac{\sqrt{42}i}{42} & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} \\ \frac{\sqrt{42}}{42} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 \end{bmatrix}$
497	symmetry	$\sqrt{3}xz$
	$\mathbb{T}_2^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & \frac{\sqrt{42}i}{42} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} \\ 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{14} & -\frac{\sqrt{42}}{84} & 0 \\ 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & \frac{\sqrt{42}}{84} \\ 0 & -\frac{\sqrt{42}i}{42} & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & -\frac{\sqrt{14}i}{14} \\ \frac{\sqrt{42}i}{42} & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & \frac{\sqrt{14}i}{14} & 0 \end{bmatrix}$
498	symmetry	$\sqrt{3}xy$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & -\frac{\sqrt{42}}{21} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{42}}{21} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} \\ -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 \\ 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & -\frac{\sqrt{42}i}{84} \\ -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & \frac{\sqrt{42}i}{84} & 0 \\ -\frac{\sqrt{42}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \\ 0 & \frac{\sqrt{42}}{21} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
499	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 \end{bmatrix}$
500	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{105}}{30} & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & -\frac{\sqrt{105}}{420} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{30} & -\frac{\sqrt{105}i}{420} & 0 & -\frac{\sqrt{105}}{420} & 0 & 0 & 0 \\ \frac{\sqrt{105}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{30} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{420} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} \\ -\frac{\sqrt{105}i}{420} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 \\ 0 & -\frac{\sqrt{105}}{420} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} \\ -\frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 \end{bmatrix}$
501	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} \\ 0 & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & \frac{3\sqrt{105}i}{140} \\ \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & -\frac{3\sqrt{105}i}{140} & 0 \\ 0 & -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{140} \\ -\frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{3\sqrt{105}}{140} & 0 \\ 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & \frac{3\sqrt{105}i}{140} & 0 & -\frac{3\sqrt{105}}{140} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & -\frac{3\sqrt{105}i}{140} & 0 & -\frac{3\sqrt{105}}{140} & 0 & 0 & 0 \end{bmatrix}$
502	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{40} & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{40} & 0 & 0 & \frac{\sqrt{5}}{40} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{40} \\ \frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & \frac{\sqrt{15}i}{40} & 0 \\ -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & -\frac{\sqrt{15}}{40} & 0 \\ 0 & \frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{15}}{40} \\ 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{40} & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{20} \\ \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & \frac{3\sqrt{5}}{20} & 0 \end{bmatrix}$
503	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & \frac{\sqrt{5}}{40} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} \\ -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 \\ 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & -\frac{\sqrt{5}i}{5} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 \\ 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} \\ 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & -\frac{3\sqrt{5}i}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & \frac{3\sqrt{5}i}{20} & 0 \end{bmatrix}$
504	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,6)$	$\begin{bmatrix} \frac{\sqrt{5}}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{5} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{5} & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
505	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,7)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{40} & \frac{11\sqrt{35}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} \\ -\frac{3\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{40} & 0 & 0 & -\frac{11\sqrt{35}}{280} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 \\ 0 & \frac{\sqrt{35}i}{40} & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{105}i}{56} \\ -\frac{\sqrt{35}i}{40} & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & \frac{\sqrt{105}i}{56} & 0 \\ \frac{11\sqrt{35}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & -\frac{\sqrt{35}i}{28} & -\frac{\sqrt{105}}{280} & 0 \\ 0 & -\frac{11\sqrt{35}}{280} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & \frac{\sqrt{105}}{280} \\ 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{28} & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & -\frac{\sqrt{105}}{280} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{140} \\ -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{105}}{280} & 0 & 0 & \frac{3\sqrt{35}}{140} & 0 \end{bmatrix}$
506	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,8)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{40} & 0 & 0 & \frac{11\sqrt{35}}{280} & 0 & 0 & \frac{\sqrt{105}i}{140} \\ \frac{3\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{35}}{280} & -\frac{\sqrt{105}i}{140} & 0 \\ 0 & -\frac{\sqrt{35}}{40} & 0 & \frac{\sqrt{35}i}{35} & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} \\ -\frac{\sqrt{35}}{40} & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ \frac{11\sqrt{35}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{105}}{280} & 0 \\ 0 & -\frac{11\sqrt{35}}{280} & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{105}}{280} \\ 0 & \frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{105}}{280} & 0 & 0 & \frac{3\sqrt{35}i}{140} \\ -\frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{280} & -\frac{3\sqrt{35}i}{140} & 0 \end{bmatrix}$
507	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{T}_4^{(1,0;a)}(A_g,9)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{28} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{140} \\ -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{3\sqrt{105}}{140} & 0 \\ 0 & \frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{3\sqrt{105}i}{140} \\ -\frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & \frac{3\sqrt{105}i}{140} & 0 \\ \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{140} & 0 & -\frac{3\sqrt{105}i}{140} & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{3\sqrt{105}}{140} & 0 & \frac{3\sqrt{105}i}{140} & 0 & 0 & 0 \end{bmatrix}$
508	symmetry	x

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_1^{(a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 & 0 \end{bmatrix}$
509	symmetry	y
	$\mathbb{M}_1^{(a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{10} \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 \end{bmatrix}$
510	symmetry	z

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_1^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
511	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_3^{(a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
512	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \end{bmatrix}$
513	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{M}_3^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 \\ \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$
514	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
515	$\mathbb{M}_3^{(a)}(A_g,5)$	$\frac{\sqrt{15}x(y-z)(y+z)}{2}\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \end{bmatrix}$
516	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$
517	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_3^{(a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
518	symmetry	x

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_1^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 \end{bmatrix}$
519	symmetry	y
	$\mathbb{M}_1^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{10} & 0 \end{bmatrix}$
520	symmetry	z

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_1^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{10} \end{bmatrix}$
521	symmetry	$\sqrt{15}xyz$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{21}}{21} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{42} & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} \\ -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{21} & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 \end{bmatrix}$
522	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{70} \\ \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{3\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{35}i}{35} \\ 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & \frac{\sqrt{35}i}{35} & 0 \\ -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & -\frac{\sqrt{35}}{70} & 0 \\ 0 & \frac{\sqrt{105}}{70} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & \frac{\sqrt{35}}{70} \\ 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{70} & -\frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{35} & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} \\ -\frac{3\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 \end{bmatrix}$
523	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{3\sqrt{35}i}{70} \\ \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & \frac{3\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} \\ 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{70} & -\frac{\sqrt{105}i}{35} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 \\ \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & -\frac{\sqrt{35}}{70} & 0 \\ 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & \frac{\sqrt{35}}{70} \\ 0 & -\frac{3\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{105}i}{70} \\ \frac{3\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & -\frac{\sqrt{105}i}{70} & 0 \end{bmatrix}$
524	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & \frac{\sqrt{105}}{35} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{35} & -\frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} \\ -\frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 \\ 0 & -\frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & \frac{\sqrt{35}i}{70} \\ \frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & -\frac{\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{105}}{35} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{35} \end{bmatrix}$
525	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{21}i}{21} \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{21}i}{21} & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{21}}{42} & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{21} & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \end{bmatrix}$
526	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{21}}{21} & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{21}}{42} & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & \frac{\sqrt{7}i}{14} & 0 \end{bmatrix}$
527	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{M}_3^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{21}}{21} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} \\ \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \\ 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{21}i}{42} \\ \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{21}i}{42} & 0 \\ -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 \\ 0 & \frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 \end{bmatrix}$
528	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
529	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & -\frac{\sqrt{15}i}{30} & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \end{bmatrix}$
530	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & \frac{19\sqrt{7}}{168} & 0 & \frac{\sqrt{7}i}{12} & -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{168} \\ \frac{19\sqrt{7}}{168} & 0 & -\frac{\sqrt{7}i}{12} & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 \\ 0 & \frac{\sqrt{7}i}{12} & 0 & -\frac{2\sqrt{7}}{21} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ -\frac{\sqrt{7}i}{12} & 0 & -\frac{2\sqrt{7}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & \frac{\sqrt{21}i}{84} & 0 \\ -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{7}}{21} & 0 & -\frac{\sqrt{7}i}{42} & \frac{\sqrt{21}}{28} & 0 \\ 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{2\sqrt{7}}{21} & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & \frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{21}}{168} & 0 & -\frac{\sqrt{21}i}{84} & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} \\ -\frac{5\sqrt{21}}{168} & 0 & \frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 \end{bmatrix}$
531	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & -\frac{19\sqrt{7}i}{168} & 0 & \frac{\sqrt{7}}{12} & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{5\sqrt{21}i}{168} \\ \frac{19\sqrt{7}i}{168} & 0 & \frac{\sqrt{7}}{12} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{84} & \frac{5\sqrt{21}i}{168} & 0 \\ 0 & \frac{\sqrt{7}}{12} & 0 & \frac{2\sqrt{7}i}{21} & \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} \\ \frac{\sqrt{7}}{12} & 0 & -\frac{2\sqrt{7}i}{21} & 0 & 0 & -\frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 \\ 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & \frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & 0 \\ \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & \frac{2\sqrt{7}i}{21} & \frac{\sqrt{21}}{28} & 0 \\ 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & -\frac{2\sqrt{7}i}{21} & 0 & 0 & -\frac{\sqrt{21}}{28} \\ 0 & -\frac{5\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & -\frac{3\sqrt{7}i}{56} \\ \frac{5\sqrt{21}i}{168} & 0 & \frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & \frac{3\sqrt{7}i}{56} & 0 \end{bmatrix}$
532	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & -\frac{\sqrt{7}i}{42} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & \frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{42} & 0 & -\frac{\sqrt{7}i}{42} & -\frac{2\sqrt{7}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} \\ \frac{\sqrt{7}}{42} & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & \frac{2\sqrt{7}}{21} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 \\ 0 & \frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{2\sqrt{7}}{21} & 0 & 0 & \frac{\sqrt{21}i}{21} \\ -\frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & \frac{2\sqrt{7}}{21} & -\frac{\sqrt{21}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{21}i}{21} & \frac{\sqrt{7}}{7} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{7}}{7} \end{bmatrix}$
533	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & \frac{\sqrt{5}}{40} & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} \\ \frac{\sqrt{5}}{40} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 \\ 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{15}i}{20} & 0 \\ \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{15}}{20} & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{20} & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} \\ \frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 \end{bmatrix}$
534	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{40} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{15}i}{40} \\ \frac{\sqrt{5}i}{40} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & -\frac{\sqrt{15}i}{40} & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & \frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{3\sqrt{5}i}{40} \\ -\frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & \frac{3\sqrt{5}i}{40} & 0 \end{bmatrix}$
535	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,8)$	$\begin{bmatrix} \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
536	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,9)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{15} & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ -\frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & \frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \end{bmatrix}$
537	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$
	$\mathbb{M}_5^{(1,-1;a)}(A_g,10)$	$\begin{bmatrix} 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & \frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{15} & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & -\frac{\sqrt{5}}{10} & 0 \\ 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{15}i}{20} & 0 \end{bmatrix}$
538	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,11)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & \frac{\sqrt{15}i}{30} & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} \\ -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 \\ 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & -\frac{\sqrt{5}i}{10} & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \end{bmatrix}$
539	symmetry	x
	$\mathbb{M}_1^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}}{70} & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} \\ \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{210}i}{70} \\ 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{140} & -\frac{\sqrt{210}i}{70} & 0 \\ \frac{3\sqrt{70}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & -\frac{3\sqrt{70}i}{140} & \frac{\sqrt{210}}{140} & 0 \\ 0 & -\frac{3\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & \frac{3\sqrt{70}i}{140} & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & -\frac{3\sqrt{70}i}{140} & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{70}}{140} & \frac{3\sqrt{70}i}{140} & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{70} & 0 & \frac{\sqrt{210}i}{70} & \frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} \\ -\frac{\sqrt{210}}{70} & 0 & -\frac{\sqrt{210}i}{70} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 \end{bmatrix}$
540	symmetry	y

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_1^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{210}i}{70} \\ \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} & \frac{\sqrt{210}i}{70} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{70} \\ 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & -\frac{3\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{210}}{70} & 0 \\ 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{70}}{140} & -\frac{\sqrt{70}i}{35} & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 \\ -\frac{3\sqrt{70}}{140} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & -\frac{\sqrt{70}i}{70} & \frac{\sqrt{210}}{140} & 0 \\ 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & -\frac{\sqrt{210}i}{70} & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & 0 & \frac{\sqrt{70}i}{70} \\ \frac{\sqrt{210}i}{70} & 0 & -\frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & -\frac{\sqrt{70}i}{70} & 0 \end{bmatrix}$
541	symmetry	z
	$\mathbb{M}_1^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} -\frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & \frac{3\sqrt{70}i}{140} & 0 & 0 \\ 0 & \frac{\sqrt{70}}{35} & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & -\frac{3\sqrt{70}i}{140} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{35} & 0 & 0 & -\frac{3\sqrt{70}i}{140} & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{35} & \frac{3\sqrt{70}i}{140} & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{70}}{140} & 0 & -\frac{3\sqrt{70}i}{140} & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} \\ \frac{3\sqrt{70}}{140} & 0 & \frac{3\sqrt{70}i}{140} & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & \frac{\sqrt{210}}{140} & 0 \\ 0 & \frac{3\sqrt{70}i}{140} & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ -\frac{3\sqrt{70}i}{140} & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & \frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & -\frac{\sqrt{210}i}{140} & \frac{\sqrt{70}}{35} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{70}}{35} \end{bmatrix}$
542	symmetry	$\sqrt{15}xyz$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & -\frac{\sqrt{21}i}{21} & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{7}i}{28} \\ -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{21} & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 \\ 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \end{bmatrix}$
543	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{M}_3^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{19\sqrt{35}}{420} & 0 & -\frac{\sqrt{35}i}{24} & \frac{5\sqrt{35}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} \\ \frac{19\sqrt{35}}{420} & 0 & \frac{\sqrt{35}i}{24} & 0 & 0 & -\frac{5\sqrt{35}}{168} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 \\ 0 & -\frac{\sqrt{35}i}{24} & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & \frac{\sqrt{105}i}{168} \\ \frac{\sqrt{35}i}{24} & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{84} & -\frac{\sqrt{105}i}{168} & 0 \\ \frac{5\sqrt{35}}{168} & 0 & 0 & 0 & 0 & -\frac{4\sqrt{35}}{105} & 0 & \frac{\sqrt{35}i}{84} & -\frac{\sqrt{105}}{56} & 0 \\ 0 & -\frac{5\sqrt{35}}{168} & 0 & 0 & -\frac{4\sqrt{35}}{105} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & \frac{\sqrt{105}}{56} \\ 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{105} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{84} & -\frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{168} & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{140} \\ -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & \frac{3\sqrt{35}}{140} & 0 \end{bmatrix}$
544	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & -\frac{19\sqrt{35}i}{420} & 0 & -\frac{\sqrt{35}}{24} & 0 & 0 & -\frac{5\sqrt{35}}{168} & 0 & 0 & -\frac{\sqrt{105}i}{84} \\ \frac{19\sqrt{35}i}{420} & 0 & -\frac{\sqrt{35}}{24} & 0 & 0 & 0 & 0 & \frac{5\sqrt{35}}{168} & \frac{\sqrt{105}i}{84} & 0 \\ 0 & -\frac{\sqrt{35}}{24} & 0 & \frac{4\sqrt{35}i}{105} & -\frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} \\ -\frac{\sqrt{35}}{24} & 0 & -\frac{4\sqrt{35}i}{105} & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{84} & \frac{\sqrt{35}i}{105} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & 0 \\ -\frac{5\sqrt{35}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & \frac{4\sqrt{35}i}{105} & -\frac{\sqrt{105}}{56} & 0 \\ 0 & \frac{5\sqrt{35}}{168} & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{4\sqrt{35}i}{105} & 0 & 0 & \frac{\sqrt{105}}{56} \\ 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & -\frac{3\sqrt{35}i}{140} \\ \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & \frac{3\sqrt{35}i}{140} & 0 \end{bmatrix}$
545	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{M}_3^{(1,1;a)}(A_g,4)$	$\begin{bmatrix} \frac{\sqrt{35}}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{105} & -\frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{84} & -\frac{4\sqrt{35}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \\ -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{105}}{42} & 0 \\ 0 & -\frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{105}i}{42} \\ \frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & \frac{4\sqrt{35}}{105} & \frac{\sqrt{105}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & -\frac{\sqrt{105}i}{42} & \frac{2\sqrt{35}}{35} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{2\sqrt{35}}{35} \end{bmatrix}$
546	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{24} & -\frac{\sqrt{21}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{24} & 0 & 0 & \frac{\sqrt{21}}{168} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 \\ 0 & \frac{\sqrt{21}i}{24} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ -\frac{\sqrt{21}i}{24} & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & -\frac{3\sqrt{7}i}{56} & 0 \\ -\frac{\sqrt{21}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{21}i}{28} & -\frac{5\sqrt{7}}{56} & 0 \\ 0 & \frac{\sqrt{21}}{168} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & \frac{5\sqrt{7}}{56} \\ 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & -\frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} \\ -\frac{\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 \end{bmatrix}$
547	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{M}_3^{(1,1;a)}(A_g,6)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{24} & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & 0 & \frac{\sqrt{7}i}{28} \\ \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{168} & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & -\frac{\sqrt{21}}{24} & 0 & \frac{\sqrt{21}i}{21} & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} \\ -\frac{\sqrt{21}}{24} & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{21} & \frac{5\sqrt{7}}{56} & 0 \\ 0 & \frac{\sqrt{21}}{168} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{5\sqrt{7}}{56} \\ 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{21}i}{28} \\ -\frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & -\frac{\sqrt{21}i}{28} & 0 \end{bmatrix}$
548	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 8

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & -\frac{\sqrt{21}i}{21} & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{21} & 0 & -\frac{\sqrt{21}i}{28} & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ \frac{\sqrt{21}}{21} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 \\ 0 & -\frac{\sqrt{21}i}{21} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{7}i}{28} \\ \frac{\sqrt{21}i}{21} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & \frac{\sqrt{7}i}{28} & 0 \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \end{bmatrix}$

bra: $= \langle d_v,\uparrow|\,,\langle d_v,\downarrow|\,,\langle d_{xy},\uparrow|\,,\langle d_{xy},\downarrow|\,,\langle d_{xz},\uparrow|\,,\langle d_{xz},\downarrow|\,,\langle d_{yz},\uparrow|\,,\langle d_{yz},\downarrow|\,,\langle d_u,\uparrow|\,,\langle d_u,\downarrow|$

ket: $= |f_2,\uparrow\rangle\,,|f_2,\downarrow\rangle\,,|f_1,\uparrow\rangle\,,|f_1,\downarrow\rangle\,,|f_{bz},\uparrow\rangle\,,|f_{bz},\downarrow\rangle\,,|f_3,\uparrow\rangle\,,|f_3,\downarrow\rangle\,,|f_{3x},\uparrow\rangle\,,|f_{3x},\downarrow\rangle\,,|f_{3y},\uparrow\rangle\,,|f_{3y},\downarrow\rangle\,,|f_{az},\uparrow\rangle\,,|f_{az},\downarrow\rangle$

Table 9: (d,f) block.

No.	multipole	matrix
549	symmetry	x
	$\mathbb{Q}_1^{(a)}(A_u,1)$	$\begin{bmatrix} \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 & 0 \end{bmatrix}$

continued ...

Table 9

No.	multipole	matrix
550	symmetry	y
	$\mathbb{Q}_1^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 \\ -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{70} & 0 & 0 \end{bmatrix}$
551	symmetry	z
	$\mathbb{Q}_1^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{70} \end{bmatrix}$
552	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 \\ -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
553	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{30}}{240} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{30}}{240} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{240} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{240} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 \end{bmatrix}$
554	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{11\sqrt{30}}{240} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{11\sqrt{30}}{240} & 0 & 0 \\ -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{240} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{240} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} \\ 0 & 0 & \frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{6}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 \end{bmatrix}$
555	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} \end{bmatrix}$
556	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_u,5)$	$\begin{bmatrix} \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
557	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{Q}_3^{(a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 \\ \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} \\ 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \end{bmatrix}$
558	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
559	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
	$\mathbb{Q}_5^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
560	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 \\ -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
561	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$
	$\mathbb{Q}_5^{(a)}(A_u,3)$	$\begin{bmatrix} \frac{11\sqrt{7}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{105}}{336} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{11\sqrt{7}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{105}}{336} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
562	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & \frac{11\sqrt{7}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{105}}{336} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{11\sqrt{7}}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{105}}{336} & 0 & 0 \\ \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} \\ 0 & 0 & \frac{\sqrt{21}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{112} & 0 & 0 \end{bmatrix}$
563	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$
	$\mathbb{Q}_5^{(a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{42} \end{bmatrix}$
564	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(a)}(A_u,6)$	$\begin{bmatrix} \frac{3\sqrt{5}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{5}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{15}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{15}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
565	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$
	$\mathbb{Q}_5^{(a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & \frac{3\sqrt{5}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{16} & 0 & 0 \\ \frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{8} \\ 0 & 0 & -\frac{3\sqrt{15}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{15}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 \end{bmatrix}$
566	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(a)}(A_u,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
567	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$
	$\mathbb{Q}_5^{(a)}(A_u,9)$	$\begin{bmatrix} -\frac{7\sqrt{15}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{7\sqrt{15}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
568	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(a)}(A_u,10)$	$\begin{bmatrix} 0 & 0 & \frac{7\sqrt{15}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{7\sqrt{15}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 \\ \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 \end{bmatrix}$
569	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{Q}_5^{(a)}(A_u,11)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
570	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & -\frac{\sqrt{42}i}{84} & 0 \\ \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} \\ 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{42} \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{42} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 \end{bmatrix}$
571	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & \frac{\sqrt{70}}{140} \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & -\frac{\sqrt{70}}{140} & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{280} \\ 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 \\ 0 & \frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{280} & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{280} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & \frac{\sqrt{105}}{140} & \frac{\sqrt{70}i}{70} & 0 \\ -\frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & -\frac{\sqrt{70}i}{70} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 \end{bmatrix}$
572	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} \\ 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & -\frac{3\sqrt{70}}{280} \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & \frac{3\sqrt{70}}{280} & 0 \\ 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{56} & -\frac{\sqrt{70}i}{70} & 0 \\ \frac{\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & \frac{\sqrt{70}i}{70} \\ 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{280} & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 \\ -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{280} & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{3\sqrt{14}}{56} & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 \end{bmatrix}$
573	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 \\ \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & \frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & \frac{\sqrt{70}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 \end{bmatrix}$
574	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{84} & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} \\ 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 \\ 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 \\ \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{42} & 0 \\ \frac{\sqrt{105}i}{168} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 \end{bmatrix}$
575	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{168} \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{168} & 0 \\ 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{56} & \frac{\sqrt{42}i}{42} & 0 \\ \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & \frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ -\frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{168} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 \end{bmatrix}$
576	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\ \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{84} & 0 \\ \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{84} \\ 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{42} & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & -\frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 \end{bmatrix}$
577	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
	$\mathbb{Q}_5^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{10} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{10} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{10} & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & -\frac{i}{20} & 0 & \frac{1}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & -\frac{i}{20} & 0 & -\frac{1}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & \frac{1}{20} & 0 & \frac{i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & -\frac{1}{20} & 0 & \frac{i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}i}{20} & 0 & \frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{2}i}{20} & 0 & -\frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
578	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{40} & 0 & -\frac{\sqrt{2}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{40} & -\frac{\sqrt{5}i}{10} & 0 \\ \frac{\sqrt{2}i}{40} & 0 & \frac{\sqrt{2}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & \frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 \\ -\frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 \\ -\frac{3\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{15} & 0 & \frac{\sqrt{3}}{20} & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ 0 & \frac{3\sqrt{2}i}{40} & 0 & 0 & -\frac{\sqrt{3}i}{15} & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & -\frac{3\sqrt{2}i}{40} & 0 & 0 & -\frac{\sqrt{3}}{15} & 0 & -\frac{\sqrt{3}i}{20} & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{40} & \frac{\sqrt{3}}{15} & 0 & -\frac{\sqrt{3}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{6}}{40} & \frac{i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 \\ -\frac{\sqrt{6}i}{40} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 & -\frac{i}{5} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 \end{bmatrix}$
579	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$
	$\mathbb{Q}_5^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}i}{560} & 0 & 0 & -\frac{\sqrt{35}}{60} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & \frac{\sqrt{14}i}{336} & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{560} & \frac{\sqrt{35}}{60} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{336} & -\frac{\sqrt{21}}{84} & 0 \\ -\frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{60} & \frac{13\sqrt{14}i}{336} & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}i}{168} \\ 0 & \frac{\sqrt{210}i}{560} & 0 & 0 & -\frac{5\sqrt{35}i}{168} & 0 & -\frac{\sqrt{35}}{60} & 0 & 0 & -\frac{13\sqrt{14}i}{336} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 \\ 0 & \frac{17\sqrt{210}}{1680} & 0 & \frac{5\sqrt{210}i}{336} & 0 & 0 & -\frac{\sqrt{35}i}{60} & 0 & 0 & \frac{\sqrt{14}}{336} & 0 & -\frac{5\sqrt{14}i}{336} & 0 & 0 \\ -\frac{17\sqrt{210}}{1680} & 0 & \frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{60} & -\frac{\sqrt{14}}{336} & 0 & -\frac{5\sqrt{14}i}{336} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{11\sqrt{210}}{1680} & \frac{\sqrt{35}i}{120} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{336} & -\frac{\sqrt{21}i}{56} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & \frac{11\sqrt{210}}{1680} & 0 & 0 & -\frac{\sqrt{35}i}{120} & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{336} & 0 & 0 & \frac{\sqrt{21}i}{56} \\ 0 & 0 & -\frac{\sqrt{70}i}{80} & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{80} & \frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 \end{bmatrix}$
580	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} -\frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{60} & 0 & -\frac{\sqrt{35}}{84} & \frac{\sqrt{14}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & \frac{\sqrt{210}i}{560} & 0 & 0 & \frac{\sqrt{35}i}{60} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & -\frac{\sqrt{14}i}{336} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{560} & 0 & 0 & -\frac{5\sqrt{35}}{168} & 0 & -\frac{\sqrt{35}i}{60} & 0 & 0 & -\frac{13\sqrt{14}i}{336} & 0 & 0 & -\frac{5\sqrt{21}}{168} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{560} & \frac{5\sqrt{35}}{168} & 0 & -\frac{\sqrt{35}i}{60} & 0 & 0 & 0 & 0 & \frac{13\sqrt{14}i}{336} & \frac{5\sqrt{21}}{168} & 0 \\ 0 & -\frac{11\sqrt{210}i}{1680} & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{336} & 0 & -\frac{5\sqrt{14}}{168} & \frac{\sqrt{21}i}{56} & 0 \\ -\frac{11\sqrt{210}i}{1680} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{120} & 0 & 0 & \frac{\sqrt{14}i}{336} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{56} \\ 0 & \frac{5\sqrt{210}}{336} & 0 & \frac{17\sqrt{210}i}{1680} & 0 & 0 & \frac{\sqrt{35}i}{60} & 0 & 0 & \frac{5\sqrt{14}}{336} & 0 & -\frac{\sqrt{14}i}{336} & 0 & 0 \\ -\frac{5\sqrt{210}}{336} & 0 & \frac{17\sqrt{210}i}{1680} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{60} & -\frac{5\sqrt{14}}{336} & 0 & -\frac{\sqrt{14}i}{336} & 0 & 0 & 0 \\ -\frac{\sqrt{70}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 & \frac{\sqrt{105}}{84} & -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{80} & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
581	$\mathbb{Q}_5^{(1,-1;a)}(A_u,5)$	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$ $\begin{bmatrix} 0 & \frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 \\ -\frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{42} & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{420} & 0 & \frac{\sqrt{210}}{420} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & \frac{\sqrt{14}}{42} & 0 & 0 \\ \frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{60} & 0 & \frac{\sqrt{35}i}{60} & 0 & 0 & -\frac{5\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{60} & 0 & \frac{\sqrt{35}i}{60} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{84} & \frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{60} & 0 & -\frac{\sqrt{35}}{60} & \frac{5\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{60} & 0 & \frac{\sqrt{35}}{60} & 0 & 0 & -\frac{5\sqrt{14}i}{84} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
582	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}i}{80} & 0 & 0 & -\frac{1}{20} & 0 & \frac{i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{80} & \frac{1}{20} & 0 & \frac{i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & \frac{\sqrt{15}}{20} & 0 \\ -\frac{\sqrt{6}i}{80} & 0 & 0 & 0 & 0 & -\frac{3i}{40} & 0 & \frac{1}{20} & -\frac{\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} \\ 0 & \frac{\sqrt{6}i}{80} & 0 & 0 & -\frac{3i}{40} & 0 & -\frac{1}{20} & 0 & 0 & \frac{\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 \\ 0 & -\frac{\sqrt{6}}{80} & 0 & -\frac{\sqrt{6}i}{80} & 0 & 0 & -\frac{i}{20} & 0 & 0 & -\frac{\sqrt{10}}{80} & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 \\ \frac{\sqrt{6}}{80} & 0 & -\frac{\sqrt{6}i}{80} & 0 & 0 & 0 & 0 & \frac{i}{20} & \frac{\sqrt{10}}{80} & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{6}}{16} & \frac{i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{80} & -\frac{\sqrt{15}i}{40} & 0 \\ \frac{\sqrt{6}i}{40} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{80} & 0 & 0 & \frac{\sqrt{15}i}{40} \\ 0 & 0 & \frac{9\sqrt{2}i}{80} & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{3}i}{20} & 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{2}i}{80} & -\frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{3}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{80} & 0 & 0 \end{bmatrix}$
583	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$
	$\mathbb{Q}_5^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} -\frac{\sqrt{6}i}{80} & 0 & 0 & 0 & 0 & \frac{i}{20} & 0 & \frac{1}{20} & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & \frac{\sqrt{6}i}{80} & 0 & 0 & \frac{i}{20} & 0 & -\frac{1}{20} & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{80} & 0 & 0 & -\frac{3}{40} & 0 & -\frac{i}{20} & 0 & 0 & \frac{\sqrt{10}i}{80} & 0 & 0 & \frac{\sqrt{15}}{40} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{80} & \frac{3}{40} & 0 & -\frac{i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{80} & -\frac{\sqrt{15}}{40} & 0 \\ 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{40} & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{80} & 0 & -\frac{\sqrt{10}}{40} & \frac{\sqrt{15}i}{40} & 0 \\ -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{40} & 0 & 0 & -\frac{i}{8} & 0 & 0 & -\frac{\sqrt{10}i}{80} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & -\frac{\sqrt{15}i}{40} \\ 0 & -\frac{\sqrt{6}}{80} & 0 & -\frac{\sqrt{6}i}{80} & 0 & 0 & \frac{i}{20} & 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & \frac{\sqrt{10}i}{80} & 0 & 0 \\ \frac{\sqrt{6}}{80} & 0 & -\frac{\sqrt{6}i}{80} & 0 & 0 & 0 & 0 & -\frac{i}{20} & -\frac{3\sqrt{10}}{80} & 0 & \frac{\sqrt{10}i}{80} & 0 & 0 & 0 \\ \frac{9\sqrt{2}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & -\frac{\sqrt{3}}{20} & -\frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{9\sqrt{2}i}{80} & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & \frac{\sqrt{3}}{20} & 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 \end{bmatrix}$
584	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,-1;a)}(A_u,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{10} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{10} & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{10} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & \frac{1}{20} & 0 & \frac{i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{20} & -\frac{1}{20} & 0 & \frac{i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{20} & 0 & 0 & 0 & 0 & \frac{i}{20} & 0 & -\frac{1}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & \frac{i}{20} & 0 & \frac{1}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}}{20} & 0 & \frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{2}}{20} & 0 & \frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
585	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$
	$\mathbb{Q}_5^{(1,-1;a)}(A_u,9)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{40} & 0 & 0 & \frac{\sqrt{3}}{15} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{40} & -\frac{\sqrt{3}}{15} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 \\ -\frac{\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} & 0 & -\frac{\sqrt{3}}{15} & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & \frac{\sqrt{2}i}{40} & 0 & 0 & \frac{\sqrt{3}i}{60} & 0 & \frac{\sqrt{3}}{15} & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 \\ 0 & -\frac{\sqrt{2}}{10} & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & -\frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 \\ \frac{\sqrt{2}}{10} & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{15} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{8} & 0 & \frac{\sqrt{2}}{10} & \frac{\sqrt{3}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ -\frac{\sqrt{2}i}{8} & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & 0 & 0 & -\frac{i}{10} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{40} & 0 & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 \end{bmatrix}$
586	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,-1;a)}(A_u,10)$	$\begin{bmatrix} \frac{\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{15} & 0 & -\frac{\sqrt{3}}{10} & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{40} & 0 & 0 & \frac{\sqrt{3}i}{15} & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{40} & 0 & 0 & -\frac{\sqrt{3}}{60} & 0 & -\frac{\sqrt{3}i}{15} & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{40} & \frac{\sqrt{3}}{60} & 0 & -\frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{2}i}{10} & 0 & \frac{\sqrt{2}}{8} & -\frac{\sqrt{3}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & -\frac{\sqrt{5}i}{20} & 0 \\ -\frac{\sqrt{2}i}{10} & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & \frac{\sqrt{3}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & \frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & -\frac{\sqrt{3}i}{15} & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{2}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{15} & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{10} & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 \end{bmatrix}$
587	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{Q}_5^{(1,-1;a)}(A_u,11)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 \\ -\frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{40} & 0 & \frac{\sqrt{2}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{40} & -\frac{\sqrt{5}i}{10} & 0 \\ -\frac{\sqrt{2}i}{40} & 0 & -\frac{\sqrt{2}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & -\frac{3\sqrt{2}i}{40} & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & -\frac{\sqrt{3}i}{15} & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & \frac{3\sqrt{2}i}{40} & \frac{\sqrt{3}}{20} & 0 & -\frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & \frac{\sqrt{5}}{20} & 0 \\ \frac{3\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{20} & 0 & -\frac{\sqrt{3}}{15} & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ 0 & -\frac{3\sqrt{2}i}{40} & 0 & 0 & \frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{3}}{15} & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & \frac{\sqrt{6}}{40} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & \frac{i}{5} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 \\ -\frac{\sqrt{6}}{40} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & 0 & 0 & -\frac{i}{5} & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \end{bmatrix}$
588	symmetry	x

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_1^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 \\ \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & \frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & \frac{3\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & -\frac{3\sqrt{70}}{140} & 0 \end{bmatrix}$
589	symmetry	y
	$\mathbb{Q}_1^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{3\sqrt{70}i}{140} & 0 \end{bmatrix}$
590	symmetry	z

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_1^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 \\ \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 \end{bmatrix}$
591	symmetry	$\sqrt{15}xyz$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}i}{48} & 0 & -\frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & -\frac{\sqrt{6}}{48} & -\frac{i}{6} & 0 \\ \frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & \frac{i}{6} \\ 0 & \frac{\sqrt{10}}{48} & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ -\frac{\sqrt{10}}{48} & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{24} \\ 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{i}{24} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{1}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & -\frac{1}{24} & 0 \\ 0 & \frac{\sqrt{30}i}{48} & 0 & \frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & \frac{\sqrt{2}}{16} & 0 & 0 \\ \frac{\sqrt{30}i}{48} & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 \end{bmatrix}$
592	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{160} & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{96} & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{160} & \frac{\sqrt{15}}{24} & 0 \\ \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & \frac{7\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & -\frac{7\sqrt{10}i}{160} & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{6}}{96} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{3\sqrt{10}}{160} & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & -\frac{3\sqrt{10}}{160} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{6}}{96} & -\frac{3i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{7\sqrt{10}}{160} & \frac{\sqrt{15}i}{240} & 0 \\ 0 & 0 & -\frac{5\sqrt{6}}{96} & 0 & 0 & \frac{3i}{16} & 0 & 0 & 0 & 0 & \frac{7\sqrt{10}}{160} & 0 & 0 & -\frac{\sqrt{15}i}{240} \\ 0 & 0 & \frac{5\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{160} & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & -\frac{5\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{160} & \frac{\sqrt{5}}{20} & 0 \end{bmatrix}$
593	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{3\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} \\ 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{160} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & -\frac{7\sqrt{10}i}{160} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & \frac{7\sqrt{10}i}{160} & 0 & 0 \\ 0 & \frac{5\sqrt{6}i}{96} & 0 & 0 & -\frac{3i}{16} & 0 & 0 & 0 & 0 & \frac{7\sqrt{10}i}{160} & 0 & 0 & -\frac{\sqrt{15}i}{240} & 0 \\ \frac{5\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & \frac{3i}{16} & 0 & 0 & \frac{7\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{240} \\ 0 & 0 & 0 & \frac{5\sqrt{6}i}{96} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{160} & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & -\frac{3\sqrt{10}i}{160} & 0 & 0 & 0 \\ \frac{5\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & -\frac{5\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{160} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 \end{bmatrix}$
594	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 \\ -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 \\ \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} \\ 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} \\ 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 \end{bmatrix}$
595	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{10}i}{96} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{96} & 0 & 0 & -\frac{1}{24} \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{96} & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{96} & \frac{1}{24} & 0 \\ \frac{\sqrt{10}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & -\frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & \frac{i}{6} \\ 0 & -\frac{\sqrt{10}i}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & \frac{i}{6} & 0 \\ 0 & \frac{\sqrt{10}}{96} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ -\frac{\sqrt{10}}{96} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & \frac{\sqrt{6}}{96} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{96} & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{32} & \frac{i}{48} & 0 \\ \frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{10}}{96} & 0 & 0 & -\frac{\sqrt{15}i}{48} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & -\frac{i}{48} \\ 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{32} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{32} & \frac{\sqrt{3}}{12} & 0 \end{bmatrix}$
596	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,0;a)}(A_u,6)$	$\begin{bmatrix} -\frac{\sqrt{10}i}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & \frac{5\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & \frac{i}{24} \\ 0 & \frac{\sqrt{10}i}{96} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{96} & 0 & 0 & \frac{i}{24} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & \frac{1}{6} \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{96} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{96} & -\frac{1}{6} & 0 \\ 0 & -\frac{\sqrt{10}i}{96} & 0 & -\frac{\sqrt{10}}{24} & -\frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & -\frac{\sqrt{6}}{24} & \frac{i}{48} & 0 \\ -\frac{\sqrt{10}i}{96} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & -\frac{i}{48} \\ 0 & \frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{96} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 \\ -\frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} \\ 0 & -\frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{32} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 \end{bmatrix}$
597	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{Q}_3^{(1,0;a)}(A_u,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ \frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{48} & 0 & -\frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & \frac{i}{6} & 0 \\ \frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & -\frac{\sqrt{6}}{48} & 0 & 0 & -\frac{i}{6} \\ 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{1}{24} \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & -\frac{1}{24} & 0 \\ \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{24} \\ 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & \frac{i}{24} & 0 \\ 0 & \frac{\sqrt{30}}{48} & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 \\ -\frac{\sqrt{30}}{48} & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 \end{bmatrix}$
598	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & \frac{i}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & -\frac{i}{5} & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{i}{5} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{5} & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{15} & 0 & 0 & 0 & 0 & -\frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{15} & 0 & 0 & -\frac{i}{10} & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{15} & 0 & 0 & \frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{15} & -\frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{20} & 0 & -\frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
599	$\mathbb{Q}_5^{(1,0;a)}(A_u,2)$	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{2}i}{120} & 0 & -\frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & -\frac{\sqrt{5}i}{30} & 0 \\ \frac{\sqrt{2}i}{120} & 0 & \frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}i}{30} \\ 0 & \frac{\sqrt{2}}{120} & 0 & \frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 \\ -\frac{\sqrt{2}}{120} & 0 & \frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & \frac{\sqrt{3}}{10} & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{15} \\ 0 & -\frac{\sqrt{2}i}{60} & 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{5}i}{15} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{60} & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{5}}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{60} & -\frac{\sqrt{3}}{30} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{60} & \frac{\sqrt{5}}{15} & 0 \\ 0 & \frac{\sqrt{6}i}{30} & 0 & \frac{\sqrt{6}}{30} & -\frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 \\ \frac{\sqrt{6}i}{30} & 0 & -\frac{\sqrt{6}}{30} & 0 & 0 & \frac{i}{10} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \end{bmatrix}$
600	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{53\sqrt{210}i}{3360} & 0 & 0 & \frac{13\sqrt{35}}{560} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{224} & 0 & 0 & -\frac{\sqrt{21}}{48} \\ 0 & 0 & 0 & \frac{53\sqrt{210}i}{3360} & -\frac{13\sqrt{35}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{224} & \frac{\sqrt{21}}{48} & 0 \\ -\frac{13\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{210}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{240} & \frac{3\sqrt{35}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{112} & -\frac{\sqrt{21}i}{168} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{240} & 0 & 0 & -\frac{3\sqrt{35}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{112} & 0 & 0 & \frac{\sqrt{21}i}{168} \\ 0 & 0 & \frac{\sqrt{70}i}{160} & 0 & 0 & -\frac{\sqrt{105}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{224} & 0 & 0 & \frac{5\sqrt{7}}{112} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{160} & \frac{\sqrt{105}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{224} & -\frac{5\sqrt{7}}{112} & 0 \end{bmatrix}$
601	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$
	$\mathbb{Q}_5^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} \frac{53\sqrt{210}i}{3360} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{35}i}{560} & 0 & 0 & \frac{3\sqrt{14}i}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{48} \\ 0 & -\frac{53\sqrt{210}i}{3360} & 0 & 0 & -\frac{13\sqrt{35}i}{560} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{224} & 0 & 0 & -\frac{\sqrt{21}i}{48} & 0 \\ 0 & 0 & -\frac{13\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{13\sqrt{210}i}{840} & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{240} & 0 & 0 & \frac{3\sqrt{35}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 \\ -\frac{\sqrt{210}i}{240} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{280} & 0 & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{168} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{120} & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 \\ \frac{\sqrt{70}i}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{80} & 0 & 0 & \frac{\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{112} \\ 0 & -\frac{\sqrt{70}i}{160} & 0 & 0 & -\frac{\sqrt{105}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{224} & 0 & 0 & -\frac{5\sqrt{7}i}{112} & 0 \end{bmatrix}$
602	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 \\ \frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{840} & 0 & -\frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 \end{bmatrix}$
603	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$
	$\mathbb{Q}_5^{(1,0;a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & -\frac{13\sqrt{6}i}{480} & 0 & 0 & -\frac{3}{80} & 0 & \frac{i}{10} & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{15}}{240} \\ 0 & 0 & 0 & \frac{13\sqrt{6}i}{480} & \frac{3}{80} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{32} & -\frac{\sqrt{15}}{240} & 0 \\ -\frac{\sqrt{6}i}{40} & 0 & 0 & 0 & 0 & \frac{i}{10} & 0 & \frac{1}{10} & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{30} \\ 0 & \frac{\sqrt{6}i}{40} & 0 & 0 & \frac{i}{10} & 0 & -\frac{1}{10} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 \\ 0 & -\frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{6}i}{60} & 0 & 0 & -\frac{i}{10} & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ \frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{6}i}{60} & 0 & 0 & 0 & 0 & \frac{i}{10} & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{20} & 0 & \frac{\sqrt{6}}{48} & -\frac{i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{3\sqrt{10}}{80} & -\frac{\sqrt{15}i}{120} & 0 \\ \frac{\sqrt{6}i}{20} & 0 & -\frac{\sqrt{6}}{48} & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 & \frac{\sqrt{15}i}{120} \\ 0 & 0 & -\frac{9\sqrt{2}i}{160} & 0 & 0 & \frac{\sqrt{3}}{80} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{30}i}{160} & 0 & 0 & \frac{\sqrt{5}}{16} \\ 0 & 0 & 0 & \frac{9\sqrt{2}i}{160} & -\frac{\sqrt{3}}{80} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{160} & -\frac{\sqrt{5}}{16} & 0 \end{bmatrix}$
604	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,0;a)}(A_u,7)$	$\begin{bmatrix} \frac{13\sqrt{6}i}{480} & 0 & 0 & 0 & 0 & \frac{3i}{80} & 0 & \frac{1}{10} & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{240} \\ 0 & -\frac{13\sqrt{6}i}{480} & 0 & 0 & \frac{3i}{80} & 0 & -\frac{1}{10} & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{15}i}{240} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & \frac{1}{10} & 0 & -\frac{i}{10} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & -\frac{\sqrt{15}}{30} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{40} & -\frac{1}{10} & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{40} & \frac{\sqrt{15}}{30} & 0 \\ 0 & \frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{20} & -\frac{i}{8} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{80} & 0 & -\frac{\sqrt{10}}{20} & \frac{\sqrt{15}i}{120} & 0 \\ \frac{\sqrt{6}i}{48} & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{3\sqrt{10}i}{80} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{120} \\ 0 & \frac{\sqrt{6}}{60} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & \frac{i}{10} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 \\ -\frac{\sqrt{6}}{60} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & 0 & 0 & -\frac{i}{10} & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ -\frac{9\sqrt{2}i}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{80} & 0 & -\frac{\sqrt{3}}{10} & \frac{\sqrt{30}i}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} \\ 0 & \frac{9\sqrt{2}i}{160} & 0 & 0 & \frac{\sqrt{3}i}{80} & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & -\frac{\sqrt{30}i}{160} & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 \end{bmatrix}$
605	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{Q}_5^{(1,0;a)}(A_u,8)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{i}{5} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{5} & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & -\frac{i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 \\ \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & \frac{i}{5} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{15} & 0 & 0 & \frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{15} & -\frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{15} & 0 & 0 & 0 & 0 & \frac{i}{10} & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{15} & 0 & 0 & \frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
606	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,0;a)}(A_u,9)$	$\begin{bmatrix} 0 & 0 & \frac{37\sqrt{2}i}{240} & 0 & 0 & \frac{\sqrt{3}}{120} & 0 & -\frac{\sqrt{3}i}{20} & 0 & 0 & \frac{\sqrt{30}i}{240} & 0 & 0 & -\frac{\sqrt{5}}{24} \\ 0 & 0 & 0 & -\frac{37\sqrt{2}i}{240} & -\frac{\sqrt{3}}{120} & 0 & -\frac{\sqrt{3}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{240} & \frac{\sqrt{5}}{24} & 0 \\ \frac{19\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{3}}{30} & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{60} \\ 0 & -\frac{19\sqrt{2}i}{120} & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & -\frac{\sqrt{3}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & \frac{\sqrt{5}i}{60} & 0 \\ 0 & \frac{\sqrt{2}}{120} & 0 & -\frac{7\sqrt{2}i}{120} & 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 \\ -\frac{\sqrt{2}}{120} & 0 & -\frac{7\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{30} & \frac{\sqrt{30}}{24} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{24} & 0 & \frac{\sqrt{2}}{30} & \frac{\sqrt{3}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & -\frac{\sqrt{5}i}{60} & 0 \\ -\frac{\sqrt{2}i}{24} & 0 & -\frac{\sqrt{2}}{30} & 0 & 0 & -\frac{\sqrt{3}i}{60} & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{60} \\ 0 & 0 & \frac{\sqrt{6}i}{80} & 0 & 0 & -\frac{1}{8} & 0 & \frac{i}{20} & 0 & 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 & \frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{80} & \frac{1}{8} & 0 & \frac{i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{80} & -\frac{\sqrt{15}}{24} & 0 \end{bmatrix}$
607	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$
	$\mathbb{Q}_5^{(1,0;a)}(A_u,10)$	$\begin{bmatrix} \frac{37\sqrt{2}i}{240} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{120} & 0 & \frac{\sqrt{3}}{20} & -\frac{\sqrt{30}i}{240} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{24} \\ 0 & -\frac{37\sqrt{2}i}{240} & 0 & 0 & \frac{\sqrt{3}i}{120} & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & \frac{\sqrt{30}i}{240} & 0 & 0 & \frac{\sqrt{5}i}{24} & 0 \\ 0 & 0 & -\frac{19\sqrt{2}i}{120} & 0 & 0 & \frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & \frac{\sqrt{5}}{60} \\ 0 & 0 & 0 & \frac{19\sqrt{2}i}{120} & -\frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & -\frac{\sqrt{5}}{60} & 0 \\ 0 & -\frac{\sqrt{2}i}{30} & 0 & \frac{\sqrt{2}}{24} & -\frac{\sqrt{3}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & -\frac{\sqrt{5}i}{60} & 0 \\ -\frac{\sqrt{2}i}{30} & 0 & -\frac{\sqrt{2}}{24} & 0 & 0 & \frac{\sqrt{3}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}i}{60} \\ 0 & \frac{7\sqrt{2}}{120} & 0 & -\frac{\sqrt{2}i}{120} & 0 & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ -\frac{7\sqrt{2}}{120} & 0 & -\frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{30} & -\frac{\sqrt{30}}{120} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{80} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{20} & -\frac{\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & \frac{\sqrt{6}i}{80} & 0 & 0 & \frac{i}{8} & 0 & -\frac{1}{20} & 0 & 0 & \frac{\sqrt{10}i}{80} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 \end{bmatrix}$
608	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_5^{(1,0;a)}(A_u,11)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{120} & 0 & \frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 \\ -\frac{\sqrt{2}}{120} & 0 & \frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{120} & 0 & \frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & -\frac{\sqrt{5}i}{30} & 0 \\ -\frac{\sqrt{2}i}{120} & 0 & -\frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}i}{30} \\ 0 & 0 & \frac{\sqrt{2}i}{60} & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{5}}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{60} & \frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & -\frac{\sqrt{5}}{15} & 0 \\ -\frac{\sqrt{2}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & \frac{\sqrt{3}}{30} & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{15} \\ 0 & \frac{\sqrt{2}i}{60} & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & -\frac{\sqrt{3}}{30} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & \frac{\sqrt{5}i}{15} & 0 \\ 0 & -\frac{\sqrt{6}}{30} & 0 & \frac{\sqrt{6}i}{30} & 0 & 0 & -\frac{i}{10} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ \frac{\sqrt{6}}{30} & 0 & \frac{\sqrt{6}i}{30} & 0 & 0 & 0 & 0 & \frac{i}{10} & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \end{bmatrix}$
609	symmetry	x
	$\mathbb{Q}_1^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}}{140} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} & \frac{\sqrt{105}}{140} & 0 \\ \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 \\ 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 \\ \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{3\sqrt{70}}{280} & -\frac{\sqrt{105}i}{70} & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & \frac{\sqrt{105}i}{70} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & 0 \end{bmatrix}$
610	symmetry	y

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_1^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & \frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}}{140} \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} & \frac{\sqrt{105}}{140} & 0 \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & \frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{70} & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{70} \\ 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{280} & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 \\ -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & -\frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & 0 & 0 \end{bmatrix}$
611	symmetry	z
	$\mathbb{Q}_1^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 \\ -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & -\frac{3\sqrt{70}}{280} & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 \\ \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & \frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & -\frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & 0 \end{bmatrix}$
612	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{560} & 0 & -\frac{\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}i}{112} & 0 & \frac{3\sqrt{42}}{112} & \frac{\sqrt{7}i}{14} & 0 \\ \frac{\sqrt{70}i}{560} & 0 & \frac{\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}i}{112} & 0 & -\frac{3\sqrt{42}}{112} & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & \frac{\sqrt{70}}{560} & 0 & \frac{\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{336} & 0 & -\frac{5\sqrt{42}i}{336} & 0 & 0 \\ -\frac{\sqrt{70}}{560} & 0 & \frac{\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{336} & 0 & -\frac{5\sqrt{42}i}{336} & 0 & 0 & 0 \\ \frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{120} & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} \\ 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 \\ 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & \frac{\sqrt{7}}{56} \\ 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} & \frac{\sqrt{105}}{120} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & -\frac{\sqrt{7}}{56} & 0 \\ 0 & -\frac{\sqrt{210}i}{80} & 0 & -\frac{\sqrt{210}}{80} & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{112} & 0 & -\frac{\sqrt{14}}{112} & 0 & 0 \\ -\frac{\sqrt{210}i}{80} & 0 & \frac{\sqrt{210}}{80} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & \frac{\sqrt{14}i}{112} & 0 & \frac{\sqrt{14}}{112} & 0 & 0 & 0 \end{bmatrix}$
613	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}}{24} & 0 & -\frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{70}i}{672} & 0 & 0 & -\frac{\sqrt{105}}{168} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{224} & -\frac{\sqrt{7}}{24} & 0 & -\frac{\sqrt{7}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{672} & \frac{\sqrt{105}}{168} & 0 \\ \frac{\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & -\frac{\sqrt{7}}{24} & -\frac{13\sqrt{70}i}{672} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} \\ 0 & -\frac{\sqrt{42}i}{224} & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & \frac{\sqrt{7}}{24} & 0 & 0 & \frac{13\sqrt{70}i}{672} & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 \\ 0 & -\frac{17\sqrt{42}}{672} & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & \frac{\sqrt{7}i}{24} & 0 & 0 & -\frac{\sqrt{70}}{672} & 0 & -\frac{\sqrt{70}i}{168} & 0 & 0 \\ \frac{17\sqrt{42}}{672} & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{24} & \frac{\sqrt{70}}{672} & 0 & -\frac{\sqrt{70}i}{168} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{84} & 0 & \frac{11\sqrt{42}}{672} & -\frac{\sqrt{7}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{672} & \frac{\sqrt{105}i}{112} & 0 \\ \frac{\sqrt{42}i}{84} & 0 & -\frac{11\sqrt{42}}{672} & 0 & 0 & \frac{\sqrt{7}i}{48} & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{672} & 0 & 0 & -\frac{\sqrt{105}i}{112} \\ 0 & 0 & \frac{\sqrt{14}i}{32} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}i}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{32} & -\frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{224} & 0 & 0 \end{bmatrix}$
614	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} \frac{\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{24} & 0 & -\frac{\sqrt{7}}{42} & -\frac{\sqrt{70}i}{672} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ 0 & -\frac{\sqrt{42}i}{224} & 0 & 0 & -\frac{\sqrt{7}i}{24} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{70}i}{672} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{224} & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & \frac{\sqrt{7}i}{24} & 0 & 0 & \frac{13\sqrt{70}i}{672} & 0 & 0 & -\frac{\sqrt{105}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{224} & \frac{5\sqrt{7}}{84} & 0 & \frac{\sqrt{7}i}{24} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{70}i}{672} & \frac{\sqrt{105}}{84} & 0 \\ 0 & \frac{11\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{84} & -\frac{\sqrt{7}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{672} & 0 & -\frac{\sqrt{70}}{84} & -\frac{\sqrt{105}i}{112} & 0 \\ \frac{11\sqrt{42}i}{672} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & \frac{\sqrt{7}i}{48} & 0 & 0 & -\frac{\sqrt{70}i}{672} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & \frac{\sqrt{105}i}{112} \\ 0 & \frac{5\sqrt{42}}{168} & 0 & -\frac{17\sqrt{42}i}{672} & 0 & 0 & -\frac{\sqrt{7}i}{24} & 0 & 0 & \frac{\sqrt{70}}{168} & 0 & \frac{\sqrt{70}i}{672} & 0 & 0 \\ -\frac{5\sqrt{42}}{168} & 0 & -\frac{17\sqrt{42}i}{672} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{24} & -\frac{\sqrt{70}}{168} & 0 & \frac{\sqrt{70}i}{672} & 0 & 0 & 0 \\ \frac{\sqrt{14}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{224} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{32} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{224} & 0 & 0 & 0 & 0 \end{bmatrix}$
615	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{Q}_3^{(1,1;a)}(A_u,4)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 \\ \frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{21} & \frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & -\frac{\sqrt{7}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 \\ -\frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & \frac{\sqrt{7}i}{21} & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{24} & 0 & -\frac{\sqrt{7}i}{24} & 0 & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & \frac{\sqrt{105}}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{24} & 0 & -\frac{\sqrt{7}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{42} & -\frac{\sqrt{105}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{24} & 0 & \frac{\sqrt{7}}{24} & \frac{\sqrt{70}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{24} & 0 & -\frac{\sqrt{7}}{24} & 0 & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 \end{bmatrix}$
616	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,1;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{70}i}{224} & 0 & 0 & -\frac{\sqrt{105}}{120} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & \frac{17\sqrt{42}i}{672} & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{224} & \frac{\sqrt{105}}{120} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{42}i}{672} & \frac{3\sqrt{7}}{56} & 0 \\ \frac{\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & \frac{\sqrt{105}}{120} & -\frac{\sqrt{42}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & -\frac{\sqrt{70}i}{224} & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & \frac{\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 \\ 0 & \frac{\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{105}i}{120} & 0 & 0 & -\frac{\sqrt{42}}{224} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \\ -\frac{\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{120} & \frac{\sqrt{42}}{224} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{23\sqrt{70}}{1120} & -\frac{\sqrt{105}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{224} & \frac{5\sqrt{7}i}{112} & 0 \\ -\frac{\sqrt{70}i}{56} & 0 & \frac{23\sqrt{70}}{1120} & 0 & 0 & \frac{\sqrt{105}i}{80} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{224} & 0 & 0 & -\frac{5\sqrt{7}i}{112} \\ 0 & 0 & -\frac{\sqrt{210}i}{160} & 0 & 0 & \frac{3\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{5\sqrt{14}i}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{160} & -\frac{3\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{224} & 0 & 0 \end{bmatrix}$
617	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{Q}_3^{(1,1;a)}(A_u,6)$	$\begin{bmatrix} -\frac{\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{120} & 0 & -\frac{\sqrt{105}}{70} & -\frac{17\sqrt{42}i}{672} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ 0 & \frac{\sqrt{70}i}{224} & 0 & 0 & -\frac{\sqrt{105}i}{120} & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & \frac{17\sqrt{42}i}{672} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{224} & 0 & 0 & -\frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{120} & 0 & 0 & -\frac{\sqrt{42}i}{224} & 0 & 0 & \frac{\sqrt{7}}{28} \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{224} & \frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{224} & -\frac{\sqrt{7}}{28} & 0 \\ 0 & \frac{23\sqrt{70}i}{1120} & 0 & \frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{224} & 0 & \frac{\sqrt{42}}{56} & \frac{5\sqrt{7}i}{112} & 0 \\ \frac{23\sqrt{70}i}{1120} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{80} & 0 & 0 & \frac{\sqrt{42}i}{224} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{5\sqrt{7}i}{112} \\ 0 & \frac{\sqrt{70}}{140} & 0 & -\frac{\sqrt{70}i}{224} & 0 & 0 & \frac{\sqrt{105}i}{120} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{224} & 0 & 0 \\ -\frac{\sqrt{70}}{140} & 0 & -\frac{\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{120} & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{224} & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{160} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{70} & -\frac{5\sqrt{14}i}{224} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{160} & 0 & 0 & -\frac{3\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & \frac{5\sqrt{14}i}{224} & 0 & 0 & 0 & 0 \end{bmatrix}$
618	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{Q}_3^{(1,1;a)}(A_u,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{70}}{560} & 0 & -\frac{\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{336} & 0 & -\frac{5\sqrt{42}i}{336} & 0 & 0 \\ \frac{\sqrt{70}}{560} & 0 & -\frac{\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{336} & 0 & -\frac{5\sqrt{42}i}{336} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{560} & 0 & -\frac{\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{112} & 0 & -\frac{3\sqrt{42}}{112} & -\frac{\sqrt{7}i}{14} & 0 \\ \frac{\sqrt{70}i}{560} & 0 & \frac{\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}i}{112} & 0 & \frac{3\sqrt{42}}{112} & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{120} & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & \frac{\sqrt{7}}{56} \\ 0 & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & \frac{\sqrt{105}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & -\frac{\sqrt{7}}{56} & 0 \\ \frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{120} & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} \\ 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 \\ 0 & -\frac{\sqrt{210}}{80} & 0 & \frac{\sqrt{210}i}{80} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{14}}{112} & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 \\ \frac{\sqrt{210}}{80} & 0 & \frac{\sqrt{210}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{14}}{112} & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 & 0 \end{bmatrix}$
619	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_2^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
620	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_2^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} \\ 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \\ \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
621	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_2^{(a)}(A_u,3)$	$\begin{bmatrix} -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
622	symmetry	$\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_2^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 \\ -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 \end{bmatrix}$
623	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
624	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & 0 \\ -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
625	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{G}_4^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 \\ \frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
626	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} \\ 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 \\ \frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
627	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{G}_4^{(a)}(A_u,4)$	$\begin{bmatrix} -\frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
628	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & 0 \\ \frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} \\ 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \end{bmatrix}$
629	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_4^{(a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
630	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(a)}(A_u,7)$	$\begin{bmatrix} -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{14}}{112} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{112} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{70}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{70}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
631	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{G}_4^{(a)}(A_u,8)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{14}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{14}}{112} & 0 & 0 \\ -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{112} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{56} \\ 0 & 0 & \frac{3\sqrt{70}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{70}}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{112} & 0 & 0 \end{bmatrix}$
632	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(a)}(A_u,9)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{210}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
633	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & -\frac{\sqrt{105}}{420} & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{105}i}{420} & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} & -\frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & \frac{2\sqrt{105}i}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & -\frac{2\sqrt{105}i}{105} & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & \frac{2\sqrt{105}i}{105} & 0 & 0 & \frac{\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{105}i}{105} & -\frac{\sqrt{70}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & \frac{\sqrt{210}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{210}i}{70} \end{bmatrix}$
634	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_2^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 \\ \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 \\ -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 \end{bmatrix}$
635	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & \frac{3\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & -\frac{3\sqrt{70}}{140} & 0 \end{bmatrix}$
636	symmetry	$\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_2^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & \frac{3\sqrt{70}i}{140} & 0 \end{bmatrix}$
637	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 \\ -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & 0 \end{bmatrix}$
638	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{10}i}{240} & 0 & \frac{11\sqrt{10}}{240} & 0 & 0 \\ \frac{\sqrt{6}i}{48} & 0 & -\frac{\sqrt{6}}{48} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{11\sqrt{10}i}{240} & 0 & -\frac{11\sqrt{10}}{240} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}}{240} & 0 & -\frac{\sqrt{10}i}{240} & 0 & 0 \\ \frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & \frac{i}{6} & \frac{\sqrt{10}}{240} & 0 & -\frac{\sqrt{10}i}{240} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{24} & 0 & -\frac{1}{6} & \frac{\sqrt{10}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{120} \\ 0 & 0 & 0 & 0 & \frac{i}{24} & 0 & \frac{1}{6} & 0 & 0 & -\frac{\sqrt{10}i}{60} & 0 & 0 & -\frac{\sqrt{15}i}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & \frac{\sqrt{10}i}{60} & 0 & 0 & -\frac{\sqrt{15}}{120} \\ 0 & 0 & 0 & 0 & \frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{60} & \frac{\sqrt{15}}{120} & 0 \\ 0 & -\frac{5\sqrt{2}i}{48} & 0 & \frac{5\sqrt{2}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{80} & 0 & -\frac{\sqrt{30}}{80} & \frac{\sqrt{5}i}{15} & 0 \\ -\frac{5\sqrt{2}i}{48} & 0 & -\frac{5\sqrt{2}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{80} & 0 & \frac{\sqrt{30}}{80} & 0 & 0 & -\frac{\sqrt{5}i}{15} \end{bmatrix}$
639	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{336} & 0 & -\frac{\sqrt{14}}{336} & 0 & 0 \\ \frac{\sqrt{210}i}{336} & 0 & -\frac{\sqrt{210}}{336} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{336} & 0 & \frac{\sqrt{14}}{336} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{13\sqrt{14}}{336} & 0 & -\frac{13\sqrt{14}i}{336} & 0 & 0 \\ \frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & \frac{13\sqrt{14}}{336} & 0 & -\frac{13\sqrt{14}i}{336} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{84} & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{168} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}i}{168} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}i}{168} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{35}}{168} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & -\frac{\sqrt{21}}{168} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}}{168} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & \frac{\sqrt{21}}{168} & 0 \\ 0 & \frac{\sqrt{70}i}{48} & 0 & -\frac{\sqrt{70}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & 0 & -\frac{\sqrt{42}}{112} & \frac{\sqrt{7}i}{21} & 0 \\ \frac{\sqrt{70}i}{48} & 0 & \frac{\sqrt{70}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & 0 & \frac{\sqrt{42}}{112} & 0 & 0 & -\frac{\sqrt{7}i}{21} \end{bmatrix}$
640	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{48} & 0 & -\frac{\sqrt{42}}{48} & \frac{\sqrt{7}i}{14} & 0 \\ \frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & \frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{336} & 0 & -\frac{5\sqrt{42}i}{336} & 0 & 0 \\ -\frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{336} & 0 & -\frac{5\sqrt{42}i}{336} & 0 & 0 & 0 \\ -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & \frac{\sqrt{105}}{84} & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} \\ 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & \frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{56} & 0 \\ 0 & -\frac{\sqrt{210}i}{336} & 0 & -\frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{112} & 0 & \frac{3\sqrt{14}}{112} & 0 & 0 \\ -\frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{112} & 0 & -\frac{3\sqrt{14}}{112} & 0 & 0 & 0 \end{bmatrix}$
641	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{7\sqrt{6}i}{96} & 0 & 0 & \frac{1}{8} \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{7\sqrt{6}i}{96} & -\frac{1}{8} & 0 \\ -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & -\frac{5\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{5\sqrt{6}i}{96} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{5\sqrt{6}}{96} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & \frac{5\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{96} & -\frac{i}{16} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & -\frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & \frac{i}{16} \\ 0 & 0 & \frac{\sqrt{30}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{32} & \frac{\sqrt{3}}{12} & 0 \end{bmatrix}$
642	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{7\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & \frac{i}{8} \\ 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{6}i}{96} & 0 & 0 & \frac{i}{8} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{5\sqrt{6}i}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{96} & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{15}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & \frac{i}{16} & 0 \\ -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{48} & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & -\frac{i}{16} \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{96} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{5\sqrt{6}i}{96} & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & -\frac{\sqrt{30}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 \end{bmatrix}$
643	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
644	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{70}i}{224} & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{672} & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{224} & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{672} & \frac{3\sqrt{7}}{56} & 0 \\ -\frac{\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & -\frac{13\sqrt{42}i}{672} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & \frac{\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{13\sqrt{42}i}{672} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & \frac{3\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{42}}{96} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 \\ -\frac{3\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & -\frac{\sqrt{42}}{96} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{3\sqrt{70}}{224} & \frac{5\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{11\sqrt{42}}{672} & -\frac{\sqrt{7}i}{112} & 0 \\ -\frac{\sqrt{70}i}{56} & 0 & -\frac{3\sqrt{70}}{224} & 0 & 0 & -\frac{5\sqrt{105}i}{336} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{11\sqrt{42}}{672} & 0 & 0 & \frac{\sqrt{7}i}{112} \\ 0 & 0 & -\frac{\sqrt{210}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{224} & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{224} & \frac{\sqrt{21}}{84} & 0 \end{bmatrix}$
645	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{G}_4^{(1,-1;a)}(A_u,8)$	$\begin{bmatrix} \frac{\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{42}i}{672} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ 0 & -\frac{\sqrt{70}i}{224} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{672} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 \\ 0 & 0 & \frac{\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{13\sqrt{42}i}{672} & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{224} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & \frac{13\sqrt{42}i}{672} & \frac{\sqrt{7}}{14} & 0 \\ 0 & -\frac{3\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & -\frac{5\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{42}i}{672} & 0 & \frac{\sqrt{42}}{56} & -\frac{\sqrt{7}i}{112} & 0 \\ -\frac{3\sqrt{70}i}{224} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & \frac{5\sqrt{105}i}{336} & 0 & 0 & -\frac{11\sqrt{42}i}{672} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}i}{112} \\ 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{3\sqrt{70}i}{224} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{96} & 0 & 0 \\ \frac{\sqrt{70}}{56} & 0 & -\frac{3\sqrt{70}i}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{96} & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ 0 & -\frac{\sqrt{210}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{224} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 \end{bmatrix}$
646	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,-1;a)}(A_u,9)$	$\begin{bmatrix} 0 & -\frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{336} & 0 & -\frac{5\sqrt{42}i}{336} & 0 & 0 \\ \frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{336} & 0 & -\frac{5\sqrt{42}i}{336} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & \frac{\sqrt{42}}{48} & -\frac{\sqrt{7}i}{14} & 0 \\ \frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & -\frac{\sqrt{42}}{48} & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{56} & 0 \\ -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{56} \\ 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{56} & 0 \\ 0 & -\frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{112} & 0 & \frac{3\sqrt{14}i}{112} & 0 & 0 \\ \frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{112} & 0 & \frac{3\sqrt{14}i}{112} & 0 & 0 & 0 \end{bmatrix}$
647	symmetry	$\frac{\sqrt{2}\left(2x^6-15x^4y^2-15x^4z^2-15x^2y^4+180x^2y^2z^2-15x^2z^4+2y^6-15y^4z^2-15y^2z^4+2z^6\right)}{8}$
	$\mathbb{G}_6^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{231}i}{616} & 0 & \frac{\sqrt{231}}{616} & -\frac{3\sqrt{154}i}{308} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}i}{616} & 0 & \frac{3\sqrt{385}}{616} & 0 & 0 \\ \frac{\sqrt{231}i}{616} & 0 & -\frac{\sqrt{231}}{616} & 0 & 0 & \frac{3\sqrt{154}i}{308} & 0 & 0 & -\frac{3\sqrt{385}i}{616} & 0 & -\frac{3\sqrt{385}}{616} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{231}}{462} & 0 & -\frac{\sqrt{231}i}{462} & 0 & 0 & \frac{\sqrt{154}i}{77} & 0 & 0 & \frac{\sqrt{385}}{154} & 0 & \frac{\sqrt{385}i}{154} & 0 & 0 \\ -\frac{\sqrt{231}}{462} & 0 & -\frac{\sqrt{231}i}{462} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{77} & -\frac{\sqrt{385}}{154} & 0 & \frac{\sqrt{385}i}{154} & 0 & 0 & 0 \\ -\frac{\sqrt{231}i}{132} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}i}{308} & 0 & \frac{\sqrt{154}}{77} & -\frac{\sqrt{385}i}{308} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{924} \\ 0 & \frac{\sqrt{231}i}{132} & 0 & 0 & -\frac{3\sqrt{154}i}{308} & 0 & -\frac{\sqrt{154}}{77} & 0 & 0 & \frac{\sqrt{385}i}{308} & 0 & 0 & -\frac{\sqrt{2310}i}{924} & 0 \\ 0 & 0 & \frac{\sqrt{231}i}{132} & 0 & 0 & \frac{3\sqrt{154}}{308} & 0 & \frac{\sqrt{154}i}{77} & 0 & 0 & -\frac{\sqrt{385}i}{308} & 0 & 0 & -\frac{\sqrt{2310}}{924} \\ 0 & 0 & 0 & -\frac{\sqrt{231}i}{132} & -\frac{3\sqrt{154}}{308} & 0 & \frac{\sqrt{154}i}{77} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{308} & \frac{\sqrt{2310}}{924} & 0 \\ 0 & -\frac{\sqrt{77}i}{88} & 0 & \frac{\sqrt{77}}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{616} & 0 & -\frac{\sqrt{1155}}{616} & \frac{\sqrt{770}i}{308} & 0 \\ -\frac{\sqrt{77}i}{88} & 0 & -\frac{\sqrt{77}}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{616} & 0 & \frac{\sqrt{1155}}{616} & 0 & 0 & -\frac{\sqrt{770}i}{308} \end{bmatrix}$
648	symmetry	$-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_6^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{7\sqrt{5}i}{120} & 0 & -\frac{7\sqrt{5}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & \frac{\sqrt{3}}{24} & -\frac{\sqrt{2}i}{12} & 0 \\ \frac{7\sqrt{5}i}{120} & 0 & \frac{7\sqrt{5}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & \frac{\sqrt{2}i}{12} \\ 0 & -\frac{\sqrt{5}}{15} & 0 & -\frac{\sqrt{5}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{15} & 0 & -\frac{\sqrt{5}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} \\ 0 & -\frac{\sqrt{5}i}{60} & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{60} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & \frac{\sqrt{2}}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{60} & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & -\frac{\sqrt{2}}{12} & 0 \\ 0 & \frac{\sqrt{15}i}{120} & 0 & \frac{\sqrt{15}}{120} & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 \\ \frac{\sqrt{15}i}{120} & 0 & -\frac{\sqrt{15}}{120} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{i}{8} & 0 & -\frac{1}{8} & 0 & 0 & 0 \end{bmatrix}$
649	symmetry	$-\frac{\sqrt{14}\left(x^6-15x^4z^2+15x^2z^4+y^6-15y^4z^2+15y^2z^4-2z^6\right)}{8}$
	$\mathbb{G}_6^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{33}i}{264} & 0 & -\frac{\sqrt{33}}{264} & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{88} & 0 & -\frac{\sqrt{55}}{88} & 0 & 0 \\ -\frac{\sqrt{33}i}{264} & 0 & \frac{\sqrt{33}}{264} & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & \frac{\sqrt{55}i}{88} & 0 & \frac{\sqrt{55}}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{33}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & -\frac{\sqrt{55}i}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{132} \\ 0 & -\frac{\sqrt{33}i}{132} & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{44} & 0 & 0 & -\frac{\sqrt{330}i}{132} & 0 \\ 0 & 0 & -\frac{\sqrt{33}i}{132} & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{44} & 0 & 0 & -\frac{\sqrt{330}}{132} \\ 0 & 0 & 0 & \frac{\sqrt{33}i}{132} & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{44} & \frac{\sqrt{330}}{132} & 0 \\ 0 & \frac{\sqrt{11}i}{88} & 0 & -\frac{\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{88} & 0 & -\frac{\sqrt{165}}{88} & \frac{\sqrt{110}i}{44} & 0 \\ \frac{\sqrt{11}i}{88} & 0 & \frac{\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{88} & 0 & \frac{\sqrt{165}}{88} & 0 & 0 & -\frac{\sqrt{110}i}{44} \end{bmatrix}$
650	symmetry	$\frac{\sqrt{42}(x-y)(x+y)\left(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_6^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & \frac{17\sqrt{11}i}{264} & 0 & -\frac{17\sqrt{11}}{264} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{264} & 0 & -\frac{\sqrt{165}}{264} & \frac{\sqrt{110}i}{132} & 0 \\ \frac{17\sqrt{11}i}{264} & 0 & \frac{17\sqrt{11}}{264} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{264} & 0 & \frac{\sqrt{165}}{264} & 0 & 0 & -\frac{\sqrt{110}i}{132} \\ 0 & -\frac{2\sqrt{11}}{33} & 0 & -\frac{2\sqrt{11}i}{33} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{2\sqrt{11}}{33} & 0 & -\frac{2\sqrt{11}i}{33} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{11}i}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{132} & 0 & 0 & \frac{\sqrt{165}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{132} \\ 0 & \frac{\sqrt{11}i}{132} & 0 & 0 & -\frac{\sqrt{66}i}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 & \frac{\sqrt{110}i}{132} & 0 \\ 0 & 0 & -\frac{\sqrt{11}i}{132} & 0 & 0 & -\frac{\sqrt{66}}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 & -\frac{\sqrt{110}}{132} \\ 0 & 0 & 0 & \frac{\sqrt{11}i}{132} & \frac{\sqrt{66}}{132} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{132} & \frac{\sqrt{110}}{132} & 0 \\ 0 & -\frac{\sqrt{33}i}{264} & 0 & -\frac{\sqrt{33}}{264} & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{88} & 0 & -\frac{\sqrt{55}}{88} & 0 & 0 \\ -\frac{\sqrt{33}i}{264} & 0 & \frac{\sqrt{33}}{264} & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & \frac{\sqrt{55}i}{88} & 0 & \frac{\sqrt{55}}{88} & 0 & 0 & 0 \end{bmatrix}$
651	symmetry	$\frac{3\sqrt{7}yz(y-z)(y+z)\left(10x^2-y^2-z^2\right)}{4}$
	$\mathbb{G}_6^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & -\frac{5\sqrt{66}i}{528} & 0 & 0 & -\frac{3\sqrt{11}}{88} & 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & -\frac{\sqrt{110}i}{176} & 0 & 0 & -\frac{\sqrt{165}}{264} \\ 0 & 0 & 0 & \frac{5\sqrt{66}i}{528} & \frac{3\sqrt{11}}{88} & 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{176} & \frac{\sqrt{165}}{264} & 0 \\ -\frac{\sqrt{66}i}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{44} & 0 & \frac{\sqrt{11}}{22} & -\frac{\sqrt{110}i}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{132} \\ 0 & \frac{\sqrt{66}i}{88} & 0 & 0 & -\frac{\sqrt{11}i}{44} & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 & -\frac{\sqrt{165}i}{132} & 0 \\ 0 & -\frac{\sqrt{66}}{88} & 0 & -\frac{\sqrt{66}i}{264} & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & -\frac{\sqrt{110}}{88} & 0 & -\frac{\sqrt{110}i}{88} & 0 & 0 \\ \frac{\sqrt{66}}{88} & 0 & -\frac{\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{22} & \frac{\sqrt{110}}{88} & 0 & -\frac{\sqrt{110}i}{88} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{66}i}{88} & 0 & \frac{\sqrt{66}}{66} & -\frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{88} & 0 & 0 & \frac{\sqrt{165}i}{132} & 0 \\ -\frac{\sqrt{66}i}{88} & 0 & -\frac{\sqrt{66}}{66} & 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & -\frac{\sqrt{110}i}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{132} \\ 0 & 0 & -\frac{3\sqrt{22}i}{176} & 0 & 0 & -\frac{\sqrt{33}}{88} & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & \frac{\sqrt{330}i}{176} & 0 & 0 & \frac{\sqrt{55}}{88} \\ 0 & 0 & 0 & \frac{3\sqrt{22}i}{176} & \frac{\sqrt{33}}{88} & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{176} & -\frac{\sqrt{55}}{88} & 0 \end{bmatrix}$
652	symmetry	$\frac{3\sqrt{7}xz(x-z)(x+z)\left(x^2-10y^2+z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_6^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} \frac{5\sqrt{66}i}{528} & 0 & 0 & 0 & 0 & \frac{3\sqrt{11}i}{88} & 0 & -\frac{\sqrt{11}}{44} & -\frac{\sqrt{110}i}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{264} \\ 0 & -\frac{5\sqrt{66}i}{528} & 0 & 0 & \frac{3\sqrt{11}i}{88} & 0 & \frac{\sqrt{11}}{44} & 0 & 0 & \frac{\sqrt{110}i}{176} & 0 & 0 & -\frac{\sqrt{165}i}{264} & 0 \\ 0 & 0 & -\frac{\sqrt{66}i}{88} & 0 & 0 & -\frac{\sqrt{11}}{44} & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 & \frac{\sqrt{165}}{132} \\ 0 & 0 & 0 & \frac{\sqrt{66}i}{88} & \frac{\sqrt{11}}{44} & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{88} & -\frac{\sqrt{165}}{132} & 0 \\ 0 & \frac{\sqrt{66}i}{66} & 0 & -\frac{\sqrt{66}}{88} & -\frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{88} & -\frac{\sqrt{165}i}{132} & 0 \\ \frac{\sqrt{66}i}{66} & 0 & \frac{\sqrt{66}}{88} & 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{88} & 0 & 0 & \frac{\sqrt{165}i}{132} \\ 0 & -\frac{\sqrt{66}}{264} & 0 & -\frac{\sqrt{66}i}{88} & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & \frac{\sqrt{110}}{88} & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 \\ \frac{\sqrt{66}}{264} & 0 & -\frac{\sqrt{66}i}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{22} & -\frac{\sqrt{110}}{88} & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 & 0 \\ -\frac{3\sqrt{22}i}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{88} & 0 & \frac{\sqrt{33}}{44} & -\frac{\sqrt{330}i}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{88} \\ 0 & \frac{3\sqrt{22}i}{176} & 0 & 0 & -\frac{\sqrt{33}i}{88} & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 & \frac{\sqrt{330}i}{176} & 0 & 0 & -\frac{\sqrt{55}i}{88} & 0 \end{bmatrix}$
653	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)\left(x^2+y^2-10z^2\right)}{4}$
	$\mathbb{G}_6^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & \frac{\sqrt{66}}{264} & 0 & -\frac{\sqrt{66}i}{264} & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & \frac{\sqrt{110}}{88} & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 \\ -\frac{\sqrt{66}}{264} & 0 & -\frac{\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{22} & -\frac{\sqrt{110}}{88} & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{66}i}{264} & 0 & -\frac{\sqrt{66}}{264} & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{88} & 0 & -\frac{\sqrt{110}}{88} & 0 & 0 \\ -\frac{\sqrt{66}i}{264} & 0 & \frac{\sqrt{66}}{264} & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & \frac{\sqrt{110}i}{88} & 0 & \frac{\sqrt{110}}{88} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{66}i}{66} & -\frac{\sqrt{11}}{22} & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{66}i}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{66}i}{66} & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{22}}{44} & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{22}}{44} & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
654	symmetry	$\frac{\sqrt{462}yz\left(y^2-3z^2\right)\left(3y^2-z^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_6^{(1,-1;a)}(A_u,8)$	$\begin{bmatrix} 0 & 0 & \frac{i}{32} & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{32} & 0 & 0 & \frac{\sqrt{10}}{32} \\ 0 & 0 & 0 & -\frac{i}{32} & -\frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{32} & -\frac{\sqrt{10}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{16} & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & \frac{\sqrt{10}i}{16} & 0 \\ 0 & 0 & \frac{1}{16} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{16} & 0 & 0 & -\frac{\sqrt{10}i}{16} \\ 0 & 0 & \frac{\sqrt{3}i}{32} & 0 & 0 & \frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{32} & 0 & 0 & \frac{\sqrt{30}}{32} \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{32} & -\frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{32} & -\frac{\sqrt{30}}{32} & 0 \end{bmatrix}$
655	symmetry	$\frac{\sqrt{462}xz\left(x^2-3z^2\right)\left(3x^2-z^2\right)}{16}$
	$\mathbb{G}_6^{(1,-1;a)}(A_u,9)$	$\begin{bmatrix} \frac{i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{\sqrt{15}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} \\ 0 & -\frac{i}{32} & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{32} & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{16} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{16} & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 \\ \frac{i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{\sqrt{15}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & \frac{3\sqrt{5}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{32} \\ 0 & \frac{\sqrt{3}i}{32} & 0 & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{32} & 0 & 0 & \frac{\sqrt{30}i}{32} & 0 \end{bmatrix}$
656	symmetry	$\frac{\sqrt{462}xy\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_{6}^{(1,-1;a)}(A_u,10)$	$\begin{bmatrix} 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
657	symmetry	$\frac{\sqrt{210}yz\left(16x^{4}-16x^{2}y^{2}-16x^{2}z^{2}+y^{4}+2y^{2}z^{2}+z^{4}\right)}{16}$
	$\mathbb{G}_{6}^{(1,-1;a)}(A_u,11)$	$\begin{bmatrix} 0 & 0 & \frac{17\sqrt{55}i}{1056} & 0 & 0 & \frac{37\sqrt{330}}{5280} & 0 & \frac{\sqrt{330}i}{110} & 0 & 0 & -\frac{\sqrt{33}i}{96} & 0 & 0 & -\frac{\sqrt{22}}{96} \\ 0 & 0 & 0 & -\frac{17\sqrt{55}i}{1056} & -\frac{37\sqrt{330}}{5280} & 0 & \frac{\sqrt{330}i}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{96} & \frac{\sqrt{22}}{96} & 0 \\ \frac{\sqrt{55}i}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{110} & 0 & -\frac{\sqrt{330}}{165} & -\frac{\sqrt{33}i}{66} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{66} \\ 0 & -\frac{\sqrt{55}i}{66} & 0 & 0 & \frac{\sqrt{330}i}{110} & 0 & \frac{\sqrt{330}}{165} & 0 & 0 & \frac{\sqrt{33}i}{66} & 0 & 0 & -\frac{\sqrt{22}i}{66} & 0 \\ 0 & \frac{\sqrt{55}}{66} & 0 & \frac{7\sqrt{55}i}{330} & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 \\ -\frac{\sqrt{55}}{66} & 0 & \frac{7\sqrt{55}i}{330} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{165} & \frac{\sqrt{33}}{66} & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{55}i}{66} & 0 & -\frac{29\sqrt{55}}{2640} & -\frac{\sqrt{330}i}{240} & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & \frac{\sqrt{33}}{176} & \frac{5\sqrt{22}i}{528} & 0 \\ \frac{\sqrt{55}i}{66} & 0 & \frac{29\sqrt{55}}{2640} & 0 & 0 & \frac{\sqrt{330}i}{240} & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & -\frac{\sqrt{33}}{176} & 0 & 0 & -\frac{5\sqrt{22}i}{528} \\ 0 & 0 & -\frac{9\sqrt{165}i}{1760} & 0 & 0 & -\frac{\sqrt{110}}{160} & 0 & -\frac{\sqrt{110}i}{110} & 0 & 0 & \frac{5\sqrt{11}i}{352} & 0 & 0 & \frac{5\sqrt{66}}{1056} \\ 0 & 0 & 0 & \frac{9\sqrt{165}i}{1760} & \frac{\sqrt{110}}{160} & 0 & -\frac{\sqrt{110}i}{110} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}i}{352} & -\frac{5\sqrt{66}}{1056} & 0 \end{bmatrix}$
658	symmetry	$\frac{\sqrt{210}xz\left(x^{4}-16x^{2}y^{2}+2x^{2}z^{2}+16y^{4}-16y^{2}z^{2}+z^{4}\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_6^{(1,-1;a)}(A_u,12)$	$\begin{bmatrix} \frac{17\sqrt{55}i}{1056} & 0 & 0 & 0 & 0 & \frac{37\sqrt{330}i}{5280} & 0 & -\frac{\sqrt{330}}{110} & \frac{\sqrt{33}i}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{96} \\ 0 & -\frac{17\sqrt{55}i}{1056} & 0 & 0 & \frac{37\sqrt{330}i}{5280} & 0 & \frac{\sqrt{330}}{110} & 0 & 0 & -\frac{\sqrt{33}i}{96} & 0 & 0 & \frac{\sqrt{22}i}{96} & 0 \\ 0 & 0 & -\frac{\sqrt{55}i}{66} & 0 & 0 & -\frac{\sqrt{330}}{110} & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 & -\frac{\sqrt{22}}{66} \\ 0 & 0 & 0 & \frac{\sqrt{55}i}{66} & \frac{\sqrt{330}}{110} & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{66} & \frac{\sqrt{22}}{66} & 0 \\ 0 & \frac{29\sqrt{55}i}{2640} & 0 & -\frac{\sqrt{55}}{66} & \frac{\sqrt{330}i}{240} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{176} & 0 & -\frac{\sqrt{33}}{66} & \frac{5\sqrt{22}i}{528} & 0 \\ \frac{29\sqrt{55}i}{2640} & 0 & \frac{\sqrt{55}}{66} & 0 & 0 & -\frac{\sqrt{330}i}{240} & 0 & 0 & \frac{\sqrt{33}i}{176} & 0 & \frac{\sqrt{33}}{66} & 0 & 0 & -\frac{5\sqrt{22}i}{528} \\ 0 & -\frac{7\sqrt{55}}{330} & 0 & -\frac{\sqrt{55}i}{66} & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 \\ \frac{7\sqrt{55}}{330} & 0 & -\frac{\sqrt{55}i}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{165} & \frac{\sqrt{33}}{66} & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 & 0 \\ \frac{9\sqrt{165}i}{1760} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{160} & 0 & -\frac{\sqrt{110}}{110} & \frac{5\sqrt{11}i}{352} & 0 & 0 & 0 & 0 & \frac{5\sqrt{66}i}{1056} \\ 0 & -\frac{9\sqrt{165}i}{1760} & 0 & 0 & \frac{\sqrt{110}i}{160} & 0 & \frac{\sqrt{110}}{110} & 0 & 0 & -\frac{5\sqrt{11}i}{352} & 0 & 0 & \frac{5\sqrt{66}i}{1056} & 0 \end{bmatrix}$
659	symmetry	$\frac{\sqrt{210}xy\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{16}$
	$\mathbb{G}_6^{(1,-1;a)}(A_u,13)$	$\begin{bmatrix} 0 & \frac{\sqrt{55}}{660} & 0 & \frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{55}}{660} & 0 & \frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{55}i}{660} & 0 & \frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & -\frac{\sqrt{33}}{66} & \frac{\sqrt{22}i}{33} & 0 \\ -\frac{\sqrt{55}i}{660} & 0 & -\frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 & \frac{\sqrt{33}}{66} & 0 & 0 & -\frac{\sqrt{22}i}{33} \\ 0 & 0 & -\frac{\sqrt{55}i}{165} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & \frac{\sqrt{33}i}{33} & 0 & 0 & \frac{\sqrt{22}}{33} \\ 0 & 0 & 0 & \frac{\sqrt{55}i}{165} & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{33} & -\frac{\sqrt{22}}{33} & 0 \\ \frac{\sqrt{55}i}{165} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{165} & \frac{\sqrt{33}i}{33} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{33} \\ 0 & -\frac{\sqrt{55}i}{165} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{165} & 0 & 0 & -\frac{\sqrt{33}i}{33} & 0 & 0 & \frac{\sqrt{22}i}{33} & 0 \\ 0 & \frac{\sqrt{165}}{330} & 0 & -\frac{\sqrt{165}i}{330} & 0 & 0 & \frac{\sqrt{110}i}{55} & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 \\ -\frac{\sqrt{165}}{330} & 0 & -\frac{\sqrt{165}i}{330} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{55} & -\frac{\sqrt{11}}{22} & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 \end{bmatrix}$
660	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_2^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 \\ \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 \end{bmatrix}$
661	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{G}_2^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & \frac{\sqrt{21}i}{42} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 \\ -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
662	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_2^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & -\frac{\sqrt{21}}{84} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 \\ 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & -\frac{\sqrt{21}i}{42} & 0 \\ \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \end{bmatrix}$
663	symmetry	$\sqrt{3}xz$
	$\mathbb{G}_2^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & \frac{\sqrt{21}}{84} & 0 \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & -\frac{\sqrt{21}i}{42} & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 \end{bmatrix}$
664	symmetry	$\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_2^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 \\ -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & \frac{\sqrt{21}i}{42} & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & -\frac{\sqrt{21}}{42} & 0 \\ -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
665	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{G}_4^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{10}i}{80} & 0 & -\frac{\sqrt{10}}{80} & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 \\ -\frac{\sqrt{10}i}{80} & 0 & \frac{\sqrt{10}}{80} & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & -\frac{\sqrt{6}}{48} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{80} & 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ -\frac{\sqrt{10}}{80} & 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & \frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 \\ 0 & -\frac{\sqrt{30}i}{80} & 0 & \frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & -\frac{\sqrt{2}}{16} & 0 & 0 \\ -\frac{\sqrt{30}i}{80} & 0 & -\frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 \end{bmatrix}$
666	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{14}i}{112} & 0 & -\frac{\sqrt{14}}{112} & \frac{\sqrt{21}i}{30} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{210}i}{1680} & 0 & \frac{17\sqrt{210}}{1680} & 0 & 0 \\ -\frac{\sqrt{14}i}{112} & 0 & \frac{\sqrt{14}}{112} & 0 & 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & -\frac{17\sqrt{210}i}{1680} & 0 & -\frac{17\sqrt{210}}{1680} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{112} & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 & -\frac{\sqrt{21}i}{30} & 0 & 0 & -\frac{\sqrt{210}}{560} & 0 & -\frac{\sqrt{210}i}{560} & 0 & 0 \\ -\frac{\sqrt{14}}{112} & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{30} & \frac{\sqrt{210}}{560} & 0 & -\frac{\sqrt{210}i}{560} & 0 & 0 & 0 \\ -\frac{\sqrt{14}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{40} & 0 & \frac{\sqrt{21}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} \\ 0 & \frac{\sqrt{14}i}{20} & 0 & 0 & \frac{\sqrt{21}i}{40} & 0 & -\frac{\sqrt{21}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{20} & 0 & 0 & -\frac{\sqrt{21}}{40} & 0 & \frac{\sqrt{21}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{20} & \frac{\sqrt{21}}{40} & 0 & \frac{\sqrt{21}i}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 \\ 0 & \frac{\sqrt{42}i}{80} & 0 & -\frac{\sqrt{42}}{80} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 \\ \frac{\sqrt{42}i}{80} & 0 & \frac{\sqrt{42}}{80} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 \end{bmatrix}$
667	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{G}_4^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{3\sqrt{42}i}{560} & 0 & -\frac{3\sqrt{42}}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{560} & 0 & -\frac{\sqrt{70}}{560} & \frac{\sqrt{105}i}{70} & 0 \\ \frac{3\sqrt{42}i}{560} & 0 & \frac{3\sqrt{42}}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{560} & 0 & \frac{\sqrt{70}}{560} & 0 & 0 & -\frac{\sqrt{105}i}{70} \\ 0 & \frac{3\sqrt{42}}{560} & 0 & \frac{3\sqrt{42}i}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{70}}{560} & 0 & \frac{13\sqrt{70}i}{560} & 0 & 0 \\ -\frac{3\sqrt{42}}{560} & 0 & \frac{3\sqrt{42}i}{560} & 0 & 0 & 0 & 0 & 0 & \frac{13\sqrt{70}}{560} & 0 & \frac{13\sqrt{70}i}{560} & 0 & 0 & 0 \\ \frac{3\sqrt{42}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{40} & 0 & \frac{\sqrt{7}}{20} & \frac{\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}i}{280} \\ 0 & -\frac{3\sqrt{42}i}{280} & 0 & 0 & -\frac{\sqrt{7}i}{40} & 0 & -\frac{\sqrt{7}}{20} & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & -\frac{3\sqrt{105}i}{280} & 0 \\ 0 & 0 & \frac{3\sqrt{42}i}{280} & 0 & 0 & -\frac{\sqrt{7}}{40} & 0 & -\frac{\sqrt{7}i}{20} & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & \frac{3\sqrt{105}}{280} \\ 0 & 0 & 0 & -\frac{3\sqrt{42}i}{280} & \frac{\sqrt{7}}{40} & 0 & -\frac{\sqrt{7}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{280} & -\frac{3\sqrt{105}}{280} & 0 \\ 0 & \frac{3\sqrt{14}i}{80} & 0 & \frac{3\sqrt{14}}{80} & -\frac{\sqrt{21}i}{35} & 0 & 0 & 0 & 0 & \frac{3\sqrt{210}i}{560} & 0 & -\frac{3\sqrt{210}}{560} & 0 & 0 \\ \frac{3\sqrt{14}i}{80} & 0 & -\frac{3\sqrt{14}}{80} & 0 & 0 & \frac{\sqrt{21}i}{35} & 0 & 0 & \frac{3\sqrt{210}i}{560} & 0 & \frac{3\sqrt{210}}{560} & 0 & 0 & 0 \end{bmatrix}$
668	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{160} & 0 & 0 & \frac{1}{40} & 0 & \frac{i}{10} & 0 & 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{15}}{40} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{160} & -\frac{1}{40} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & -\frac{\sqrt{15}}{40} & 0 \\ \frac{\sqrt{6}i}{160} & 0 & 0 & 0 & 0 & -\frac{3i}{20} & 0 & -\frac{1}{40} & \frac{\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & -\frac{\sqrt{6}i}{160} & 0 & 0 & -\frac{3i}{20} & 0 & \frac{1}{40} & 0 & 0 & -\frac{\sqrt{10}i}{160} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & \frac{\sqrt{6}}{160} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & \frac{i}{40} & 0 & 0 & \frac{\sqrt{10}}{160} & 0 & -\frac{3\sqrt{10}i}{40} & 0 & 0 \\ -\frac{\sqrt{6}}{160} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & 0 & 0 & -\frac{i}{40} & -\frac{\sqrt{10}}{160} & 0 & -\frac{3\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{20} & 0 & \frac{\sqrt{6}}{32} & -\frac{i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{160} & \frac{\sqrt{15}i}{80} & 0 \\ \frac{\sqrt{6}i}{20} & 0 & -\frac{\sqrt{6}}{32} & 0 & 0 & \frac{i}{16} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{160} & 0 & 0 & -\frac{\sqrt{15}i}{80} \\ 0 & 0 & -\frac{9\sqrt{2}i}{160} & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{30}i}{160} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{2}i}{160} & \frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{160} & 0 & 0 \end{bmatrix}$
669	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{G}_4^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} \frac{\sqrt{6}i}{160} & 0 & 0 & 0 & 0 & -\frac{i}{40} & 0 & \frac{1}{10} & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} \\ 0 & -\frac{\sqrt{6}i}{160} & 0 & 0 & -\frac{i}{40} & 0 & -\frac{1}{10} & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{160} & 0 & 0 & -\frac{3}{20} & 0 & \frac{i}{40} & 0 & 0 & -\frac{\sqrt{10}i}{160} & 0 & 0 & \frac{\sqrt{15}}{20} \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{160} & \frac{3}{20} & 0 & \frac{i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{160} & -\frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{6}i}{32} & 0 & \frac{\sqrt{6}}{20} & -\frac{i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{160} & 0 & -\frac{\sqrt{10}}{20} & -\frac{\sqrt{15}i}{80} & 0 \\ \frac{\sqrt{6}i}{32} & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & \frac{i}{16} & 0 & 0 & \frac{\sqrt{10}i}{160} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & \frac{\sqrt{15}i}{80} \\ 0 & -\frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{6}i}{160} & 0 & 0 & -\frac{i}{40} & 0 & 0 & \frac{3\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{160} & 0 & 0 \\ \frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{6}i}{160} & 0 & 0 & 0 & 0 & \frac{i}{40} & -\frac{3\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{160} & 0 & 0 & 0 \\ -\frac{9\sqrt{2}i}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & -\frac{\sqrt{3}}{10} & \frac{\sqrt{30}i}{160} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{9\sqrt{2}i}{160} & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & -\frac{\sqrt{30}i}{160} & 0 & 0 & 0 & 0 \end{bmatrix}$
670	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,0;a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{5} & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{5} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{10} & 0 & 0 & -\frac{1}{40} & 0 & -\frac{i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{10} & \frac{1}{40} & 0 & -\frac{i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{10} & 0 & 0 & 0 & 0 & -\frac{i}{40} & 0 & \frac{1}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{10} & 0 & 0 & -\frac{i}{40} & 0 & -\frac{1}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}}{40} & 0 & -\frac{3\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{2}}{40} & 0 & -\frac{3\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
671	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$
	$\mathbb{G}_4^{(1,0;a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}i}{1120} & 0 & 0 & -\frac{\sqrt{7}}{40} & 0 & \frac{3\sqrt{7}i}{70} & 0 & 0 & -\frac{19\sqrt{70}i}{1120} & 0 & 0 & \frac{\sqrt{105}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{1120} & \frac{\sqrt{7}}{40} & 0 & \frac{3\sqrt{7}i}{70} & 0 & 0 & 0 & 0 & \frac{19\sqrt{70}i}{1120} & -\frac{\sqrt{105}}{56} & 0 \\ \frac{\sqrt{42}i}{1120} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{140} & 0 & \frac{\sqrt{7}}{40} & -\frac{23\sqrt{70}i}{1120} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} \\ 0 & -\frac{\sqrt{42}i}{1120} & 0 & 0 & \frac{\sqrt{7}i}{140} & 0 & -\frac{\sqrt{7}}{40} & 0 & 0 & \frac{23\sqrt{70}i}{1120} & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 \\ 0 & \frac{29\sqrt{42}}{1120} & 0 & -\frac{\sqrt{42}i}{140} & 0 & 0 & \frac{\sqrt{7}i}{40} & 0 & 0 & \frac{\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 \\ -\frac{29\sqrt{42}}{1120} & 0 & -\frac{\sqrt{42}i}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{40} & -\frac{\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{1120} & \frac{\sqrt{7}i}{80} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & -\frac{\sqrt{70}}{224} & \frac{\sqrt{105}i}{560} & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{1120} & 0 & 0 & -\frac{\sqrt{7}i}{80} & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}i}{560} \\ 0 & 0 & \frac{9\sqrt{14}i}{160} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{70} & 0 & 0 & -\frac{\sqrt{210}i}{1120} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{14}i}{160} & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{1120} & 0 & 0 \end{bmatrix}$
672	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,0;a)}(A_u,8)$	$\begin{bmatrix} -\frac{\sqrt{42}i}{1120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{40} & 0 & -\frac{3\sqrt{7}}{70} & \frac{19\sqrt{70}i}{1120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} \\ 0 & \frac{\sqrt{42}i}{1120} & 0 & 0 & -\frac{\sqrt{7}i}{40} & 0 & \frac{3\sqrt{7}}{70} & 0 & 0 & -\frac{19\sqrt{70}i}{1120} & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{1120} & 0 & 0 & -\frac{\sqrt{7}}{140} & 0 & \frac{\sqrt{7}i}{40} & 0 & 0 & -\frac{23\sqrt{70}i}{1120} & 0 & 0 & \frac{\sqrt{105}}{140} \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{1120} & \frac{\sqrt{7}}{140} & 0 & \frac{\sqrt{7}i}{40} & 0 & 0 & 0 & 0 & \frac{23\sqrt{70}i}{1120} & -\frac{\sqrt{105}}{140} & 0 \\ 0 & -\frac{\sqrt{42}i}{1120} & 0 & \frac{\sqrt{42}}{56} & -\frac{\sqrt{7}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{224} & 0 & \frac{3\sqrt{70}}{280} & \frac{\sqrt{105}i}{560} & 0 \\ -\frac{\sqrt{42}i}{1120} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}i}{80} & 0 & 0 & -\frac{\sqrt{70}i}{224} & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}i}{560} \\ 0 & \frac{\sqrt{42}}{140} & 0 & -\frac{29\sqrt{42}i}{1120} & 0 & 0 & \frac{\sqrt{7}i}{40} & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & \frac{\sqrt{70}i}{224} & 0 & 0 \\ -\frac{\sqrt{42}}{140} & 0 & -\frac{29\sqrt{42}i}{1120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{40} & \frac{\sqrt{70}}{140} & 0 & \frac{\sqrt{70}i}{224} & 0 & 0 & 0 \\ -\frac{9\sqrt{14}i}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{70} & -\frac{\sqrt{210}i}{1120} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{9\sqrt{14}i}{160} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{70} & 0 & 0 & \frac{\sqrt{210}i}{1120} & 0 & 0 & 0 & 0 \end{bmatrix}$
673	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{G}_4^{(1,0;a)}(A_u,9)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{42}}{560} & 0 & -\frac{3\sqrt{42}i}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{70}}{560} & 0 & \frac{13\sqrt{70}i}{560} & 0 & 0 \\ \frac{3\sqrt{42}}{560} & 0 & -\frac{3\sqrt{42}i}{560} & 0 & 0 & 0 & 0 & 0 & \frac{13\sqrt{70}}{560} & 0 & \frac{13\sqrt{70}i}{560} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{42}i}{560} & 0 & -\frac{3\sqrt{42}}{560} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{560} & 0 & \frac{\sqrt{70}}{560} & -\frac{\sqrt{105}i}{70} & 0 \\ \frac{3\sqrt{42}i}{560} & 0 & \frac{3\sqrt{42}}{560} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{560} & 0 & -\frac{\sqrt{70}}{560} & 0 & 0 & \frac{\sqrt{105}i}{70} \\ 0 & 0 & -\frac{3\sqrt{42}i}{280} & 0 & 0 & \frac{\sqrt{7}}{20} & 0 & \frac{\sqrt{7}i}{40} & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & \frac{3\sqrt{105}}{280} \\ 0 & 0 & 0 & \frac{3\sqrt{42}i}{280} & -\frac{\sqrt{7}}{20} & 0 & \frac{\sqrt{7}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{280} & -\frac{3\sqrt{105}}{280} & 0 \\ \frac{3\sqrt{42}i}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{20} & 0 & \frac{\sqrt{7}}{40} & -\frac{\sqrt{70}i}{280} & 0 & 0 & 0 & 0 & \frac{3\sqrt{105}i}{280} \\ 0 & -\frac{3\sqrt{42}i}{280} & 0 & 0 & -\frac{\sqrt{7}i}{20} & 0 & -\frac{\sqrt{7}}{40} & 0 & 0 & \frac{\sqrt{70}i}{280} & 0 & 0 & \frac{3\sqrt{105}i}{280} & 0 \\ 0 & \frac{3\sqrt{14}}{80} & 0 & -\frac{3\sqrt{14}i}{80} & 0 & 0 & \frac{\sqrt{21}i}{35} & 0 & 0 & -\frac{3\sqrt{210}}{560} & 0 & -\frac{3\sqrt{210}i}{560} & 0 & 0 \\ -\frac{3\sqrt{14}}{80} & 0 & -\frac{3\sqrt{14}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{35} & \frac{3\sqrt{210}}{560} & 0 & -\frac{3\sqrt{210}i}{560} & 0 & 0 & 0 \end{bmatrix}$
674	symmetry	1

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_0^{(1,1;a)}(A_u)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{420} & 0 & \frac{\sqrt{210}}{420} & 0 & 0 \\ \frac{\sqrt{14}i}{28} & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 \\ \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & \frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{70}}{70} & \frac{\sqrt{105}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & -\frac{\sqrt{105}i}{70} \end{bmatrix}$
675	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{G}_2^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 \\ -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 \\ -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & -\frac{\sqrt{70}}{70} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & \frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & \frac{\sqrt{105}}{210} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & -\frac{\sqrt{105}}{210} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & \frac{\sqrt{210}}{140} & \frac{\sqrt{35}i}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & -\frac{\sqrt{35}i}{35} \end{bmatrix}$
676	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_2^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{120} & 0 & -\frac{\sqrt{210}}{120} & -\frac{\sqrt{35}i}{42} & 0 \\ \frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{120} & 0 & \frac{\sqrt{210}}{120} & 0 & 0 & \frac{\sqrt{35}i}{42} \\ 0 & \frac{\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{280} & 0 & 0 \\ -\frac{\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{280} & 0 & 0 & 0 \\ \frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{28} & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{420} \\ 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{420} & 0 \\ 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{420} \\ 0 & 0 & 0 & -\frac{5\sqrt{14}i}{168} & -\frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{420} & 0 \\ 0 & -\frac{5\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & \frac{\sqrt{70}}{280} & 0 & 0 \\ -\frac{5\sqrt{42}i}{168} & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & 0 \end{bmatrix}$
677	symmetry	$\sqrt{3}yz$
	$\mathbb{G}_2^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & 0 & \frac{\sqrt{35}}{42} \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{42} & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{105} & -\frac{\sqrt{35}}{42} & 0 \\ \frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ 0 & -\frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & -\frac{5\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{120} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 \\ \frac{5\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{120} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{14}i}{168} & 0 & -\frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{280} & \frac{\sqrt{35}i}{105} & 0 \\ -\frac{5\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 & -\frac{\sqrt{35}i}{105} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{105} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & \frac{\sqrt{105}}{105} & 0 \end{bmatrix}$
678	symmetry	$\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_2^{(1,1;a)}(A_u,4)$	$\begin{bmatrix} -\frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{105} & 0 & 0 & -\frac{\sqrt{35}}{42} \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{105} & \frac{\sqrt{35}}{42} & 0 \\ 0 & \frac{5\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{105} & 0 \\ \frac{5\sqrt{14}i}{168} & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{280} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{105} \\ 0 & -\frac{5\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{120} & 0 & 0 \\ \frac{5\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{120} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{105} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & -\frac{\sqrt{105}i}{105} & 0 \end{bmatrix}$
679	symmetry	$\sqrt{3}xy$
	$\mathbb{G}_2^{(1,1;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{280} & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 \\ -\frac{\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{280} & 0 & -\frac{\sqrt{210}i}{280} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{120} & 0 & -\frac{\sqrt{210}}{120} & -\frac{\sqrt{35}i}{42} & 0 \\ -\frac{\sqrt{14}i}{168} & 0 & -\frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{120} & 0 & \frac{\sqrt{210}}{120} & 0 & 0 & \frac{\sqrt{35}i}{42} \\ 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}}{420} \\ 0 & 0 & 0 & -\frac{5\sqrt{14}i}{168} & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & \frac{\sqrt{35}}{420} & 0 \\ -\frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{420} \\ 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{420} & 0 \\ 0 & \frac{5\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 \\ -\frac{5\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 & 0 \end{bmatrix}$
680	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{2\sqrt{165}i}{165} & 0 & \frac{2\sqrt{165}}{165} & \frac{7\sqrt{110}i}{660} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{66} & 0 & \frac{\sqrt{11}}{66} & 0 & 0 \\ \frac{2\sqrt{165}i}{165} & 0 & -\frac{2\sqrt{165}}{165} & 0 & 0 & -\frac{7\sqrt{110}i}{660} & 0 & 0 & -\frac{\sqrt{11}i}{66} & 0 & -\frac{\sqrt{11}}{66} & 0 & 0 & 0 \\ 0 & \frac{7\sqrt{165}}{660} & 0 & -\frac{7\sqrt{165}i}{660} & 0 & 0 & -\frac{\sqrt{110}i}{330} & 0 & 0 & -\frac{\sqrt{11}}{132} & 0 & -\frac{\sqrt{11}i}{132} & 0 & 0 \\ -\frac{7\sqrt{165}}{660} & 0 & -\frac{7\sqrt{165}i}{660} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{330} & \frac{\sqrt{11}}{132} & 0 & -\frac{\sqrt{11}i}{132} & 0 & 0 & 0 \\ \frac{\sqrt{165}i}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{165} & 0 & -\frac{\sqrt{110}}{330} & -\frac{5\sqrt{11}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} \\ 0 & -\frac{\sqrt{165}i}{220} & 0 & 0 & -\frac{\sqrt{110}i}{165} & 0 & \frac{\sqrt{110}}{330} & 0 & 0 & \frac{5\sqrt{11}i}{132} & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 \\ 0 & 0 & -\frac{\sqrt{165}i}{220} & 0 & 0 & \frac{\sqrt{110}}{165} & 0 & -\frac{\sqrt{110}i}{330} & 0 & 0 & -\frac{5\sqrt{11}i}{132} & 0 & 0 & \frac{\sqrt{66}}{66} \\ 0 & 0 & 0 & \frac{\sqrt{165}i}{220} & -\frac{\sqrt{110}}{165} & 0 & -\frac{\sqrt{110}i}{330} & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}i}{132} & -\frac{\sqrt{66}}{66} & 0 \\ 0 & -\frac{\sqrt{55}i}{660} & 0 & \frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & \frac{\sqrt{33}}{44} & \frac{5\sqrt{22}i}{132} & 0 \\ -\frac{\sqrt{55}i}{660} & 0 & -\frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{44} & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 & -\frac{5\sqrt{22}i}{132} \end{bmatrix}$
681	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{G}_4^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} 0 & -\frac{5\sqrt{231}i}{462} & 0 & -\frac{5\sqrt{231}}{462} & -\frac{19\sqrt{154}i}{4620} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{1155} & 0 & \frac{\sqrt{385}}{1155} & 0 & 0 \\ -\frac{5\sqrt{231}i}{462} & 0 & \frac{5\sqrt{231}}{462} & 0 & 0 & \frac{19\sqrt{154}i}{4620} & 0 & 0 & -\frac{\sqrt{385}i}{1155} & 0 & -\frac{\sqrt{385}}{1155} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{231}}{84} & 0 & \frac{\sqrt{231}i}{84} & 0 & 0 & \frac{\sqrt{154}i}{105} & 0 & 0 & -\frac{\sqrt{385}}{420} & 0 & -\frac{\sqrt{385}i}{420} & 0 & 0 \\ \frac{\sqrt{231}}{84} & 0 & \frac{\sqrt{231}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{105} & \frac{\sqrt{385}}{420} & 0 & -\frac{\sqrt{385}i}{420} & 0 & 0 & 0 \\ -\frac{\sqrt{231}i}{220} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{154}i}{1155} & 0 & -\frac{\sqrt{154}}{210} & -\frac{5\sqrt{385}i}{924} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{462} \\ 0 & \frac{\sqrt{231}i}{220} & 0 & 0 & -\frac{2\sqrt{154}i}{1155} & 0 & \frac{\sqrt{154}}{210} & 0 & 0 & \frac{5\sqrt{385}i}{924} & 0 & 0 & \frac{\sqrt{2310}i}{462} & 0 \\ 0 & 0 & \frac{\sqrt{231}i}{220} & 0 & 0 & \frac{2\sqrt{154}}{1155} & 0 & -\frac{\sqrt{154}i}{210} & 0 & 0 & -\frac{5\sqrt{385}i}{924} & 0 & 0 & \frac{\sqrt{2310}}{462} \\ 0 & 0 & 0 & -\frac{\sqrt{231}i}{220} & -\frac{2\sqrt{154}}{1155} & 0 & -\frac{\sqrt{154}i}{210} & 0 & 0 & 0 & 0 & \frac{5\sqrt{385}i}{924} & -\frac{\sqrt{2310}}{462} & 0 \\ 0 & \frac{\sqrt{77}i}{660} & 0 & -\frac{\sqrt{77}}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{308} & 0 & \frac{\sqrt{1155}}{308} & \frac{5\sqrt{770}i}{924} & 0 \\ \frac{\sqrt{77}i}{660} & 0 & \frac{\sqrt{77}}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{308} & 0 & -\frac{\sqrt{1155}}{308} & 0 & 0 & -\frac{5\sqrt{770}i}{924} \end{bmatrix}$
682	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{77}i}{1540} & 0 & -\frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & 0 & -\frac{17\sqrt{1155}i}{4620} & 0 & -\frac{17\sqrt{1155}}{4620} & -\frac{\sqrt{770}i}{220} & 0 \\ \frac{\sqrt{77}i}{1540} & 0 & \frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & 0 & -\frac{17\sqrt{1155}i}{4620} & 0 & \frac{17\sqrt{1155}}{4620} & 0 & 0 & \frac{\sqrt{770}i}{220} \\ 0 & \frac{\sqrt{77}}{1540} & 0 & \frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{420} & 0 & \frac{\sqrt{1155}i}{420} & 0 & 0 \\ -\frac{\sqrt{77}}{1540} & 0 & \frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{420} & 0 & \frac{\sqrt{1155}i}{420} & 0 & 0 & 0 \\ \frac{\sqrt{77}i}{220} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{462}i}{2310} & 0 & -\frac{\sqrt{462}}{210} & -\frac{\sqrt{1155}i}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{385} \\ 0 & -\frac{\sqrt{77}i}{220} & 0 & 0 & -\frac{17\sqrt{462}i}{2310} & 0 & \frac{\sqrt{462}}{210} & 0 & 0 & \frac{\sqrt{1155}i}{220} & 0 & 0 & \frac{\sqrt{770}i}{385} & 0 \\ 0 & 0 & \frac{\sqrt{77}i}{220} & 0 & 0 & -\frac{17\sqrt{462}}{2310} & 0 & \frac{\sqrt{462}i}{210} & 0 & 0 & \frac{\sqrt{1155}i}{220} & 0 & 0 & -\frac{\sqrt{770}}{385} \\ 0 & 0 & 0 & -\frac{\sqrt{77}i}{220} & \frac{17\sqrt{462}}{2310} & 0 & \frac{\sqrt{462}i}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{220} & \frac{\sqrt{770}}{385} & 0 \\ 0 & -\frac{\sqrt{231}i}{165} & 0 & -\frac{\sqrt{231}}{165} & -\frac{3\sqrt{154}i}{220} & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}i}{770} & 0 & -\frac{3\sqrt{385}}{770} & 0 & 0 \\ -\frac{\sqrt{231}i}{165} & 0 & \frac{\sqrt{231}}{165} & 0 & 0 & \frac{3\sqrt{154}i}{220} & 0 & 0 & \frac{3\sqrt{385}i}{770} & 0 & \frac{3\sqrt{385}}{770} & 0 & 0 & 0 \end{bmatrix}$
683	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{G}_4^{(1,1;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{11}i}{220} & 0 & 0 & \frac{7\sqrt{66}}{660} & 0 & -\frac{3\sqrt{66}i}{440} & 0 & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 & \frac{\sqrt{110}}{110} \\ 0 & 0 & 0 & \frac{\sqrt{11}i}{220} & -\frac{7\sqrt{66}}{660} & 0 & -\frac{3\sqrt{66}i}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{132} & -\frac{\sqrt{110}}{110} & 0 \\ \frac{\sqrt{11}i}{220} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{66}i}{440} & 0 & -\frac{\sqrt{66}}{330} & \frac{\sqrt{165}i}{660} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{440} \\ 0 & -\frac{\sqrt{11}i}{220} & 0 & 0 & -\frac{3\sqrt{66}i}{440} & 0 & \frac{\sqrt{66}}{330} & 0 & 0 & -\frac{\sqrt{165}i}{660} & 0 & 0 & -\frac{3\sqrt{110}i}{440} & 0 \\ 0 & \frac{\sqrt{11}}{220} & 0 & -\frac{3\sqrt{11}i}{440} & 0 & 0 & \frac{\sqrt{66}i}{330} & 0 & 0 & \frac{\sqrt{165}}{660} & 0 & -\frac{3\sqrt{165}i}{440} & 0 & 0 \\ -\frac{\sqrt{11}}{220} & 0 & -\frac{3\sqrt{11}i}{440} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{330} & -\frac{\sqrt{165}}{660} & 0 & -\frac{3\sqrt{165}i}{440} & 0 & 0 & 0 \\ 0 & -\frac{9\sqrt{11}i}{440} & 0 & -\frac{\sqrt{11}}{44} & -\frac{\sqrt{66}i}{66} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{165}i}{440} & 0 & -\frac{\sqrt{165}}{60} & -\frac{\sqrt{110}i}{55} & 0 \\ -\frac{9\sqrt{11}i}{440} & 0 & \frac{\sqrt{11}}{44} & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 & -\frac{3\sqrt{165}i}{440} & 0 & \frac{\sqrt{165}}{60} & 0 & 0 & \frac{\sqrt{110}i}{55} \\ 0 & 0 & -\frac{\sqrt{33}i}{165} & 0 & 0 & \frac{3\sqrt{22}}{110} & 0 & -\frac{9\sqrt{22}i}{440} & 0 & 0 & -\frac{3\sqrt{55}i}{110} & 0 & 0 & \frac{\sqrt{330}}{132} \\ 0 & 0 & 0 & \frac{\sqrt{33}i}{165} & -\frac{3\sqrt{22}}{110} & 0 & -\frac{9\sqrt{22}i}{440} & 0 & 0 & 0 & 0 & \frac{3\sqrt{55}i}{110} & -\frac{\sqrt{330}}{132} & 0 \end{bmatrix}$
684	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,1;a)}(A_u,5)$	$\begin{bmatrix} \frac{\sqrt{11}i}{220} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{66}i}{660} & 0 & -\frac{3\sqrt{66}}{440} & -\frac{\sqrt{165}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{110} \\ 0 & -\frac{\sqrt{11}i}{220} & 0 & 0 & -\frac{7\sqrt{66}i}{660} & 0 & \frac{3\sqrt{66}}{440} & 0 & 0 & \frac{\sqrt{165}i}{132} & 0 & 0 & \frac{\sqrt{110}i}{110} & 0 \\ 0 & 0 & \frac{\sqrt{11}i}{220} & 0 & 0 & -\frac{3\sqrt{66}}{440} & 0 & \frac{\sqrt{66}i}{330} & 0 & 0 & -\frac{\sqrt{165}i}{660} & 0 & 0 & \frac{3\sqrt{110}}{440} \\ 0 & 0 & 0 & -\frac{\sqrt{11}i}{220} & \frac{3\sqrt{66}}{440} & 0 & \frac{\sqrt{66}i}{330} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{660} & -\frac{3\sqrt{110}}{440} & 0 \\ 0 & -\frac{\sqrt{11}i}{44} & 0 & -\frac{9\sqrt{11}}{440} & -\frac{\sqrt{66}i}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{60} & 0 & \frac{3\sqrt{165}}{440} & \frac{\sqrt{110}i}{55} & 0 \\ -\frac{\sqrt{11}i}{44} & 0 & \frac{9\sqrt{11}}{440} & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 & \frac{\sqrt{165}i}{60} & 0 & -\frac{3\sqrt{165}}{440} & 0 & 0 & -\frac{\sqrt{110}i}{55} \\ 0 & -\frac{3\sqrt{11}}{440} & 0 & \frac{\sqrt{11}i}{220} & 0 & 0 & -\frac{\sqrt{66}i}{330} & 0 & 0 & \frac{3\sqrt{165}}{440} & 0 & -\frac{\sqrt{165}i}{660} & 0 & 0 \\ \frac{3\sqrt{11}}{440} & 0 & \frac{\sqrt{11}i}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{330} & -\frac{3\sqrt{165}}{440} & 0 & -\frac{\sqrt{165}i}{660} & 0 & 0 & 0 \\ -\frac{\sqrt{33}i}{165} & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}i}{110} & 0 & \frac{9\sqrt{22}}{440} & \frac{3\sqrt{55}i}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{132} \\ 0 & \frac{\sqrt{33}i}{165} & 0 & 0 & \frac{3\sqrt{22}i}{110} & 0 & -\frac{9\sqrt{22}}{440} & 0 & 0 & -\frac{3\sqrt{55}i}{110} & 0 & 0 & -\frac{\sqrt{330}i}{132} & 0 \end{bmatrix}$
685	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{G}_4^{(1,1;a)}(A_u,6)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{11}}{44} & 0 & \frac{3\sqrt{11}i}{44} & 0 & 0 & \frac{3\sqrt{66}i}{220} & 0 & 0 & -\frac{\sqrt{165}}{660} & 0 & -\frac{\sqrt{165}i}{660} & 0 & 0 \\ \frac{3\sqrt{11}}{44} & 0 & \frac{3\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{66}i}{220} & \frac{\sqrt{165}}{660} & 0 & -\frac{\sqrt{165}i}{660} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{11}i}{44} & 0 & \frac{3\sqrt{11}}{44} & \frac{3\sqrt{66}i}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{660} & 0 & \frac{\sqrt{165}}{660} & 0 & 0 \\ \frac{3\sqrt{11}i}{44} & 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & -\frac{3\sqrt{66}i}{220} & 0 & 0 & -\frac{\sqrt{165}i}{660} & 0 & -\frac{\sqrt{165}}{660} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{11}i}{110} & 0 & 0 & -\frac{\sqrt{66}}{330} & 0 & -\frac{\sqrt{66}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{11}i}{110} & \frac{\sqrt{66}}{330} & 0 & -\frac{\sqrt{66}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{11}i}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{330} & 0 & \frac{\sqrt{66}}{330} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{11}i}{110} & 0 & 0 & -\frac{\sqrt{66}i}{330} & 0 & -\frac{\sqrt{66}}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{33}}{330} & 0 & -\frac{\sqrt{33}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{33}}{330} & 0 & -\frac{\sqrt{33}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
686	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,1;a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{77}i}{1540} & 0 & 0 & -\frac{29\sqrt{462}}{4620} & 0 & \frac{3\sqrt{462}i}{440} & 0 & 0 & \frac{\sqrt{1155}i}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{77}i}{1540} & \frac{29\sqrt{462}}{4620} & 0 & \frac{3\sqrt{462}i}{440} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{420} & 0 & 0 \\ \frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & \frac{3\sqrt{462}i}{440} & 0 & \frac{17\sqrt{462}}{2310} & \frac{17\sqrt{1155}i}{4620} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{440} \\ 0 & -\frac{\sqrt{77}i}{1540} & 0 & 0 & \frac{3\sqrt{462}i}{440} & 0 & -\frac{17\sqrt{462}}{2310} & 0 & 0 & -\frac{17\sqrt{1155}i}{4620} & 0 & 0 & -\frac{\sqrt{770}i}{440} & 0 \\ 0 & -\frac{3\sqrt{77}}{220} & 0 & \frac{7\sqrt{77}i}{440} & 0 & 0 & \frac{17\sqrt{462}i}{2310} & 0 & 0 & -\frac{\sqrt{1155}}{924} & 0 & -\frac{\sqrt{1155}i}{440} & 0 & 0 \\ \frac{3\sqrt{77}}{220} & 0 & \frac{7\sqrt{77}i}{440} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{462}i}{2310} & \frac{\sqrt{1155}}{924} & 0 & -\frac{\sqrt{1155}i}{440} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}i}{88} & 0 & \frac{3\sqrt{77}}{220} & \frac{\sqrt{462}i}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{440} & 0 & -\frac{\sqrt{1155}}{924} & -\frac{\sqrt{770}i}{385} & 0 \\ \frac{\sqrt{77}i}{88} & 0 & -\frac{3\sqrt{77}}{220} & 0 & 0 & -\frac{\sqrt{462}i}{210} & 0 & 0 & -\frac{\sqrt{1155}i}{440} & 0 & \frac{\sqrt{1155}}{924} & 0 & 0 & \frac{\sqrt{770}i}{385} \\ 0 & 0 & \frac{\sqrt{231}i}{165} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}i}{440} & 0 & 0 & -\frac{3\sqrt{385}i}{770} & 0 & 0 & \frac{\sqrt{2310}}{924} \\ 0 & 0 & 0 & -\frac{\sqrt{231}i}{165} & 0 & 0 & -\frac{3\sqrt{154}i}{440} & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}i}{770} & -\frac{\sqrt{2310}}{924} & 0 \end{bmatrix}$
687	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{G}_4^{(1,1;a)}(A_u,8)$	$\begin{bmatrix} -\frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & -\frac{29\sqrt{462}i}{4620} & 0 & -\frac{3\sqrt{462}}{440} & -\frac{\sqrt{1155}i}{420} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}i}{1540} & 0 & 0 & -\frac{29\sqrt{462}i}{4620} & 0 & \frac{3\sqrt{462}}{440} & 0 & 0 & \frac{\sqrt{1155}i}{420} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{77}i}{1540} & 0 & 0 & -\frac{3\sqrt{462}}{440} & 0 & \frac{17\sqrt{462}i}{2310} & 0 & 0 & \frac{17\sqrt{1155}i}{4620} & 0 & 0 & -\frac{\sqrt{770}}{440} \\ 0 & 0 & 0 & \frac{\sqrt{77}i}{1540} & \frac{3\sqrt{462}}{440} & 0 & \frac{17\sqrt{462}i}{2310} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{1155}i}{4620} & \frac{\sqrt{770}}{440} & 0 \\ 0 & -\frac{3\sqrt{77}i}{220} & 0 & -\frac{\sqrt{77}}{88} & -\frac{\sqrt{462}i}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{924} & 0 & -\frac{\sqrt{1155}}{440} & -\frac{\sqrt{770}i}{385} & 0 \\ -\frac{3\sqrt{77}i}{220} & 0 & \frac{\sqrt{77}}{88} & 0 & 0 & \frac{\sqrt{462}i}{210} & 0 & 0 & -\frac{\sqrt{1155}i}{924} & 0 & \frac{\sqrt{1155}}{440} & 0 & 0 & \frac{\sqrt{770}i}{385} \\ 0 & -\frac{7\sqrt{77}}{440} & 0 & \frac{3\sqrt{77}i}{220} & 0 & 0 & \frac{17\sqrt{462}i}{2310} & 0 & 0 & -\frac{\sqrt{1155}}{440} & 0 & -\frac{\sqrt{1155}i}{924} & 0 & 0 \\ \frac{7\sqrt{77}}{440} & 0 & \frac{3\sqrt{77}i}{220} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{462}i}{2310} & \frac{\sqrt{1155}}{440} & 0 & -\frac{\sqrt{1155}i}{924} & 0 & 0 & 0 \\ -\frac{\sqrt{231}i}{165} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}}{440} & -\frac{3\sqrt{385}i}{770} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}i}{924} \\ 0 & \frac{\sqrt{231}i}{165} & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{440} & 0 & 0 & \frac{3\sqrt{385}i}{770} & 0 & 0 & \frac{\sqrt{2310}i}{924} & 0 \end{bmatrix}$
688	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{G}_4^{(1,1;a)}(A_u,9)$	$\begin{bmatrix} 0 & -\frac{\sqrt{77}}{1540} & 0 & -\frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{420} & 0 & \frac{\sqrt{1155}i}{420} & 0 & 0 \\ \frac{\sqrt{77}}{1540} & 0 & -\frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{420} & 0 & \frac{\sqrt{1155}i}{420} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}i}{1540} & 0 & -\frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{1155}i}{4620} & 0 & \frac{17\sqrt{1155}}{4620} & \frac{\sqrt{770}i}{220} & 0 \\ \frac{\sqrt{77}i}{1540} & 0 & \frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{1155}i}{4620} & 0 & -\frac{17\sqrt{1155}}{4620} & 0 & 0 & -\frac{\sqrt{770}i}{220} \\ 0 & 0 & -\frac{\sqrt{77}i}{220} & 0 & 0 & -\frac{\sqrt{462}}{210} & 0 & \frac{17\sqrt{462}i}{2310} & 0 & 0 & \frac{\sqrt{1155}i}{220} & 0 & 0 & -\frac{\sqrt{770}}{385} \\ 0 & 0 & 0 & \frac{\sqrt{77}i}{220} & \frac{\sqrt{462}}{210} & 0 & \frac{17\sqrt{462}i}{2310} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{220} & \frac{\sqrt{770}}{385} & 0 \\ \frac{\sqrt{77}i}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{210} & 0 & \frac{17\sqrt{462}}{2310} & \frac{\sqrt{1155}i}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{385} \\ 0 & -\frac{\sqrt{77}i}{220} & 0 & 0 & \frac{\sqrt{462}i}{210} & 0 & -\frac{17\sqrt{462}}{2310} & 0 & 0 & -\frac{\sqrt{1155}i}{220} & 0 & 0 & -\frac{\sqrt{770}i}{385} & 0 \\ 0 & -\frac{\sqrt{231}}{165} & 0 & \frac{\sqrt{231}i}{165} & 0 & 0 & \frac{3\sqrt{154}i}{220} & 0 & 0 & -\frac{3\sqrt{385}}{770} & 0 & -\frac{3\sqrt{385}i}{770} & 0 & 0 \\ \frac{\sqrt{231}}{165} & 0 & \frac{\sqrt{231}i}{165} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}i}{220} & \frac{3\sqrt{385}}{770} & 0 & -\frac{3\sqrt{385}i}{770} & 0 & 0 & 0 \end{bmatrix}$
689	symmetry	x
	$\mathbb{T}_1^{(a)}(A_u,1)$	$\begin{bmatrix} \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 & 0 \end{bmatrix}$
690	symmetry	y

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_1^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 \\ -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{70} & 0 & 0 \end{bmatrix}$
691	symmetry	z
	$\mathbb{T}_1^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{70} \end{bmatrix}$
692	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \\ -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
693	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{30}i}{240} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{30}i}{240} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{240} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{240} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 \end{bmatrix}$
694	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{11\sqrt{30}i}{240} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{11\sqrt{30}i}{240} & 0 & 0 \\ -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{240} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{240} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} \\ 0 & 0 & \frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 \end{bmatrix}$
695	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{60} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} \end{bmatrix}$
696	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(a)}(A_u,5)$	$\begin{bmatrix} \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{16} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
697	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{T}_3^{(a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 \\ \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} \\ 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 \end{bmatrix}$
698	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
699	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
	$\mathbb{T}_5^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
700	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
701	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$
	$\mathbb{T}_5^{(a)}(A_u,3)$	$\begin{bmatrix} \frac{11\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{11\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{105}i}{336} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
702	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & \frac{11\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{105}i}{336} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{11\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{105}i}{336} & 0 & 0 \\ \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} \\ 0 & 0 & \frac{\sqrt{21}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}i}{112} & 0 & 0 \end{bmatrix}$
703	$\mathbb{T}_5^{(a)}(A_u,5)$	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{42} \end{bmatrix}$
704	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(a)}(A_u,6)$	$\begin{bmatrix} \frac{3\sqrt{5}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{15}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{15}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
705	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$
	$\mathbb{T}_5^{(a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & \frac{3\sqrt{5}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{5}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{16} & 0 & 0 \\ \frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ 0 & 0 & -\frac{3\sqrt{15}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{15}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3i}{16} & 0 & 0 \end{bmatrix}$
706	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(a)}(A_u,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
707	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$
	$\mathbb{T}_5^{(a)}(A_u,9)$	$\begin{bmatrix} -\frac{7\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{7\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$
708	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(a)}(A_u,10)$	$\begin{bmatrix} 0 & 0 & \frac{7\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{7\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 \end{bmatrix}$
709	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{T}_5^{(a)}(A_u,11)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
710	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{84} & 0 \\ -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} \\ 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 \\ 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 \end{bmatrix}$
711	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{T}_3^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & \frac{\sqrt{70}i}{140} \\ 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & -\frac{\sqrt{70}i}{140} & 0 \\ \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} \\ 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 \\ 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{280} & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{280} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & \frac{\sqrt{105}i}{140} & -\frac{\sqrt{70}}{70} & 0 \\ \frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & \frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 \end{bmatrix}$
712	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & \frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} \\ 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 \\ 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & -\frac{3\sqrt{70}i}{280} \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & \frac{3\sqrt{70}i}{280} & 0 \\ 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{56} & \frac{\sqrt{70}}{70} & 0 \\ -\frac{\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & -\frac{\sqrt{70}}{70} \\ 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{280} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 \\ -\frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{280} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{3\sqrt{14}i}{56} & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 \end{bmatrix}$
713	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}_3^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & \frac{\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{140} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 \\ \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{70}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & \frac{\sqrt{70}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 \end{bmatrix}$
714	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{84} & 0 \\ \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{168} \\ 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}}{168} & 0 \\ 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 \\ \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{28} & -\frac{\sqrt{42}}{42} & 0 \\ -\frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}}{42} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 \end{bmatrix}$
715	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{T}_3^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} \\ 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{168} \\ 0 & 0 & 0 & \frac{\sqrt{105}}{84} & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{168} & 0 \\ 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{56} & -\frac{\sqrt{42}}{42} & 0 \\ -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{42}}{42} \\ 0 & \frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{168} & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \end{bmatrix}$
716	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & -\frac{\sqrt{42}}{84} & 0 \\ -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}}{84} \\ 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{42} & 0 \\ \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} \\ 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 \end{bmatrix}$
717	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
	$\mathbb{T}_5^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{10} & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & \frac{1}{20} & 0 & \frac{i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & \frac{1}{20} & 0 & -\frac{i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & \frac{i}{20} & 0 & -\frac{1}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{20} & -\frac{i}{20} & 0 & -\frac{1}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}}{20} & 0 & \frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{2}}{20} & 0 & -\frac{3\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
718	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}}{40} & 0 & -\frac{\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{40} & \frac{\sqrt{5}}{10} & 0 \\ -\frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{2}i}{40} & 0 & -\frac{\sqrt{2}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 \\ -\frac{\sqrt{2}i}{40} & 0 & -\frac{\sqrt{2}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & 0 \\ \frac{3\sqrt{2}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{15} & 0 & \frac{\sqrt{3}i}{20} & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & -\frac{3\sqrt{2}}{40} & 0 & 0 & \frac{\sqrt{3}}{15} & 0 & -\frac{\sqrt{3}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & \frac{3\sqrt{2}}{40} & 0 & 0 & -\frac{\sqrt{3}i}{15} & 0 & \frac{\sqrt{3}}{20} & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{40} & \frac{\sqrt{3}i}{15} & 0 & \frac{\sqrt{3}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & \frac{\sqrt{6}}{40} & 0 & -\frac{\sqrt{6}i}{40} & -\frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 \\ \frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{6}i}{40} & 0 & 0 & \frac{1}{5} & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \end{bmatrix}$
719	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$
	$\mathbb{T}_5^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & -\frac{\sqrt{35}i}{60} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & -\frac{\sqrt{14}}{336} & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}}{560} & \frac{\sqrt{35}i}{60} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{336} & -\frac{\sqrt{21}i}{84} & 0 \\ \frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & \frac{5\sqrt{35}}{168} & 0 & \frac{\sqrt{35}i}{60} & -\frac{13\sqrt{14}}{336} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{168} \\ 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & \frac{5\sqrt{35}}{168} & 0 & -\frac{\sqrt{35}i}{60} & 0 & 0 & \frac{13\sqrt{14}}{336} & 0 & 0 & -\frac{5\sqrt{21}}{168} & 0 \\ 0 & \frac{17\sqrt{210}i}{1680} & 0 & -\frac{5\sqrt{210}}{336} & 0 & 0 & \frac{\sqrt{35}}{60} & 0 & 0 & \frac{\sqrt{14}i}{336} & 0 & \frac{5\sqrt{14}}{336} & 0 & 0 \\ -\frac{17\sqrt{210}i}{1680} & 0 & -\frac{5\sqrt{210}}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{60} & -\frac{\sqrt{14}i}{336} & 0 & \frac{5\sqrt{14}}{336} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{11\sqrt{210}i}{1680} & -\frac{\sqrt{35}}{120} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{336} & \frac{\sqrt{21}}{56} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & \frac{11\sqrt{210}i}{1680} & 0 & 0 & \frac{\sqrt{35}}{120} & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{336} & 0 & 0 & -\frac{\sqrt{21}}{56} \\ 0 & 0 & \frac{\sqrt{70}}{80} & 0 & 0 & -\frac{\sqrt{105}i}{210} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{80} & \frac{\sqrt{105}i}{210} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{112} & 0 & 0 \end{bmatrix}$
720	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} \frac{\sqrt{210}}{560} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{60} & 0 & -\frac{\sqrt{35}i}{84} & -\frac{\sqrt{14}}{336} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & -\frac{\sqrt{210}}{560} & 0 & 0 & -\frac{\sqrt{35}}{60} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & \frac{\sqrt{14}}{336} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{560} & 0 & 0 & -\frac{5\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{60} & 0 & 0 & \frac{13\sqrt{14}}{336} & 0 & 0 & -\frac{5\sqrt{21}i}{168} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{560} & \frac{5\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{60} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{14}}{336} & \frac{5\sqrt{21}i}{168} & 0 \\ 0 & \frac{11\sqrt{210}}{1680} & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{336} & 0 & -\frac{5\sqrt{14}i}{168} & -\frac{\sqrt{21}}{56} & 0 \\ \frac{11\sqrt{210}}{1680} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{120} & 0 & 0 & -\frac{\sqrt{14}}{336} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{56} \\ 0 & \frac{5\sqrt{210}i}{336} & 0 & -\frac{17\sqrt{210}}{1680} & 0 & 0 & -\frac{\sqrt{35}}{60} & 0 & 0 & \frac{5\sqrt{14}i}{336} & 0 & \frac{\sqrt{14}}{336} & 0 & 0 \\ -\frac{5\sqrt{210}i}{336} & 0 & -\frac{17\sqrt{210}}{1680} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{60} & -\frac{5\sqrt{14}i}{336} & 0 & \frac{\sqrt{14}}{336} & 0 & 0 & 0 \\ \frac{\sqrt{70}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} & 0 & \frac{\sqrt{105}i}{84} & \frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{80} & 0 & 0 & \frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
721	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$
	$\mathbb{T}_5^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{420} & 0 & \frac{\sqrt{210}}{420} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{42} & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 \\ -\frac{\sqrt{210}i}{420} & 0 & \frac{\sqrt{210}}{420} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{42} & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{420} & 0 & \frac{\sqrt{210}i}{420} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & \frac{\sqrt{14}i}{42} & 0 & 0 \\ -\frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & -\frac{\sqrt{14}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{60} & 0 & -\frac{\sqrt{35}}{60} & 0 & 0 & \frac{5\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{60} & 0 & -\frac{\sqrt{35}}{60} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{84} & \frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{60} & 0 & -\frac{\sqrt{35}i}{60} & -\frac{5\sqrt{14}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{60} & 0 & \frac{\sqrt{35}i}{60} & 0 & 0 & \frac{5\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
722	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{80} & 0 & 0 & -\frac{i}{20} & 0 & -\frac{1}{20} & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{80} & \frac{i}{20} & 0 & -\frac{1}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & \frac{\sqrt{15}i}{20} & 0 \\ \frac{\sqrt{6}}{80} & 0 & 0 & 0 & 0 & \frac{3}{40} & 0 & \frac{i}{20} & \frac{\sqrt{10}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} \\ 0 & -\frac{\sqrt{6}}{80} & 0 & 0 & \frac{3}{40} & 0 & -\frac{i}{20} & 0 & 0 & -\frac{\sqrt{10}}{80} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 \\ 0 & -\frac{\sqrt{6}i}{80} & 0 & \frac{\sqrt{6}}{80} & 0 & 0 & \frac{1}{20} & 0 & 0 & -\frac{\sqrt{10}i}{80} & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 \\ \frac{\sqrt{6}i}{80} & 0 & \frac{\sqrt{6}}{80} & 0 & 0 & 0 & 0 & -\frac{1}{20} & \frac{\sqrt{10}i}{80} & 0 & \frac{3\sqrt{10}}{80} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{40} & 0 & -\frac{\sqrt{6}i}{16} & -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{80} & \frac{\sqrt{15}}{40} & 0 \\ -\frac{\sqrt{6}}{40} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}}{40} \\ 0 & 0 & -\frac{9\sqrt{2}}{80} & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{2}}{80} & -\frac{\sqrt{3}i}{10} & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{80} & 0 & 0 \end{bmatrix}$
723	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$
	$\mathbb{T}_5^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} \frac{\sqrt{6}}{80} & 0 & 0 & 0 & 0 & -\frac{1}{20} & 0 & \frac{i}{20} & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ 0 & -\frac{\sqrt{6}}{80} & 0 & 0 & -\frac{1}{20} & 0 & -\frac{i}{20} & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{80} & 0 & 0 & -\frac{3i}{40} & 0 & \frac{1}{20} & 0 & 0 & -\frac{\sqrt{10}}{80} & 0 & 0 & \frac{\sqrt{15}i}{40} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{80} & \frac{3i}{40} & 0 & \frac{1}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{80} & -\frac{\sqrt{15}i}{40} & 0 \\ 0 & \frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{40} & -\frac{1}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{80} & 0 & -\frac{\sqrt{10}i}{40} & -\frac{\sqrt{15}}{40} & 0 \\ \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{40} & 0 & 0 & \frac{1}{8} & 0 & 0 & \frac{\sqrt{10}}{80} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & \frac{\sqrt{15}}{40} \\ 0 & -\frac{\sqrt{6}i}{80} & 0 & \frac{\sqrt{6}}{80} & 0 & 0 & -\frac{1}{20} & 0 & 0 & \frac{3\sqrt{10}i}{80} & 0 & -\frac{\sqrt{10}}{80} & 0 & 0 \\ \frac{\sqrt{6}i}{80} & 0 & \frac{\sqrt{6}}{80} & 0 & 0 & 0 & 0 & \frac{1}{20} & -\frac{3\sqrt{10}i}{80} & 0 & -\frac{\sqrt{10}}{80} & 0 & 0 & 0 \\ -\frac{9\sqrt{2}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & -\frac{\sqrt{3}i}{20} & \frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{9\sqrt{2}}{80} & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{3}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & 0 & 0 & 0 \end{bmatrix}$
724	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,-1;a)}(A_u,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{10} & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{10} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{20} & 0 & 0 & \frac{i}{20} & 0 & -\frac{1}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{20} & -\frac{i}{20} & 0 & -\frac{1}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{20} & 0 & 0 & 0 & 0 & -\frac{1}{20} & 0 & -\frac{i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{20} & 0 & 0 & -\frac{1}{20} & 0 & \frac{i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{2}i}{20} & 0 & -\frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{2}i}{20} & 0 & -\frac{3\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
725	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$
	$\mathbb{T}_5^{(1,-1;a)}(A_u,9)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{40} & 0 & 0 & \frac{\sqrt{3}i}{15} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{40} & -\frac{\sqrt{3}i}{15} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 \\ \frac{\sqrt{2}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{60} & 0 & -\frac{\sqrt{3}i}{15} & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & -\frac{\sqrt{2}}{40} & 0 & 0 & -\frac{\sqrt{3}}{60} & 0 & \frac{\sqrt{3}i}{15} & 0 & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & -\frac{\sqrt{2}i}{10} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & \frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 \\ \frac{\sqrt{2}i}{10} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{15} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{8} & 0 & \frac{\sqrt{2}i}{10} & -\frac{\sqrt{3}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 \\ \frac{\sqrt{2}}{8} & 0 & -\frac{\sqrt{2}i}{10} & 0 & 0 & \frac{\sqrt{3}}{20} & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & 0 & \frac{\sqrt{6}}{40} & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{40} & 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & 0 \end{bmatrix}$
726	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,-1;a)}(A_u,10)$	$\begin{bmatrix} -\frac{\sqrt{2}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{15} & 0 & -\frac{\sqrt{3}i}{10} & -\frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{40} & 0 & 0 & -\frac{\sqrt{3}}{15} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}}{40} & 0 & 0 & -\frac{\sqrt{3}i}{60} & 0 & \frac{\sqrt{3}}{15} & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{2}}{40} & \frac{\sqrt{3}i}{60} & 0 & \frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{40} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & \frac{\sqrt{2}}{10} & 0 & \frac{\sqrt{2}i}{8} & \frac{\sqrt{3}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & \frac{\sqrt{5}}{20} & 0 \\ \frac{\sqrt{2}}{10} & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & \frac{\sqrt{2}i}{20} & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & \frac{\sqrt{3}}{15} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{20} & 0 & -\frac{\sqrt{2}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{15} & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{10} & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{40} & 0 & 0 & 0 & 0 & \frac{i}{10} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 \end{bmatrix}$
727	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$
	$\mathbb{T}_5^{(1,-1;a)}(A_u,11)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}i}{40} & 0 & -\frac{\sqrt{2}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 \\ -\frac{\sqrt{2}i}{40} & 0 & -\frac{\sqrt{2}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{40} & 0 & \frac{\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & \frac{\sqrt{30}i}{40} & \frac{\sqrt{5}}{10} & 0 \\ \frac{\sqrt{2}}{40} & 0 & -\frac{\sqrt{2}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & \frac{3\sqrt{2}}{40} & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{3}}{15} & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & -\frac{3\sqrt{2}}{40} & \frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{120} & \frac{\sqrt{5}i}{20} & 0 \\ -\frac{3\sqrt{2}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & -\frac{\sqrt{3}i}{15} & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & \frac{3\sqrt{2}}{40} & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{3}i}{15} & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 \\ 0 & \frac{\sqrt{6}i}{40} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 & -\frac{1}{5} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 \\ -\frac{\sqrt{6}i}{40} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 & 0 & 0 & \frac{1}{5} & -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 \end{bmatrix}$
728	symmetry	x

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_1^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}}{28} & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & 0 \\ \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & \frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{3\sqrt{70}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & \frac{3\sqrt{70}i}{140} & 0 \end{bmatrix}$
729	symmetry	y
	$\mathbb{T}_1^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{3\sqrt{70}}{140} & 0 \end{bmatrix}$
730	symmetry	z

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_1^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 \\ -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 \\ -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & \frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 \end{bmatrix}$
731	symmetry	$\sqrt{15}xyz$
	$\mathbb{T}_3^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}}{48} & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & -\frac{1}{6} & 0 \\ \frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & \frac{1}{6} \\ 0 & -\frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ \frac{\sqrt{10}i}{48} & 0 & \frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & -\frac{1}{24} \\ 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & -\frac{1}{24} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & -\frac{i}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & \frac{i}{24} & 0 \\ 0 & \frac{\sqrt{30}}{48} & 0 & -\frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 \\ \frac{\sqrt{30}}{48} & 0 & \frac{\sqrt{30}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{16} & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 \end{bmatrix}$
732	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{160} & 0 & 0 & \frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{96} & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{160} & -\frac{\sqrt{15}i}{24} & 0 \\ \frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & \frac{7\sqrt{10}}{160} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & -\frac{7\sqrt{10}}{160} & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & -\frac{3\sqrt{10}i}{160} & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & \frac{3\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{6}i}{96} & -\frac{3}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{7\sqrt{10}i}{160} & \frac{\sqrt{15}}{240} & 0 \\ 0 & 0 & \frac{5\sqrt{6}i}{96} & 0 & 0 & \frac{3}{16} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{10}i}{160} & 0 & 0 & -\frac{\sqrt{15}}{240} \\ 0 & 0 & \frac{5\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{160} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & -\frac{5\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{160} & -\frac{\sqrt{5}i}{20} & 0 \end{bmatrix}$
733	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} \frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & \frac{3\sqrt{10}}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{160} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & -\frac{7\sqrt{10}}{160} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & \frac{7\sqrt{10}}{160} & 0 & 0 \\ 0 & \frac{5\sqrt{6}}{96} & 0 & 0 & -\frac{3}{16} & 0 & 0 & 0 & 0 & \frac{7\sqrt{10}}{160} & 0 & 0 & -\frac{\sqrt{15}}{240} & 0 \\ \frac{5\sqrt{6}}{96} & 0 & 0 & 0 & 0 & \frac{3}{16} & 0 & 0 & \frac{7\sqrt{10}}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{240} \\ 0 & 0 & 0 & \frac{5\sqrt{6}}{96} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{160} & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{6}}{96} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & -\frac{3\sqrt{10}}{160} & 0 & 0 & 0 \\ \frac{5\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & -\frac{5\sqrt{2}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{160} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 \end{bmatrix}$
734	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 \\ \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} \\ 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} \\ 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & 0 \end{bmatrix}$
735	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{10}}{96} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{96} & 0 & 0 & \frac{i}{24} \\ 0 & 0 & 0 & \frac{\sqrt{10}}{96} & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{96} & -\frac{i}{24} & 0 \\ \frac{\sqrt{10}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & \frac{1}{6} \\ 0 & -\frac{\sqrt{10}}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{6}}{96} & 0 & 0 & \frac{1}{6} & 0 \\ 0 & -\frac{\sqrt{10}i}{96} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 \\ \frac{\sqrt{10}i}{96} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & -\frac{\sqrt{6}i}{96} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{96} & \frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{32} & \frac{1}{48} & 0 \\ \frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{96} & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{1}{48} \\ 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{32} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{32} & -\frac{\sqrt{3}i}{12} & 0 \end{bmatrix}$
736	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,0;a)}(A_u,6)$	$\begin{bmatrix} -\frac{\sqrt{10}}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & \frac{5\sqrt{6}}{96} & 0 & 0 & 0 & 0 & \frac{1}{24} \\ 0 & \frac{\sqrt{10}}{96} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{96} & 0 & 0 & \frac{1}{24} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & -\frac{i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{10}}{96} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{96} & \frac{i}{6} & 0 \\ 0 & -\frac{\sqrt{10}}{96} & 0 & \frac{\sqrt{10}i}{24} & -\frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & \frac{\sqrt{6}i}{24} & \frac{1}{48} & 0 \\ -\frac{\sqrt{10}}{96} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & \frac{\sqrt{15}}{48} & 0 & 0 & -\frac{\sqrt{6}}{32} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{1}{48} \\ 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{10}}{96} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 \\ \frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{10}}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} \\ 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{32} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 \end{bmatrix}$
737	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
	$\mathbb{T}_3^{(1,0;a)}(A_u,7)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}i}{48} & 0 & -\frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ -\frac{\sqrt{10}i}{48} & 0 & -\frac{\sqrt{10}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{48} & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & \frac{1}{6} & 0 \\ \frac{\sqrt{10}}{48} & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & -\frac{1}{6} \\ 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & -\frac{i}{24} \\ 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & \frac{i}{24} & 0 \\ \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & \frac{1}{24} \\ 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & \frac{1}{24} & 0 \\ 0 & -\frac{\sqrt{30}i}{48} & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & \frac{\sqrt{2}}{16} & 0 & 0 \\ \frac{\sqrt{30}i}{48} & 0 & -\frac{\sqrt{30}}{48} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & \frac{\sqrt{2}}{16} & 0 & 0 & 0 \end{bmatrix}$
738	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & \frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 \\ -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{1}{5} & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & -\frac{1}{5} & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & \frac{1}{5} & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{15} & 0 & 0 & 0 & 0 & -\frac{1}{10} & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & -\frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & -\frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{15} & \frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{20} & 0 & -\frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{20} & 0 & \frac{\sqrt{2}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
739	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$
	$\mathbb{T}_5^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{2}}{120} & 0 & \frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & -\frac{\sqrt{30}i}{120} & -\frac{\sqrt{5}}{30} & 0 \\ \frac{\sqrt{2}}{120} & 0 & -\frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & \frac{\sqrt{5}}{30} \\ 0 & -\frac{\sqrt{2}i}{120} & 0 & \frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 \\ \frac{\sqrt{2}i}{120} & 0 & \frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 \\ \frac{\sqrt{2}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & -\frac{\sqrt{3}i}{10} & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{15} \\ 0 & -\frac{\sqrt{2}}{60} & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & \frac{\sqrt{5}}{15} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{60} & 0 & 0 & -\frac{\sqrt{3}i}{30} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & \frac{\sqrt{5}i}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{60} & \frac{\sqrt{3}i}{30} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{60} & -\frac{\sqrt{5}i}{15} & 0 \\ 0 & \frac{\sqrt{6}}{30} & 0 & -\frac{\sqrt{6}i}{30} & -\frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 \\ \frac{\sqrt{6}}{30} & 0 & \frac{\sqrt{6}i}{30} & 0 & 0 & \frac{1}{10} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 \end{bmatrix}$
740	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{53\sqrt{210}}{3360} & 0 & 0 & -\frac{13\sqrt{35}i}{560} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{224} & 0 & 0 & \frac{\sqrt{21}i}{48} \\ 0 & 0 & 0 & \frac{53\sqrt{210}}{3360} & \frac{13\sqrt{35}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{224} & -\frac{\sqrt{21}i}{48} & 0 \\ -\frac{13\sqrt{210}}{840} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{210}}{840} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{210}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{240} & \frac{3\sqrt{35}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{112} & -\frac{\sqrt{21}}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{210}i}{240} & 0 & 0 & -\frac{3\sqrt{35}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{112} & 0 & 0 & \frac{\sqrt{21}}{168} \\ 0 & 0 & \frac{\sqrt{70}}{160} & 0 & 0 & \frac{\sqrt{105}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{224} & 0 & 0 & -\frac{5\sqrt{7}i}{112} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{160} & -\frac{\sqrt{105}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{224} & \frac{5\sqrt{7}i}{112} & 0 \end{bmatrix}$
741	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$
	$\mathbb{T}_5^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} \frac{53\sqrt{210}}{3360} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{35}}{560} & 0 & 0 & \frac{3\sqrt{14}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{48} \\ 0 & -\frac{53\sqrt{210}}{3360} & 0 & 0 & -\frac{13\sqrt{35}}{560} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{224} & 0 & 0 & -\frac{\sqrt{21}}{48} & 0 \\ 0 & 0 & -\frac{13\sqrt{210}}{840} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{13\sqrt{210}}{840} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{240} & 0 & 0 & \frac{3\sqrt{35}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{112} & 0 & 0 & \frac{\sqrt{21}}{168} & 0 \\ -\frac{\sqrt{210}}{240} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{35}}{280} & 0 & 0 & -\frac{\sqrt{14}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} \\ 0 & 0 & 0 & \frac{\sqrt{210}}{120} & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 \\ \frac{\sqrt{70}}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{80} & 0 & 0 & \frac{\sqrt{42}}{224} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{112} \\ 0 & -\frac{\sqrt{70}}{160} & 0 & 0 & -\frac{\sqrt{105}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{224} & 0 & 0 & -\frac{5\sqrt{7}}{112} & 0 \end{bmatrix}$
742	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{840} & 0 & \frac{\sqrt{210}}{840} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{840} & 0 & \frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 \\ -\frac{\sqrt{210}}{840} & 0 & -\frac{\sqrt{210}i}{840} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 \end{bmatrix}$
743	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$
	$\mathbb{T}_5^{(1,0;a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & -\frac{13\sqrt{6}}{480} & 0 & 0 & \frac{3i}{80} & 0 & \frac{1}{10} & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & -\frac{\sqrt{15}i}{240} \\ 0 & 0 & 0 & \frac{13\sqrt{6}}{480} & -\frac{3i}{80} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & \frac{\sqrt{15}i}{240} & 0 \\ -\frac{\sqrt{6}}{40} & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & -\frac{i}{10} & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} \\ 0 & \frac{\sqrt{6}}{40} & 0 & 0 & \frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & \frac{\sqrt{15}}{30} & 0 \\ 0 & \frac{\sqrt{6}i}{40} & 0 & \frac{\sqrt{6}}{60} & 0 & 0 & -\frac{1}{10} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 \\ -\frac{\sqrt{6}i}{40} & 0 & \frac{\sqrt{6}}{60} & 0 & 0 & 0 & 0 & \frac{1}{10} & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{20} & 0 & -\frac{\sqrt{6}i}{48} & -\frac{1}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & \frac{3\sqrt{10}i}{80} & -\frac{\sqrt{15}}{120} & 0 \\ \frac{\sqrt{6}}{20} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & \frac{1}{8} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & \frac{\sqrt{15}}{120} \\ 0 & 0 & -\frac{9\sqrt{2}}{160} & 0 & 0 & -\frac{\sqrt{3}i}{80} & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & -\frac{\sqrt{30}}{160} & 0 & 0 & -\frac{\sqrt{5}i}{16} \\ 0 & 0 & 0 & \frac{9\sqrt{2}}{160} & \frac{\sqrt{3}i}{80} & 0 & \frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{160} & \frac{\sqrt{5}i}{16} & 0 \end{bmatrix}$
744	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,0;a)}(A_u,7)$	$\begin{bmatrix} \frac{13\sqrt{6}}{480} & 0 & 0 & 0 & 0 & \frac{3}{80} & 0 & -\frac{i}{10} & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{240} \\ 0 & -\frac{13\sqrt{6}}{480} & 0 & 0 & \frac{3}{80} & 0 & \frac{i}{10} & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}}{240} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{40} & 0 & 0 & -\frac{i}{10} & 0 & -\frac{1}{10} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & \frac{\sqrt{15}i}{30} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{40} & \frac{i}{10} & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & -\frac{\sqrt{15}i}{30} & 0 \\ 0 & \frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{20} & -\frac{1}{8} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & \frac{\sqrt{10}i}{20} & \frac{\sqrt{15}}{120} & 0 \\ \frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{20} & 0 & 0 & \frac{1}{8} & 0 & 0 & \frac{3\sqrt{10}}{80} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{120} \\ 0 & -\frac{\sqrt{6}i}{60} & 0 & -\frac{\sqrt{6}}{40} & 0 & 0 & \frac{1}{10} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 \\ \frac{\sqrt{6}i}{60} & 0 & -\frac{\sqrt{6}}{40} & 0 & 0 & 0 & 0 & -\frac{1}{10} & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ -\frac{9\sqrt{2}}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{80} & 0 & \frac{\sqrt{3}i}{10} & \frac{\sqrt{30}}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{16} \\ 0 & \frac{9\sqrt{2}}{160} & 0 & 0 & \frac{\sqrt{3}}{80} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & -\frac{\sqrt{30}}{160} & 0 & 0 & -\frac{\sqrt{5}}{16} & 0 \end{bmatrix}$
745	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
	$\mathbb{T}_5^{(1,0;a)}(A_u,8)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & -\frac{1}{5} & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & \frac{1}{5} & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & -\frac{1}{5} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & \frac{1}{5} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{15} & 0 & 0 & -\frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{15} & \frac{i}{10} & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{15} & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{15} & 0 & 0 & \frac{1}{10} & 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{20} & 0 & \frac{\sqrt{2}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
746	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,0;a)}(A_u,9)$	$\begin{bmatrix} 0 & 0 & \frac{37\sqrt{2}}{240} & 0 & 0 & -\frac{\sqrt{3}i}{120} & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & \frac{\sqrt{30}}{240} & 0 & 0 & \frac{\sqrt{5}i}{24} \\ 0 & 0 & 0 & -\frac{37\sqrt{2}}{240} & \frac{\sqrt{3}i}{120} & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{240} & -\frac{\sqrt{5}i}{24} & 0 \\ \frac{19\sqrt{2}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & -\frac{\sqrt{3}i}{30} & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{60} \\ 0 & -\frac{19\sqrt{2}}{120} & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}}{60} & 0 \\ 0 & -\frac{\sqrt{2}i}{120} & 0 & -\frac{7\sqrt{2}}{120} & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 \\ \frac{\sqrt{2}i}{120} & 0 & -\frac{7\sqrt{2}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{30} & -\frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{24} & 0 & -\frac{\sqrt{2}i}{30} & \frac{\sqrt{3}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}}{60} & 0 \\ -\frac{\sqrt{2}}{24} & 0 & \frac{\sqrt{2}i}{30} & 0 & 0 & -\frac{\sqrt{3}}{60} & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{60} \\ 0 & 0 & \frac{\sqrt{6}}{80} & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{20} & 0 & 0 & -\frac{\sqrt{10}}{80} & 0 & 0 & -\frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{80} & -\frac{i}{8} & 0 & \frac{1}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{80} & \frac{\sqrt{15}i}{24} & 0 \end{bmatrix}$
747	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$
	$\mathbb{T}_5^{(1,0;a)}(A_u,10)$	$\begin{bmatrix} \frac{37\sqrt{2}}{240} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{120} & 0 & -\frac{\sqrt{3}i}{20} & -\frac{\sqrt{30}}{240} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{24} \\ 0 & -\frac{37\sqrt{2}}{240} & 0 & 0 & \frac{\sqrt{3}}{120} & 0 & \frac{\sqrt{3}i}{20} & 0 & 0 & \frac{\sqrt{30}}{240} & 0 & 0 & \frac{\sqrt{5}}{24} & 0 \\ 0 & 0 & -\frac{19\sqrt{2}}{120} & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}i}{60} \\ 0 & 0 & 0 & \frac{19\sqrt{2}}{120} & \frac{\sqrt{3}i}{20} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{120} & \frac{\sqrt{5}i}{60} & 0 \\ 0 & -\frac{\sqrt{2}}{30} & 0 & -\frac{\sqrt{2}i}{24} & -\frac{\sqrt{3}}{60} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & -\frac{\sqrt{5}}{60} & 0 \\ -\frac{\sqrt{2}}{30} & 0 & \frac{\sqrt{2}i}{24} & 0 & 0 & \frac{\sqrt{3}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & \frac{\sqrt{5}}{60} \\ 0 & -\frac{7\sqrt{2}i}{120} & 0 & -\frac{\sqrt{2}}{120} & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 \\ \frac{7\sqrt{2}i}{120} & 0 & -\frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{30} & \frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{80} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & -\frac{i}{20} & -\frac{\sqrt{10}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} \\ 0 & \frac{\sqrt{6}}{80} & 0 & 0 & \frac{1}{8} & 0 & \frac{i}{20} & 0 & 0 & \frac{\sqrt{10}}{80} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 \end{bmatrix}$
748	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_5^{(1,0;a)}(A_u,11)$	$\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{120} & 0 & \frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 \\ \frac{\sqrt{2}i}{120} & 0 & \frac{\sqrt{2}}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & \frac{\sqrt{30}}{40} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}}{120} & 0 & -\frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & -\frac{\sqrt{30}i}{120} & -\frac{\sqrt{5}}{30} & 0 \\ -\frac{\sqrt{2}}{120} & 0 & \frac{\sqrt{2}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{120} & 0 & 0 & \frac{\sqrt{5}}{30} \\ 0 & 0 & \frac{\sqrt{2}}{60} & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{5}i}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{60} & -\frac{\sqrt{3}i}{10} & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & \frac{\sqrt{5}i}{15} & 0 \\ -\frac{\sqrt{2}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & -\frac{\sqrt{3}i}{30} & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{15} \\ 0 & \frac{\sqrt{2}}{60} & 0 & 0 & \frac{\sqrt{3}}{10} & 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & \frac{\sqrt{5}}{15} & 0 \\ 0 & \frac{\sqrt{6}i}{30} & 0 & \frac{\sqrt{6}}{30} & 0 & 0 & -\frac{1}{10} & 0 & 0 & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 \\ -\frac{\sqrt{6}i}{30} & 0 & \frac{\sqrt{6}}{30} & 0 & 0 & 0 & 0 & \frac{1}{10} & \frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 \end{bmatrix}$
749	symmetry	x
	$\mathbb{T}_1^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}i}{140} \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{280} & \frac{\sqrt{105}i}{140} & 0 \\ -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} \\ 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & \frac{\sqrt{70}}{280} & 0 & 0 \\ \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{280} & 0 & \frac{\sqrt{70}}{280} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & -\frac{3\sqrt{70}i}{280} & \frac{\sqrt{105}}{70} & 0 \\ \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & -\frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & 0 \end{bmatrix}$
750	symmetry	y

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_1^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} \\ 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & \frac{\sqrt{105}}{140} & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}i}{140} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{56} & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{280} & \frac{\sqrt{105}i}{140} & 0 \\ 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & \frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{70} & 0 \\ \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{70} \\ 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{280} & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & \frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 & 0 \end{bmatrix}$
751	symmetry	z
	$\mathbb{T}_1^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{3\sqrt{70}i}{280} & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{3\sqrt{70}i}{280} & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 \\ -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & \frac{\sqrt{105}i}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & -\frac{\sqrt{105}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 & -\frac{\sqrt{210}}{140} & 0 & 0 & 0 \end{bmatrix}$
752	symmetry	$\sqrt{15}xyz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{70}}{560} & 0 & -\frac{\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & \frac{3\sqrt{42}i}{112} & -\frac{\sqrt{7}}{14} & 0 \\ -\frac{\sqrt{70}}{560} & 0 & \frac{\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & -\frac{3\sqrt{42}i}{112} & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & \frac{\sqrt{70}i}{560} & 0 & -\frac{\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{336} & 0 & \frac{5\sqrt{42}}{336} & 0 & 0 \\ -\frac{\sqrt{70}i}{560} & 0 & -\frac{\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{336} & 0 & \frac{5\sqrt{42}}{336} & 0 & 0 & 0 \\ -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{120} & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} \\ 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & \frac{\sqrt{105}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & \frac{\sqrt{7}}{56} & 0 \\ 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & \frac{\sqrt{7}i}{56} \\ 0 & 0 & 0 & \frac{3\sqrt{70}}{280} & \frac{\sqrt{105}i}{120} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & -\frac{\sqrt{7}i}{56} & 0 \\ 0 & \frac{\sqrt{210}}{80} & 0 & -\frac{\sqrt{210}i}{80} & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{112} & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 \\ \frac{\sqrt{210}}{80} & 0 & \frac{\sqrt{210}i}{80} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{14}}{112} & 0 & \frac{\sqrt{14}i}{112} & 0 & 0 & 0 \end{bmatrix}$
753	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$
	$\mathbb{T}_3^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}i}{24} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & \frac{\sqrt{70}}{672} & 0 & 0 & -\frac{\sqrt{105}i}{168} \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{224} & -\frac{\sqrt{7}i}{24} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{672} & \frac{\sqrt{105}i}{168} & 0 \\ -\frac{\sqrt{42}}{224} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & -\frac{\sqrt{7}i}{24} & \frac{13\sqrt{70}}{672} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} \\ 0 & \frac{\sqrt{42}}{224} & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & \frac{\sqrt{7}i}{24} & 0 & 0 & -\frac{13\sqrt{70}}{672} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 \\ 0 & -\frac{17\sqrt{42}i}{672} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & -\frac{\sqrt{7}}{24} & 0 & 0 & -\frac{\sqrt{70}i}{672} & 0 & \frac{\sqrt{70}}{168} & 0 & 0 \\ \frac{17\sqrt{42}i}{672} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{24} & \frac{\sqrt{70}i}{672} & 0 & \frac{\sqrt{70}}{168} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{11\sqrt{42}i}{672} & \frac{\sqrt{7}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{672} & -\frac{\sqrt{105}}{112} & 0 \\ -\frac{\sqrt{42}}{84} & 0 & -\frac{11\sqrt{42}i}{672} & 0 & 0 & -\frac{\sqrt{7}}{48} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{672} & 0 & 0 & \frac{\sqrt{105}}{112} \\ 0 & 0 & -\frac{\sqrt{14}}{32} & 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{32} & -\frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{224} & 0 & 0 \end{bmatrix}$
754	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} -\frac{\sqrt{42}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{24} & 0 & -\frac{\sqrt{7}i}{42} & \frac{\sqrt{70}}{672} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} \\ 0 & \frac{\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}}{24} & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{70}}{672} & 0 & 0 & \frac{\sqrt{105}}{168} & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{224} & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & -\frac{\sqrt{7}}{24} & 0 & 0 & -\frac{13\sqrt{70}}{672} & 0 & 0 & -\frac{\sqrt{105}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{42}}{224} & \frac{5\sqrt{7}i}{84} & 0 & -\frac{\sqrt{7}}{24} & 0 & 0 & 0 & 0 & \frac{13\sqrt{70}}{672} & \frac{\sqrt{105}i}{84} & 0 \\ 0 & -\frac{11\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{84} & \frac{\sqrt{7}}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{672} & 0 & -\frac{\sqrt{70}i}{84} & \frac{\sqrt{105}}{112} & 0 \\ -\frac{11\sqrt{42}}{672} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{\sqrt{7}}{48} & 0 & 0 & \frac{\sqrt{70}}{672} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{105}}{112} \\ 0 & \frac{5\sqrt{42}i}{168} & 0 & \frac{17\sqrt{42}}{672} & 0 & 0 & \frac{\sqrt{7}}{24} & 0 & 0 & \frac{\sqrt{70}i}{168} & 0 & -\frac{\sqrt{70}}{672} & 0 & 0 \\ -\frac{5\sqrt{42}i}{168} & 0 & \frac{17\sqrt{42}}{672} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{24} & -\frac{\sqrt{70}i}{168} & 0 & -\frac{\sqrt{70}}{672} & 0 & 0 & 0 \\ -\frac{\sqrt{14}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{42} & -\frac{\sqrt{210}}{224} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{32} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{210}}{224} & 0 & 0 & 0 & 0 \end{bmatrix}$
755	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
	$\mathbb{T}_3^{(1,1;a)}(A_u,4)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 \\ \frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{21} & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & \frac{\sqrt{7}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 \\ \frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & -\frac{\sqrt{7}}{21} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{24} & 0 & \frac{\sqrt{7}}{24} & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & \frac{\sqrt{105}i}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{24} & 0 & \frac{\sqrt{7}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{42} & -\frac{\sqrt{105}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{24} & 0 & \frac{\sqrt{7}i}{24} & -\frac{\sqrt{70}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{24} & 0 & -\frac{\sqrt{7}i}{24} & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & \frac{\sqrt{105}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \end{bmatrix}$
756	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,1;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}i}{120} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & -\frac{17\sqrt{42}}{672} & 0 & 0 & -\frac{3\sqrt{7}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{224} & \frac{\sqrt{105}i}{120} & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{17\sqrt{42}}{672} & \frac{3\sqrt{7}i}{56} & 0 \\ -\frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{120} & \frac{\sqrt{42}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ 0 & \frac{\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}}{420} & 0 & -\frac{\sqrt{105}i}{120} & 0 & 0 & -\frac{\sqrt{42}}{224} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 \\ 0 & \frac{\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & -\frac{\sqrt{42}i}{224} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ -\frac{\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{120} & \frac{\sqrt{42}i}{224} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{56} & 0 & -\frac{23\sqrt{70}i}{1120} & \frac{\sqrt{105}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{224} & -\frac{5\sqrt{7}}{112} & 0 \\ \frac{\sqrt{70}}{56} & 0 & \frac{23\sqrt{70}i}{1120} & 0 & 0 & -\frac{\sqrt{105}}{80} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{224} & 0 & 0 & \frac{5\sqrt{7}}{112} \\ 0 & 0 & \frac{\sqrt{210}}{160} & 0 & 0 & \frac{3\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & \frac{5\sqrt{14}}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{160} & -\frac{3\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{224} & 0 & 0 \end{bmatrix}$
757	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
	$\mathbb{T}_3^{(1,1;a)}(A_u,6)$	$\begin{bmatrix} \frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{120} & 0 & -\frac{\sqrt{105}i}{70} & \frac{17\sqrt{42}}{672} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & -\frac{\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}}{120} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{17\sqrt{42}}{672} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & \frac{\sqrt{42}}{224} & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{224} & \frac{\sqrt{105}i}{420} & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{224} & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & -\frac{23\sqrt{70}}{1120} & 0 & \frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{224} & 0 & \frac{\sqrt{42}i}{56} & -\frac{5\sqrt{7}}{112} & 0 \\ -\frac{23\sqrt{70}}{1120} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{80} & 0 & 0 & -\frac{\sqrt{42}}{224} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{5\sqrt{7}}{112} \\ 0 & \frac{\sqrt{70}i}{140} & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{224} & 0 & 0 \\ -\frac{\sqrt{70}i}{140} & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{120} & \frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{224} & 0 & 0 & 0 \\ -\frac{\sqrt{210}}{160} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{70} & \frac{5\sqrt{14}}{224} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{160} & 0 & 0 & \frac{3\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{5\sqrt{14}}{224} & 0 & 0 & 0 & 0 \end{bmatrix}$
758	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{T}_3^{(1,1;a)}(A_u,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{70}i}{560} & 0 & \frac{\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{336} & 0 & \frac{5\sqrt{42}}{336} & 0 & 0 \\ \frac{\sqrt{70}i}{560} & 0 & \frac{\sqrt{70}}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{336} & 0 & \frac{5\sqrt{42}}{336} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{560} & 0 & -\frac{\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}}{112} & 0 & -\frac{3\sqrt{42}i}{112} & \frac{\sqrt{7}}{14} & 0 \\ -\frac{\sqrt{70}}{560} & 0 & \frac{\sqrt{70}i}{560} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{42}}{112} & 0 & \frac{3\sqrt{42}i}{112} & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & \frac{\sqrt{7}i}{56} \\ 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & 0 & -\frac{\sqrt{105}}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & -\frac{\sqrt{7}i}{56} & 0 \\ -\frac{3\sqrt{70}}{280} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{120} & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{56} \\ 0 & \frac{3\sqrt{70}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{120} & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & -\frac{\sqrt{7}}{56} & 0 \\ 0 & -\frac{\sqrt{210}i}{80} & 0 & -\frac{\sqrt{210}}{80} & 0 & 0 & -\frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{14}i}{112} & 0 & \frac{\sqrt{14}}{112} & 0 & 0 \\ \frac{\sqrt{210}i}{80} & 0 & -\frac{\sqrt{210}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & \frac{\sqrt{14}i}{112} & 0 & \frac{\sqrt{14}}{112} & 0 & 0 & 0 \end{bmatrix}$
759	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_2^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
760	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_2^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} \\ 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
761	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_2^{(a)}(A_u,3)$	$\begin{bmatrix} \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \end{bmatrix}$
762	symmetry	$\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_2^{(a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 \\ \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \end{bmatrix}$
763	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_2^{(a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
764	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(a)}(A_u,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
765	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{M}_4^{(a)}(A_u,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 \\ -\frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
766	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} \\ 0 & 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 \\ -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
767	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{M}_4^{(a)}(A_u,4)$	$\begin{bmatrix} \frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
768	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 \\ -\frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} \\ 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 \end{bmatrix}$
769	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_4^{(a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
770	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(a)}(A_u,7)$	$\begin{bmatrix} \frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{14}i}{112} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{112} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{56} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{70}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{70}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 \end{bmatrix}$
771	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{M}_4^{(a)}(A_u,8)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{14}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{14}i}{112} & 0 & 0 \\ \frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{560} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{112} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{56} \\ 0 & 0 & -\frac{3\sqrt{70}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{70}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 \end{bmatrix}$
772	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(a)}(A_u,9)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{210}i}{280} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{35} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
773	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_2^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & \frac{\sqrt{105}i}{420} & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & -\frac{\sqrt{105}i}{420} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & \frac{\sqrt{105}}{420} & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & \frac{\sqrt{105}i}{420} & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & \frac{2\sqrt{105}}{105} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{2\sqrt{105}}{105} & 0 & 0 & \frac{\sqrt{70}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & \frac{2\sqrt{105}}{105} & 0 & 0 & -\frac{\sqrt{70}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{105}}{105} & \frac{\sqrt{70}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & \frac{\sqrt{35}i}{70} & \frac{\sqrt{210}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{210}}{70} \end{bmatrix}$
774	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_2^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 \\ \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 \\ \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{70} & 0 & 0 & 0 \end{bmatrix}$
775	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_2^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 \\ -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & \frac{\sqrt{35}i}{35} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & -\frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & 0 & \frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{3\sqrt{70}i}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & \frac{3\sqrt{70}i}{140} & 0 \end{bmatrix}$
776	symmetry	$\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_2^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{140} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 \end{bmatrix}$
777	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_2^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 \\ \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{140} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & \frac{\sqrt{35}i}{140} & 0 & 0 \\ -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{140} & 0 & -\frac{\sqrt{35}i}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & \frac{\sqrt{105}}{70} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{70} & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 \end{bmatrix}$
778	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & -\frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{10}}{240} & 0 & -\frac{11\sqrt{10}i}{240} & 0 & 0 \\ \frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & \frac{1}{6} & 0 & 0 & -\frac{11\sqrt{10}}{240} & 0 & \frac{11\sqrt{10}i}{240} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{10}i}{240} & 0 & -\frac{\sqrt{10}}{240} & 0 & 0 \\ -\frac{\sqrt{6}i}{48} & 0 & \frac{\sqrt{6}}{48} & 0 & 0 & 0 & 0 & \frac{1}{6} & -\frac{\sqrt{10}i}{240} & 0 & -\frac{\sqrt{10}}{240} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{24} & 0 & \frac{i}{6} & \frac{\sqrt{10}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{120} \\ 0 & 0 & 0 & 0 & \frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}}{60} & 0 & 0 & -\frac{\sqrt{15}}{120} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{10}}{60} & 0 & 0 & \frac{\sqrt{15}i}{120} \\ 0 & 0 & 0 & 0 & -\frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{60} & -\frac{\sqrt{15}i}{120} & 0 \\ 0 & -\frac{5\sqrt{2}}{48} & 0 & -\frac{5\sqrt{2}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & \frac{\sqrt{30}i}{80} & \frac{\sqrt{5}}{15} & 0 \\ -\frac{5\sqrt{2}}{48} & 0 & \frac{5\sqrt{2}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{80} & 0 & -\frac{\sqrt{30}i}{80} & 0 & 0 & -\frac{\sqrt{5}}{15} \end{bmatrix}$
779	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{336} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{336} & 0 & \frac{\sqrt{14}i}{336} & 0 & 0 \\ \frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}}{336} & 0 & -\frac{\sqrt{14}i}{336} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{13\sqrt{14}i}{336} & 0 & -\frac{13\sqrt{14}}{336} & 0 & 0 \\ -\frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & -\frac{13\sqrt{14}i}{336} & 0 & -\frac{13\sqrt{14}}{336} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}}{168} & 0 & -\frac{\sqrt{35}i}{84} & \frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}}{168} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & \frac{\sqrt{21}i}{168} \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & -\frac{\sqrt{21}i}{168} & 0 \\ 0 & \frac{\sqrt{70}}{48} & 0 & \frac{\sqrt{70}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & \frac{\sqrt{42}i}{112} & \frac{\sqrt{7}}{21} & 0 \\ \frac{\sqrt{70}}{48} & 0 & -\frac{\sqrt{70}i}{48} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 & -\frac{\sqrt{7}}{21} \end{bmatrix}$
780	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{48} & 0 & \frac{\sqrt{42}i}{48} & \frac{\sqrt{7}}{14} & 0 \\ \frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{48} & 0 & -\frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & -\frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{336} & 0 & -\frac{5\sqrt{42}}{336} & 0 & 0 \\ \frac{\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{336} & 0 & -\frac{5\sqrt{42}}{336} & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & -\frac{\sqrt{105}i}{84} & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{56} \\ 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}}{56} & -\frac{\sqrt{105}i}{168} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & \frac{\sqrt{7}i}{56} & 0 \\ 0 & -\frac{\sqrt{210}}{336} & 0 & \frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{112} & 0 & -\frac{3\sqrt{14}i}{112} & 0 & 0 \\ -\frac{\sqrt{210}}{336} & 0 & -\frac{\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{112} & 0 & \frac{3\sqrt{14}i}{112} & 0 & 0 & 0 \end{bmatrix}$
781	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{7\sqrt{6}}{96} & 0 & 0 & -\frac{i}{8} \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{7\sqrt{6}}{96} & \frac{i}{8} & 0 \\ -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & -\frac{5\sqrt{6}}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & \frac{5\sqrt{6}}{96} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{5\sqrt{6}i}{96} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & -\frac{5\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{32} & \frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & -\frac{1}{16} & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & \frac{1}{16} \\ 0 & 0 & \frac{\sqrt{30}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{32} & 0 & 0 & \frac{\sqrt{3}i}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{32} & -\frac{\sqrt{3}i}{12} & 0 \end{bmatrix}$
782	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{7\sqrt{6}}{96} & 0 & 0 & 0 & 0 & \frac{1}{8} \\ 0 & \frac{\sqrt{10}}{32} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{6}}{96} & 0 & 0 & \frac{1}{8} & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{5\sqrt{6}}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{96} & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & \frac{1}{16} & 0 \\ -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{48} & 0 & 0 & -\frac{\sqrt{6}}{96} & 0 & 0 & 0 & 0 & -\frac{1}{16} \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{96} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{5\sqrt{6}}{96} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} \\ 0 & -\frac{\sqrt{30}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{32} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 \end{bmatrix}$
783	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
784	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{672} & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{224} & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{672} & -\frac{3\sqrt{7}i}{56} & 0 \\ -\frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & -\frac{13\sqrt{42}}{672} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & \frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & \frac{13\sqrt{42}}{672} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & -\frac{3\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{42}i}{96} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 \\ \frac{3\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & \frac{\sqrt{42}i}{96} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{3\sqrt{70}i}{224} & \frac{5\sqrt{105}}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{11\sqrt{42}i}{672} & -\frac{\sqrt{7}}{112} & 0 \\ -\frac{\sqrt{70}}{56} & 0 & \frac{3\sqrt{70}i}{224} & 0 & 0 & -\frac{5\sqrt{105}}{336} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{11\sqrt{42}i}{672} & 0 & 0 & \frac{\sqrt{7}}{112} \\ 0 & 0 & -\frac{\sqrt{210}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{224} & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{210}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{224} & -\frac{\sqrt{21}i}{84} & 0 \end{bmatrix}$
785	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{M}_4^{(1,-1;a)}(A_u,8)$	$\begin{bmatrix} \frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{42}}{672} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} \\ 0 & -\frac{\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{672} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{70}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & -\frac{13\sqrt{42}}{672} & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & \frac{13\sqrt{42}}{672} & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & -\frac{3\sqrt{70}}{224} & 0 & -\frac{\sqrt{70}i}{56} & -\frac{5\sqrt{105}}{336} & 0 & 0 & 0 & 0 & -\frac{11\sqrt{42}}{672} & 0 & -\frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{112} & 0 \\ -\frac{3\sqrt{70}}{224} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{5\sqrt{105}}{336} & 0 & 0 & -\frac{11\sqrt{42}}{672} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{112} \\ 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{3\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{96} & 0 & 0 \\ -\frac{\sqrt{70}i}{56} & 0 & -\frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{96} & 0 & 0 & 0 \\ \frac{\sqrt{210}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} \\ 0 & -\frac{\sqrt{210}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{224} & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 \end{bmatrix}$
786	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,-1;a)}(A_u,9)$	$\begin{bmatrix} 0 & \frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{336} & 0 & -\frac{5\sqrt{42}}{336} & 0 & 0 \\ -\frac{\sqrt{70}i}{112} & 0 & -\frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{336} & 0 & -\frac{5\sqrt{42}}{336} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{48} & 0 & -\frac{\sqrt{42}i}{48} & -\frac{\sqrt{7}}{14} & 0 \\ \frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{48} & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & \frac{\sqrt{7}i}{56} & 0 \\ -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{168} & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} \\ 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}}{56} & 0 \\ 0 & \frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{112} & 0 & \frac{3\sqrt{14}}{112} & 0 & 0 \\ -\frac{\sqrt{210}i}{336} & 0 & \frac{\sqrt{210}}{336} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{112} & 0 & \frac{3\sqrt{14}}{112} & 0 & 0 & 0 \end{bmatrix}$
787	symmetry	$\frac{\sqrt{2}\left(2x^6-15x^4y^2-15x^4z^2-15x^2y^4+180x^2y^2z^2-15x^2z^4+2y^6-15y^4z^2-15y^2z^4+2z^6\right)}{8}$
	$\mathbb{M}_6^{(1,-1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{231}}{616} & 0 & -\frac{\sqrt{231}i}{616} & -\frac{3\sqrt{154}}{308} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{385}}{616} & 0 & -\frac{3\sqrt{385}i}{616} & 0 & 0 \\ \frac{\sqrt{231}}{616} & 0 & \frac{\sqrt{231}i}{616} & 0 & 0 & \frac{3\sqrt{154}}{308} & 0 & 0 & -\frac{3\sqrt{385}}{616} & 0 & \frac{3\sqrt{385}i}{616} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{231}i}{462} & 0 & -\frac{\sqrt{231}}{462} & 0 & 0 & \frac{\sqrt{154}}{77} & 0 & 0 & -\frac{\sqrt{385}i}{154} & 0 & \frac{\sqrt{385}}{154} & 0 & 0 \\ \frac{\sqrt{231}i}{462} & 0 & -\frac{\sqrt{231}}{462} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{77} & \frac{\sqrt{385}i}{154} & 0 & \frac{\sqrt{385}}{154} & 0 & 0 & 0 \\ -\frac{\sqrt{231}}{132} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}}{308} & 0 & -\frac{\sqrt{154}i}{77} & -\frac{\sqrt{385}}{308} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{924} \\ 0 & \frac{\sqrt{231}}{132} & 0 & 0 & -\frac{3\sqrt{154}}{308} & 0 & \frac{\sqrt{154}i}{77} & 0 & 0 & \frac{\sqrt{385}}{308} & 0 & 0 & -\frac{\sqrt{2310}}{924} & 0 \\ 0 & 0 & \frac{\sqrt{231}}{132} & 0 & 0 & -\frac{3\sqrt{154}i}{308} & 0 & \frac{\sqrt{154}}{77} & 0 & 0 & -\frac{\sqrt{385}}{308} & 0 & 0 & \frac{\sqrt{2310}i}{924} \\ 0 & 0 & 0 & -\frac{\sqrt{231}}{132} & \frac{3\sqrt{154}i}{308} & 0 & \frac{\sqrt{154}}{77} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{308} & -\frac{\sqrt{2310}i}{924} & 0 \\ 0 & -\frac{\sqrt{77}}{88} & 0 & -\frac{\sqrt{77}i}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{616} & 0 & \frac{\sqrt{1155}i}{616} & \frac{\sqrt{770}}{308} & 0 \\ -\frac{\sqrt{77}}{88} & 0 & \frac{\sqrt{77}i}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{616} & 0 & -\frac{\sqrt{1155}i}{616} & 0 & 0 & -\frac{\sqrt{770}}{308} \end{bmatrix}$
788	symmetry	$-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_6^{(1,-1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{7\sqrt{5}}{120} & 0 & \frac{7\sqrt{5}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & -\frac{\sqrt{3}i}{24} & -\frac{\sqrt{2}}{12} & 0 \\ \frac{7\sqrt{5}}{120} & 0 & -\frac{7\sqrt{5}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & \frac{\sqrt{2}}{12} \\ 0 & \frac{\sqrt{5}i}{15} & 0 & -\frac{\sqrt{5}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{15} & 0 & -\frac{\sqrt{5}}{15} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} \\ 0 & -\frac{\sqrt{5}}{60} & 0 & 0 & \frac{\sqrt{30}}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 \\ 0 & 0 & \frac{\sqrt{5}}{60} & 0 & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{60} & \frac{\sqrt{30}i}{60} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & \frac{\sqrt{2}i}{12} & 0 \\ 0 & \frac{\sqrt{15}}{120} & 0 & -\frac{\sqrt{15}i}{120} & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 \\ \frac{\sqrt{15}}{120} & 0 & \frac{\sqrt{15}i}{120} & 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & -\frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 \end{bmatrix}$
789	symmetry	$-\frac{\sqrt{14}\left(x^6-15x^4z^2+15x^2z^4+y^6-15y^4z^2+15y^2z^4-2z^6\right)}{8}$
	$\mathbb{M}_6^{(1,-1;a)}(A_u,3)$	$\begin{bmatrix} 0 & -\frac{\sqrt{33}}{264} & 0 & \frac{\sqrt{33}i}{264} & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{88} & 0 & \frac{\sqrt{55}i}{88} & 0 & 0 \\ -\frac{\sqrt{33}}{264} & 0 & -\frac{\sqrt{33}i}{264} & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & \frac{\sqrt{55}}{88} & 0 & -\frac{\sqrt{55}i}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{33}}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & -\frac{\sqrt{55}}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{132} \\ 0 & -\frac{\sqrt{33}}{132} & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{44} & 0 & 0 & -\frac{\sqrt{330}}{132} & 0 \\ 0 & 0 & -\frac{\sqrt{33}}{132} & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{44} & 0 & 0 & \frac{\sqrt{330}i}{132} \\ 0 & 0 & 0 & \frac{\sqrt{33}}{132} & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{44} & -\frac{\sqrt{330}i}{132} & 0 \\ 0 & \frac{\sqrt{11}}{88} & 0 & \frac{\sqrt{11}i}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & \frac{\sqrt{165}i}{88} & \frac{\sqrt{110}}{44} & 0 \\ \frac{\sqrt{11}}{88} & 0 & -\frac{\sqrt{11}i}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & -\frac{\sqrt{165}i}{88} & 0 & 0 & -\frac{\sqrt{110}}{44} \end{bmatrix}$
790	symmetry	$\frac{\sqrt{42}(x-y)(x+y)\left(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4\right)}{8}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_6^{(1,-1;a)}(A_u,4)$	$\begin{bmatrix} 0 & \frac{17\sqrt{11}}{264} & 0 & \frac{17\sqrt{11}i}{264} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{264} & 0 & \frac{\sqrt{165}i}{264} & \frac{\sqrt{110}}{132} & 0 \\ \frac{17\sqrt{11}}{264} & 0 & -\frac{17\sqrt{11}i}{264} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{264} & 0 & -\frac{\sqrt{165}i}{264} & 0 & 0 & -\frac{\sqrt{110}}{132} \\ 0 & \frac{2\sqrt{11}i}{33} & 0 & -\frac{2\sqrt{11}}{33} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{2\sqrt{11}i}{33} & 0 & -\frac{2\sqrt{11}}{33} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{11}}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{132} & 0 & 0 & \frac{\sqrt{165}}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{132} \\ 0 & \frac{\sqrt{11}}{132} & 0 & 0 & -\frac{\sqrt{66}}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{132} & 0 & 0 & \frac{\sqrt{110}}{132} & 0 \\ 0 & 0 & -\frac{\sqrt{11}}{132} & 0 & 0 & \frac{\sqrt{66}i}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{132} & 0 & 0 & \frac{\sqrt{110}i}{132} \\ 0 & 0 & 0 & \frac{\sqrt{11}}{132} & -\frac{\sqrt{66}i}{132} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{132} & -\frac{\sqrt{110}i}{132} & 0 \\ 0 & -\frac{\sqrt{33}}{264} & 0 & \frac{\sqrt{33}i}{264} & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{88} & 0 & \frac{\sqrt{55}i}{88} & 0 & 0 \\ -\frac{\sqrt{33}}{264} & 0 & -\frac{\sqrt{33}i}{264} & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & \frac{\sqrt{55}}{88} & 0 & -\frac{\sqrt{55}i}{88} & 0 & 0 & 0 \end{bmatrix}$
791	symmetry	$\frac{3\sqrt{7}yz(y-z)(y+z)\left(10x^2-y^2-z^2\right)}{4}$
	$\mathbb{M}_6^{(1,-1;a)}(A_u,5)$	$\begin{bmatrix} 0 & 0 & -\frac{5\sqrt{66}}{528} & 0 & 0 & \frac{3\sqrt{11}i}{88} & 0 & -\frac{\sqrt{11}}{44} & 0 & 0 & -\frac{\sqrt{110}}{176} & 0 & 0 & \frac{\sqrt{165}i}{264} \\ 0 & 0 & 0 & \frac{5\sqrt{66}}{528} & -\frac{3\sqrt{11}i}{88} & 0 & -\frac{\sqrt{11}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{176} & -\frac{\sqrt{165}i}{264} & 0 \\ -\frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{44} & 0 & -\frac{\sqrt{11}i}{22} & -\frac{\sqrt{110}}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{132} \\ 0 & \frac{\sqrt{66}}{88} & 0 & 0 & -\frac{\sqrt{11}}{44} & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & \frac{\sqrt{110}}{88} & 0 & 0 & -\frac{\sqrt{165}}{132} & 0 \\ 0 & \frac{\sqrt{66}i}{88} & 0 & -\frac{\sqrt{66}}{264} & 0 & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & \frac{\sqrt{110}i}{88} & 0 & -\frac{\sqrt{110}}{88} & 0 & 0 \\ -\frac{\sqrt{66}i}{88} & 0 & -\frac{\sqrt{66}}{264} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & -\frac{\sqrt{110}i}{88} & 0 & -\frac{\sqrt{110}}{88} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{66}}{88} & 0 & -\frac{\sqrt{66}i}{66} & -\frac{\sqrt{11}}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{88} & 0 & 0 & \frac{\sqrt{165}}{132} & 0 \\ -\frac{\sqrt{66}}{88} & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 & \frac{\sqrt{11}}{44} & 0 & 0 & -\frac{\sqrt{110}}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{132} \\ 0 & 0 & -\frac{3\sqrt{22}}{176} & 0 & 0 & \frac{\sqrt{33}i}{88} & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 & \frac{\sqrt{330}}{176} & 0 & 0 & -\frac{\sqrt{55}i}{88} \\ 0 & 0 & 0 & \frac{3\sqrt{22}}{176} & -\frac{\sqrt{33}i}{88} & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{176} & \frac{\sqrt{55}i}{88} & 0 \end{bmatrix}$
792	symmetry	$\frac{3\sqrt{7}xz(x-z)(x+z)\left(x^2-10y^2+z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_6^{(1,-1;a)}(A_u,6)$	$\begin{bmatrix} \frac{5\sqrt{66}}{528} & 0 & 0 & 0 & 0 & \frac{3\sqrt{11}}{88} & 0 & \frac{\sqrt{11}i}{44} & -\frac{\sqrt{110}}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{264} \\ 0 & -\frac{5\sqrt{66}}{528} & 0 & 0 & \frac{3\sqrt{11}}{88} & 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & \frac{\sqrt{110}}{176} & 0 & 0 & -\frac{\sqrt{165}}{264} & 0 \\ 0 & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & \frac{\sqrt{110}}{88} & 0 & 0 & -\frac{\sqrt{165}i}{132} \\ 0 & 0 & 0 & \frac{\sqrt{66}}{88} & -\frac{\sqrt{11}i}{44} & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{88} & \frac{\sqrt{165}i}{132} & 0 \\ 0 & \frac{\sqrt{66}}{66} & 0 & \frac{\sqrt{66}i}{88} & -\frac{\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{88} & -\frac{\sqrt{165}}{132} & 0 \\ \frac{\sqrt{66}}{66} & 0 & -\frac{\sqrt{66}i}{88} & 0 & 0 & \frac{\sqrt{11}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 & \frac{\sqrt{165}}{132} \\ 0 & \frac{\sqrt{66}i}{264} & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & -\frac{\sqrt{110}i}{88} & 0 & \frac{\sqrt{110}}{88} & 0 & 0 \\ -\frac{\sqrt{66}i}{264} & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{22} & \frac{\sqrt{110}i}{88} & 0 & \frac{\sqrt{110}}{88} & 0 & 0 & 0 \\ -\frac{3\sqrt{22}}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{88} & 0 & -\frac{\sqrt{33}i}{44} & -\frac{\sqrt{330}}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{88} \\ 0 & \frac{3\sqrt{22}}{176} & 0 & 0 & -\frac{\sqrt{33}}{88} & 0 & \frac{\sqrt{33}i}{44} & 0 & 0 & \frac{\sqrt{330}}{176} & 0 & 0 & -\frac{\sqrt{55}}{88} & 0 \end{bmatrix}$
793	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)\left(x^2+y^2-10z^2\right)}{4}$
	$\mathbb{M}_6^{(1,-1;a)}(A_u,7)$	$\begin{bmatrix} 0 & -\frac{\sqrt{66}i}{264} & 0 & -\frac{\sqrt{66}}{264} & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & -\frac{\sqrt{110}i}{88} & 0 & \frac{\sqrt{110}}{88} & 0 & 0 \\ \frac{\sqrt{66}i}{264} & 0 & -\frac{\sqrt{66}}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{22} & \frac{\sqrt{110}i}{88} & 0 & \frac{\sqrt{110}}{88} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{66}}{264} & 0 & \frac{\sqrt{66}i}{264} & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{88} & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 \\ -\frac{\sqrt{66}}{264} & 0 & -\frac{\sqrt{66}i}{264} & 0 & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & \frac{\sqrt{110}}{88} & 0 & -\frac{\sqrt{110}i}{88} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{66}}{66} & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{66}}{66} & \frac{\sqrt{11}i}{22} & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{66}}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{66}}{66} & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{22}i}{44} & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{22}i}{44} & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
794	symmetry	$\frac{\sqrt{462}yz\left(y^2-3z^2\right)\left(3y^2-z^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_6^{(1,-1;a)}(A_u,8)$	$\begin{bmatrix} 0 & 0 & \frac{1}{32} & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{32} & 0 & 0 & -\frac{\sqrt{10}i}{32} \\ 0 & 0 & 0 & -\frac{1}{32} & \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{32} & \frac{\sqrt{10}i}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{16} & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{16} & \frac{\sqrt{10}}{16} & 0 \\ 0 & 0 & -\frac{i}{16} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{16} & 0 & 0 & -\frac{\sqrt{10}}{16} \\ 0 & 0 & \frac{\sqrt{3}}{32} & 0 & 0 & -\frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{32} & 0 & 0 & -\frac{\sqrt{30}i}{32} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{32} & \frac{3\sqrt{2}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{32} & \frac{\sqrt{30}i}{32} & 0 \end{bmatrix}$
795	symmetry	$\frac{\sqrt{462}xz\left(x^2-3z^2\right)\left(3x^2-z^2\right)}{16}$
	$\mathbb{M}_6^{(1,-1;a)}(A_u,9)$	$\begin{bmatrix} \frac{1}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & -\frac{\sqrt{15}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{32} \\ 0 & -\frac{1}{32} & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{32} & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{16} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & \frac{\sqrt{10}}{16} & 0 \\ \frac{1}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{32} & 0 & 0 & \frac{3\sqrt{5}}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{32} \\ 0 & \frac{\sqrt{3}}{32} & 0 & 0 & -\frac{3\sqrt{2}}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{32} & 0 & 0 & \frac{\sqrt{30}}{32} & 0 \end{bmatrix}$
796	symmetry	$\frac{\sqrt{462}xy\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_6^{(1,-1;a)}(A_u,10)$	$\begin{bmatrix} 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
797	symmetry	$\frac{\sqrt{210}yz\left(16x^4-16x^2y^2-16x^2z^2+y^4+2y^2z^2+z^4\right)}{16}$
	$\mathbb{M}_6^{(1,-1;a)}(A_u,11)$	$\begin{bmatrix} 0 & 0 & \frac{17\sqrt{55}}{1056} & 0 & 0 & -\frac{37\sqrt{330}i}{5280} & 0 & \frac{\sqrt{330}}{110} & 0 & 0 & -\frac{\sqrt{33}}{96} & 0 & 0 & \frac{\sqrt{22}i}{96} \\ 0 & 0 & 0 & -\frac{17\sqrt{55}}{1056} & \frac{37\sqrt{330}i}{5280} & 0 & \frac{\sqrt{330}}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{96} & -\frac{\sqrt{22}i}{96} & 0 \\ \frac{\sqrt{55}}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{110} & 0 & \frac{\sqrt{330}i}{165} & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{66} \\ 0 & -\frac{\sqrt{55}}{66} & 0 & 0 & \frac{\sqrt{330}}{110} & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & \frac{\sqrt{33}}{66} & 0 & 0 & -\frac{\sqrt{22}}{66} & 0 \\ 0 & -\frac{\sqrt{55}i}{66} & 0 & \frac{7\sqrt{55}}{330} & 0 & 0 & -\frac{\sqrt{330}}{165} & 0 & 0 & \frac{\sqrt{33}i}{66} & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 \\ \frac{\sqrt{55}i}{66} & 0 & \frac{7\sqrt{55}}{330} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{165} & -\frac{\sqrt{33}i}{66} & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{55}}{66} & 0 & \frac{29\sqrt{55}i}{2640} & -\frac{\sqrt{330}}{240} & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & -\frac{\sqrt{33}i}{176} & \frac{5\sqrt{22}}{528} & 0 \\ \frac{\sqrt{55}}{66} & 0 & -\frac{29\sqrt{55}i}{2640} & 0 & 0 & \frac{\sqrt{330}}{240} & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & \frac{\sqrt{33}i}{176} & 0 & 0 & -\frac{5\sqrt{22}}{528} \\ 0 & 0 & -\frac{9\sqrt{165}}{1760} & 0 & 0 & \frac{\sqrt{110}i}{160} & 0 & -\frac{\sqrt{110}}{110} & 0 & 0 & \frac{5\sqrt{11}}{352} & 0 & 0 & -\frac{5\sqrt{66}i}{1056} \\ 0 & 0 & 0 & \frac{9\sqrt{165}}{1760} & -\frac{\sqrt{110}i}{160} & 0 & -\frac{\sqrt{110}}{110} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{352} & \frac{5\sqrt{66}i}{1056} & 0 \end{bmatrix}$
798	symmetry	$\frac{\sqrt{210}xz\left(x^4-16x^2y^2+2x^2z^2+16y^4-16y^2z^2+z^4\right)}{16}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_6^{(1,-1;a)}(A_u,12)$	$\begin{bmatrix} \frac{17\sqrt{55}}{1056} & 0 & 0 & 0 & 0 & \frac{37\sqrt{330}}{5280} & 0 & \frac{\sqrt{330}i}{110} & \frac{\sqrt{33}}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{96} \\ 0 & -\frac{17\sqrt{55}}{1056} & 0 & 0 & \frac{37\sqrt{330}}{5280} & 0 & -\frac{\sqrt{330}i}{110} & 0 & 0 & -\frac{\sqrt{33}}{96} & 0 & 0 & \frac{\sqrt{22}}{96} & 0 \\ 0 & 0 & -\frac{\sqrt{55}}{66} & 0 & 0 & \frac{\sqrt{330}i}{110} & 0 & -\frac{\sqrt{330}}{165} & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & \frac{\sqrt{22}i}{66} \\ 0 & 0 & 0 & \frac{\sqrt{55}}{66} & -\frac{\sqrt{330}i}{110} & 0 & -\frac{\sqrt{330}}{165} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{66} & -\frac{\sqrt{22}i}{66} & 0 \\ 0 & \frac{29\sqrt{55}}{2640} & 0 & \frac{\sqrt{55}i}{66} & \frac{\sqrt{330}}{240} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{176} & 0 & \frac{\sqrt{33}i}{66} & \frac{5\sqrt{22}}{528} & 0 \\ \frac{29\sqrt{55}}{2640} & 0 & -\frac{\sqrt{55}i}{66} & 0 & 0 & -\frac{\sqrt{330}}{240} & 0 & 0 & \frac{\sqrt{33}}{176} & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 & -\frac{5\sqrt{22}}{528} \\ 0 & \frac{7\sqrt{55}i}{330} & 0 & -\frac{\sqrt{55}}{66} & 0 & 0 & -\frac{\sqrt{330}}{165} & 0 & 0 & \frac{\sqrt{33}i}{66} & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 \\ -\frac{7\sqrt{55}i}{330} & 0 & -\frac{\sqrt{55}}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{165} & -\frac{\sqrt{33}i}{66} & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 \\ \frac{9\sqrt{165}}{1760} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{160} & 0 & \frac{\sqrt{110}i}{110} & \frac{5\sqrt{11}}{352} & 0 & 0 & 0 & 0 & \frac{5\sqrt{66}}{1056} \\ 0 & -\frac{9\sqrt{165}}{1760} & 0 & 0 & \frac{\sqrt{110}}{160} & 0 & -\frac{\sqrt{110}i}{110} & 0 & 0 & -\frac{5\sqrt{11}}{352} & 0 & 0 & \frac{5\sqrt{66}}{1056} & 0 \end{bmatrix}$
799	$\mathbb{M}_6^{(1,-1;a)}(A_u,13)$	$\frac{\sqrt{210}xy\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{16}$ $\begin{bmatrix} 0 & -\frac{\sqrt{55}i}{660} & 0 & \frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{55}i}{660} & 0 & \frac{\sqrt{55}}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{55}}{660} & 0 & -\frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & \frac{\sqrt{33}i}{66} & \frac{\sqrt{22}}{33} & 0 \\ -\frac{\sqrt{55}}{660} & 0 & \frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 & -\frac{\sqrt{22}}{33} \\ 0 & 0 & -\frac{\sqrt{55}}{165} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{165} & 0 & 0 & \frac{\sqrt{33}}{33} & 0 & 0 & -\frac{\sqrt{22}i}{33} \\ 0 & 0 & 0 & \frac{\sqrt{55}}{165} & 0 & 0 & -\frac{\sqrt{330}}{165} & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{33} & \frac{\sqrt{22}i}{33} & 0 \\ \frac{\sqrt{55}}{165} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{165} & \frac{\sqrt{33}}{33} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{33} \\ 0 & -\frac{\sqrt{55}}{165} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{165} & 0 & 0 & -\frac{\sqrt{33}}{33} & 0 & 0 & \frac{\sqrt{22}}{33} & 0 \\ 0 & -\frac{\sqrt{165}i}{330} & 0 & -\frac{\sqrt{165}}{330} & 0 & 0 & \frac{\sqrt{110}}{55} & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & \frac{\sqrt{11}}{22} & 0 & 0 \\ \frac{\sqrt{165}i}{330} & 0 & -\frac{\sqrt{165}}{330} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{55} & \frac{\sqrt{11}i}{22} & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 \end{bmatrix}$
800	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_2^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 \\ -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 \end{bmatrix}$
801	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
	$\mathbb{M}_2^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & -\frac{\sqrt{21}}{42} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & \frac{\sqrt{21}i}{42} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 \end{bmatrix}$
802	symmetry	$\sqrt{3}yz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_2^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & -\frac{\sqrt{21}i}{84} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 \\ 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & \frac{\sqrt{21}}{42} & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \end{bmatrix}$
803	symmetry	$\sqrt{3}xz$
	$\mathbb{M}_2^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{84} \\ 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & \frac{\sqrt{21}}{84} & 0 \\ 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & \frac{\sqrt{21}i}{84} & 0 \\ 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & \frac{\sqrt{21}}{42} & 0 \\ \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 \end{bmatrix}$
804	symmetry	$\sqrt{3}xy$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_2^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & \frac{\sqrt{14}i}{56} & -\frac{\sqrt{21}}{42} & 0 \\ \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{21}i}{42} \\ 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & -\frac{\sqrt{21}i}{42} & 0 \\ \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & \frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{bmatrix}$
805	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$
	$\mathbb{M}_4^{(1,0;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{\sqrt{10}}{80} & 0 & -\frac{\sqrt{10}i}{80} & \frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{48} & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 \\ \frac{\sqrt{10}}{80} & 0 & \frac{\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & \frac{\sqrt{6}}{48} & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{80} & 0 & \frac{\sqrt{10}}{80} & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ -\frac{\sqrt{10}i}{80} & 0 & \frac{\sqrt{10}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{30} & \frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} \\ 0 & \frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & \frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 \\ 0 & \frac{\sqrt{30}}{80} & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & -\frac{\sqrt{2}i}{16} & 0 & 0 \\ \frac{\sqrt{30}}{80} & 0 & -\frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{16} & 0 & \frac{\sqrt{2}i}{16} & 0 & 0 & 0 \end{bmatrix}$
806	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,0;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{112} & 0 & -\frac{\sqrt{14}i}{112} & -\frac{\sqrt{21}}{30} & 0 & 0 & 0 & 0 & \frac{17\sqrt{210}}{1680} & 0 & \frac{17\sqrt{210}i}{1680} & 0 & 0 \\ \frac{\sqrt{14}}{112} & 0 & \frac{\sqrt{14}i}{112} & 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & \frac{17\sqrt{210}}{1680} & 0 & -\frac{17\sqrt{210}i}{1680} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{112} & 0 & \frac{\sqrt{14}}{112} & 0 & 0 & \frac{\sqrt{21}}{30} & 0 & 0 & -\frac{\sqrt{210}i}{560} & 0 & \frac{\sqrt{210}}{560} & 0 & 0 \\ -\frac{\sqrt{14}i}{112} & 0 & \frac{\sqrt{14}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{30} & \frac{\sqrt{210}i}{560} & 0 & \frac{\sqrt{210}}{560} & 0 & 0 & 0 \\ \frac{\sqrt{14}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{40} & 0 & \frac{\sqrt{21}i}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} \\ 0 & -\frac{\sqrt{14}}{20} & 0 & 0 & -\frac{\sqrt{21}}{40} & 0 & -\frac{\sqrt{21}i}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{20} & 0 & 0 & -\frac{\sqrt{21}i}{40} & 0 & -\frac{\sqrt{21}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{14}}{20} & \frac{\sqrt{21}i}{40} & 0 & -\frac{\sqrt{21}}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 \\ 0 & -\frac{\sqrt{42}}{80} & 0 & -\frac{\sqrt{42}i}{80} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 \\ -\frac{\sqrt{42}}{80} & 0 & \frac{\sqrt{42}i}{80} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 \end{bmatrix}$
807	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
	$\mathbb{M}_4^{(1,0;a)}(A_u,3)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{42}}{560} & 0 & -\frac{3\sqrt{42}i}{560} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{560} & 0 & -\frac{\sqrt{70}i}{560} & -\frac{\sqrt{105}}{70} & 0 \\ -\frac{3\sqrt{42}}{560} & 0 & \frac{3\sqrt{42}i}{560} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{560} & 0 & \frac{\sqrt{70}i}{560} & 0 & 0 & \frac{\sqrt{105}}{70} \\ 0 & \frac{3\sqrt{42}i}{560} & 0 & -\frac{3\sqrt{42}}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{70}i}{560} & 0 & -\frac{13\sqrt{70}}{560} & 0 & 0 \\ -\frac{3\sqrt{42}i}{560} & 0 & -\frac{3\sqrt{42}}{560} & 0 & 0 & 0 & 0 & 0 & \frac{13\sqrt{70}i}{560} & 0 & -\frac{13\sqrt{70}}{560} & 0 & 0 & 0 \\ -\frac{3\sqrt{42}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{40} & 0 & \frac{\sqrt{7}i}{20} & -\frac{\sqrt{70}}{280} & 0 & 0 & 0 & 0 & \frac{3\sqrt{105}}{280} \\ 0 & \frac{3\sqrt{42}}{280} & 0 & 0 & \frac{\sqrt{7}}{40} & 0 & -\frac{\sqrt{7}i}{20} & 0 & 0 & \frac{\sqrt{70}}{280} & 0 & 0 & \frac{3\sqrt{105}}{280} & 0 \\ 0 & 0 & -\frac{3\sqrt{42}}{280} & 0 & 0 & -\frac{\sqrt{7}i}{40} & 0 & \frac{\sqrt{7}}{20} & 0 & 0 & \frac{\sqrt{70}}{280} & 0 & 0 & \frac{3\sqrt{105}i}{280} \\ 0 & 0 & 0 & \frac{3\sqrt{42}}{280} & \frac{\sqrt{7}i}{40} & 0 & \frac{\sqrt{7}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & -\frac{3\sqrt{105}i}{280} & 0 \\ 0 & -\frac{3\sqrt{14}}{80} & 0 & \frac{3\sqrt{14}i}{80} & \frac{\sqrt{21}}{35} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{210}}{560} & 0 & -\frac{3\sqrt{210}i}{560} & 0 & 0 \\ -\frac{3\sqrt{14}}{80} & 0 & -\frac{3\sqrt{14}i}{80} & 0 & 0 & -\frac{\sqrt{21}}{35} & 0 & 0 & -\frac{3\sqrt{210}}{560} & 0 & \frac{3\sqrt{210}i}{560} & 0 & 0 & 0 \end{bmatrix}$
808	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,0;a)}(A_u,4)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{6}}{160} & 0 & 0 & \frac{i}{40} & 0 & -\frac{1}{10} & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{15}i}{40} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{160} & -\frac{i}{40} & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & -\frac{\sqrt{15}i}{40} & 0 \\ -\frac{\sqrt{6}}{160} & 0 & 0 & 0 & 0 & \frac{3}{20} & 0 & -\frac{i}{40} & -\frac{\sqrt{10}}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ 0 & \frac{\sqrt{6}}{160} & 0 & 0 & \frac{3}{20} & 0 & \frac{i}{40} & 0 & 0 & \frac{\sqrt{10}}{160} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & \frac{\sqrt{6}i}{160} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 & -\frac{1}{40} & 0 & 0 & \frac{\sqrt{10}i}{160} & 0 & \frac{3\sqrt{10}}{40} & 0 & 0 \\ -\frac{\sqrt{6}i}{160} & 0 & \frac{\sqrt{6}}{40} & 0 & 0 & 0 & 0 & \frac{1}{40} & -\frac{\sqrt{10}i}{160} & 0 & \frac{3\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{20} & 0 & \frac{\sqrt{6}i}{32} & \frac{1}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{160} & -\frac{\sqrt{15}}{80} & 0 \\ -\frac{\sqrt{6}}{20} & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{1}{16} & 0 & 0 & -\frac{\sqrt{10}}{20} & 0 & \frac{\sqrt{10}i}{160} & 0 & 0 & \frac{\sqrt{15}}{80} \\ 0 & 0 & \frac{9\sqrt{2}}{160} & 0 & 0 & -\frac{\sqrt{3}i}{20} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & \frac{\sqrt{30}}{160} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{2}}{160} & \frac{\sqrt{3}i}{20} & 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{160} & 0 & 0 \end{bmatrix}$
809	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
	$\mathbb{M}_4^{(1,0;a)}(A_u,5)$	$\begin{bmatrix} -\frac{\sqrt{6}}{160} & 0 & 0 & 0 & 0 & \frac{1}{40} & 0 & \frac{i}{10} & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} \\ 0 & \frac{\sqrt{6}}{160} & 0 & 0 & \frac{1}{40} & 0 & -\frac{i}{10} & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{160} & 0 & 0 & -\frac{3i}{20} & 0 & -\frac{1}{40} & 0 & 0 & \frac{\sqrt{10}}{160} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{160} & \frac{3i}{20} & 0 & -\frac{1}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{160} & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{6}}{32} & 0 & \frac{\sqrt{6}i}{20} & \frac{1}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{160} & 0 & -\frac{\sqrt{10}i}{20} & \frac{\sqrt{15}}{80} & 0 \\ -\frac{\sqrt{6}}{32} & 0 & -\frac{\sqrt{6}i}{20} & 0 & 0 & -\frac{1}{16} & 0 & 0 & -\frac{\sqrt{10}}{160} & 0 & \frac{\sqrt{10}i}{20} & 0 & 0 & -\frac{\sqrt{15}}{80} \\ 0 & -\frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{6}}{160} & 0 & 0 & \frac{1}{40} & 0 & 0 & \frac{3\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{160} & 0 & 0 \\ \frac{\sqrt{6}i}{40} & 0 & -\frac{\sqrt{6}}{160} & 0 & 0 & 0 & 0 & -\frac{1}{40} & -\frac{3\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{160} & 0 & 0 & 0 \\ \frac{9\sqrt{2}}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{20} & 0 & -\frac{\sqrt{3}i}{10} & -\frac{\sqrt{30}}{160} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{9\sqrt{2}}{160} & 0 & 0 & \frac{\sqrt{3}}{20} & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & \frac{\sqrt{30}}{160} & 0 & 0 & 0 & 0 \end{bmatrix}$
810	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,0;a)}(A_u,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{5} & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{5} & -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{5} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{5} & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{10} & 0 & 0 & -\frac{i}{40} & 0 & \frac{1}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{10} & \frac{i}{40} & 0 & \frac{1}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{10} & 0 & 0 & 0 & 0 & \frac{1}{40} & 0 & \frac{i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{10} & 0 & 0 & \frac{1}{40} & 0 & -\frac{i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{2}i}{40} & 0 & \frac{3\sqrt{2}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{2}i}{40} & 0 & \frac{3\sqrt{2}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
811	$\mathbb{M}_4^{(1,0;a)}(A_u,7)$	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$ $\begin{bmatrix} 0 & 0 & \frac{\sqrt{42}}{1120} & 0 & 0 & -\frac{\sqrt{7}i}{40} & 0 & -\frac{3\sqrt{7}}{70} & 0 & 0 & \frac{19\sqrt{70}}{1120} & 0 & 0 & \frac{\sqrt{105}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{1120} & \frac{\sqrt{7}i}{40} & 0 & -\frac{3\sqrt{7}}{70} & 0 & 0 & 0 & 0 & -\frac{19\sqrt{70}}{1120} & -\frac{\sqrt{105}i}{56} & 0 \\ -\frac{\sqrt{42}}{1120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{140} & 0 & \frac{\sqrt{7}i}{40} & \frac{23\sqrt{70}}{1120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{140} \\ 0 & \frac{\sqrt{42}}{1120} & 0 & 0 & -\frac{\sqrt{7}}{140} & 0 & -\frac{\sqrt{7}i}{40} & 0 & 0 & -\frac{23\sqrt{70}}{1120} & 0 & 0 & -\frac{\sqrt{105}}{140} & 0 \\ 0 & \frac{29\sqrt{42}i}{1120} & 0 & \frac{\sqrt{42}}{140} & 0 & 0 & -\frac{\sqrt{7}}{40} & 0 & 0 & \frac{\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{140} & 0 & 0 \\ -\frac{29\sqrt{42}i}{1120} & 0 & \frac{\sqrt{42}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{40} & -\frac{\sqrt{70}i}{224} & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{1120} & -\frac{\sqrt{7}}{80} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{224} & -\frac{\sqrt{105}}{560} & 0 \\ \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{1120} & 0 & 0 & \frac{\sqrt{7}}{80} & 0 & 0 & -\frac{3\sqrt{70}}{280} & 0 & \frac{\sqrt{70}i}{224} & 0 & 0 & \frac{\sqrt{105}}{560} \\ 0 & 0 & -\frac{9\sqrt{14}}{160} & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{70} & 0 & 0 & \frac{\sqrt{210}}{1120} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{14}}{160} & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{1120} & 0 & 0 \end{bmatrix}$
812	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,0;a)}(A_u,8)$	$\begin{bmatrix} \frac{\sqrt{42}}{1120} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{40} & 0 & -\frac{3\sqrt{7}i}{70} & -\frac{19\sqrt{70}}{1120} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} \\ 0 & -\frac{\sqrt{42}}{1120} & 0 & 0 & \frac{\sqrt{7}}{40} & 0 & \frac{3\sqrt{7}i}{70} & 0 & 0 & \frac{19\sqrt{70}}{1120} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 \\ 0 & 0 & \frac{\sqrt{42}}{1120} & 0 & 0 & -\frac{\sqrt{7}i}{140} & 0 & -\frac{\sqrt{7}}{40} & 0 & 0 & \frac{23\sqrt{70}}{1120} & 0 & 0 & \frac{\sqrt{105}i}{140} \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{1120} & \frac{\sqrt{7}i}{140} & 0 & -\frac{\sqrt{7}}{40} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{70}}{1120} & -\frac{\sqrt{105}i}{140} & 0 \\ 0 & \frac{\sqrt{42}}{1120} & 0 & \frac{\sqrt{42}i}{56} & \frac{\sqrt{7}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{224} & 0 & \frac{3\sqrt{70}i}{280} & -\frac{\sqrt{105}}{560} & 0 \\ \frac{\sqrt{42}}{1120} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}}{80} & 0 & 0 & \frac{\sqrt{70}}{224} & 0 & -\frac{3\sqrt{70}i}{280} & 0 & 0 & \frac{\sqrt{105}}{560} \\ 0 & \frac{\sqrt{42}i}{140} & 0 & \frac{29\sqrt{42}}{1120} & 0 & 0 & -\frac{\sqrt{7}}{40} & 0 & 0 & -\frac{\sqrt{70}i}{140} & 0 & -\frac{\sqrt{70}}{224} & 0 & 0 \\ -\frac{\sqrt{42}i}{140} & 0 & \frac{29\sqrt{42}}{1120} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{40} & \frac{\sqrt{70}i}{140} & 0 & -\frac{\sqrt{70}}{224} & 0 & 0 & 0 \\ \frac{9\sqrt{14}}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{70} & \frac{\sqrt{210}}{1120} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{9\sqrt{14}}{160} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{70} & 0 & 0 & -\frac{\sqrt{210}}{1120} & 0 & 0 & 0 & 0 \end{bmatrix}$
813	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
	$\mathbb{M}_4^{(1,0;a)}(A_u,9)$	$\begin{bmatrix} 0 & -\frac{3\sqrt{42}i}{560} & 0 & \frac{3\sqrt{42}}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{70}i}{560} & 0 & -\frac{13\sqrt{70}}{560} & 0 & 0 \\ \frac{3\sqrt{42}i}{560} & 0 & \frac{3\sqrt{42}}{560} & 0 & 0 & 0 & 0 & 0 & \frac{13\sqrt{70}i}{560} & 0 & -\frac{13\sqrt{70}}{560} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{42}}{560} & 0 & -\frac{3\sqrt{42}i}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{560} & 0 & \frac{\sqrt{70}i}{560} & \frac{\sqrt{105}}{70} & 0 \\ -\frac{3\sqrt{42}}{560} & 0 & \frac{3\sqrt{42}i}{560} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{560} & 0 & -\frac{\sqrt{70}i}{560} & 0 & 0 & -\frac{\sqrt{105}}{70} \\ 0 & 0 & \frac{3\sqrt{42}}{280} & 0 & 0 & \frac{\sqrt{7}i}{20} & 0 & -\frac{\sqrt{7}}{40} & 0 & 0 & \frac{\sqrt{70}}{280} & 0 & 0 & \frac{3\sqrt{105}i}{280} \\ 0 & 0 & 0 & -\frac{3\sqrt{42}}{280} & -\frac{\sqrt{7}i}{20} & 0 & -\frac{\sqrt{7}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & -\frac{3\sqrt{105}i}{280} & 0 \\ -\frac{3\sqrt{42}}{280} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{20} & 0 & \frac{\sqrt{7}i}{40} & \frac{\sqrt{70}}{280} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{280} \\ 0 & \frac{3\sqrt{42}}{280} & 0 & 0 & \frac{\sqrt{7}}{20} & 0 & -\frac{\sqrt{7}i}{40} & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & -\frac{3\sqrt{105}}{280} & 0 \\ 0 & \frac{3\sqrt{14}i}{80} & 0 & \frac{3\sqrt{14}}{80} & 0 & 0 & -\frac{\sqrt{21}}{35} & 0 & 0 & -\frac{3\sqrt{210}i}{560} & 0 & \frac{3\sqrt{210}}{560} & 0 & 0 \\ -\frac{3\sqrt{14}i}{80} & 0 & \frac{3\sqrt{14}}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{35} & \frac{3\sqrt{210}i}{560} & 0 & \frac{3\sqrt{210}}{560} & 0 & 0 & 0 \end{bmatrix}$
814	symmetry	1

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_0^{(1,1;a)}(A_u)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & -\frac{\sqrt{210}i}{420} & 0 & 0 \\ \frac{\sqrt{14}}{28} & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}}{420} & 0 & \frac{\sqrt{210}i}{420} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 \\ -\frac{\sqrt{14}i}{28} & 0 & \frac{\sqrt{14}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & -\frac{\sqrt{210}i}{420} & 0 & -\frac{\sqrt{210}}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & \frac{\sqrt{35}i}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & -\frac{\sqrt{35}i}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & -\frac{\sqrt{70}i}{70} & \frac{\sqrt{105}}{70} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 & -\frac{\sqrt{105}}{70} \end{bmatrix}$
815	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
	$\mathbb{M}_2^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & \frac{\sqrt{70}i}{70} & 0 & 0 \\ -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 \\ \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & \frac{\sqrt{70}i}{70} & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{105}}{210} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{105}i}{210} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & \frac{\sqrt{105}i}{210} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & -\frac{\sqrt{210}i}{140} & \frac{\sqrt{35}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{140} & 0 & \frac{\sqrt{210}i}{140} & 0 & 0 & -\frac{\sqrt{35}}{35} \end{bmatrix}$
816	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_2^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} 0 & \frac{\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{120} & 0 & \frac{\sqrt{210}i}{120} & -\frac{\sqrt{35}}{42} & 0 \\ \frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{120} & 0 & -\frac{\sqrt{210}i}{120} & 0 & 0 & \frac{\sqrt{35}}{42} \\ 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{280} & 0 & 0 \\ \frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{280} & 0 & \frac{\sqrt{210}}{280} & 0 & 0 & 0 \\ \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{\sqrt{21}i}{28} & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{420} \\ 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{420} & 0 \\ 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{420} \\ 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{420} & 0 \\ 0 & -\frac{5\sqrt{42}}{168} & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{280} & 0 & 0 \\ -\frac{5\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{280} & 0 & \frac{\sqrt{70}i}{280} & 0 & 0 & 0 \end{bmatrix}$
817	symmetry	$\sqrt{3}yz$
	$\mathbb{M}_2^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ 0 & 0 & 0 & \frac{\sqrt{14}}{42} & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{105} & \frac{\sqrt{35}i}{42} & 0 \\ \frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \\ 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 \\ 0 & \frac{5\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}i}{120} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 \\ -\frac{5\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & -\frac{\sqrt{210}i}{120} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{280} & \frac{\sqrt{35}}{105} & 0 \\ -\frac{5\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{280} & 0 & 0 & -\frac{\sqrt{35}}{105} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & \frac{\sqrt{105}i}{105} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & -\frac{\sqrt{105}i}{105} & 0 \end{bmatrix}$
818	symmetry	$\sqrt{3}xz$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_2^{(1,1;a)}(A_u,4)$	$\begin{bmatrix} -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \\ 0 & \frac{\sqrt{14}}{42} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{105} & 0 & 0 & \frac{\sqrt{35}i}{42} \\ 0 & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{105} & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & \frac{5\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{280} & 0 & -\frac{\sqrt{210}i}{168} & \frac{\sqrt{35}}{105} & 0 \\ \frac{5\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{280} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}}{105} \\ 0 & \frac{5\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{120} & 0 & 0 \\ -\frac{5\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{120} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{70} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{105} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & -\frac{\sqrt{105}}{105} & 0 \end{bmatrix}$
819	symmetry	$\sqrt{3}xy$
	$\mathbb{M}_2^{(1,1;a)}(A_u,5)$	$\begin{bmatrix} 0 & -\frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{280} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 \\ \frac{\sqrt{14}i}{168} & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{280} & 0 & -\frac{\sqrt{210}}{280} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{168} & 0 & -\frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{120} & 0 & \frac{\sqrt{210}i}{120} & -\frac{\sqrt{35}}{42} & 0 \\ -\frac{\sqrt{14}}{168} & 0 & \frac{\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{120} & 0 & -\frac{\sqrt{210}i}{120} & 0 & 0 & \frac{\sqrt{35}}{42} \\ 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}i}{420} \\ 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & -\frac{\sqrt{35}i}{420} & 0 \\ -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{42} & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{420} \\ 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{420} & 0 \\ 0 & -\frac{5\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{280} & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 \\ \frac{5\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{280} & 0 & -\frac{\sqrt{70}}{280} & 0 & 0 & 0 \end{bmatrix}$
820	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,1;a)}(A_u,1)$	$\begin{bmatrix} 0 & \frac{2\sqrt{165}}{165} & 0 & -\frac{2\sqrt{165}i}{165} & \frac{7\sqrt{110}}{660} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{66} & 0 & -\frac{\sqrt{11}i}{66} & 0 & 0 \\ \frac{2\sqrt{165}}{165} & 0 & \frac{2\sqrt{165}i}{165} & 0 & 0 & -\frac{7\sqrt{110}}{660} & 0 & 0 & -\frac{\sqrt{11}}{66} & 0 & \frac{\sqrt{11}i}{66} & 0 & 0 & 0 \\ 0 & -\frac{7\sqrt{165}i}{660} & 0 & -\frac{7\sqrt{165}}{660} & 0 & 0 & -\frac{\sqrt{110}}{330} & 0 & 0 & \frac{\sqrt{11}i}{132} & 0 & -\frac{\sqrt{11}}{132} & 0 & 0 \\ \frac{7\sqrt{165}i}{660} & 0 & -\frac{7\sqrt{165}}{660} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{330} & -\frac{\sqrt{11}i}{132} & 0 & -\frac{\sqrt{11}}{132} & 0 & 0 & 0 \\ \frac{\sqrt{165}}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{165} & 0 & \frac{\sqrt{110}i}{330} & -\frac{5\sqrt{11}}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{66} \\ 0 & -\frac{\sqrt{165}}{220} & 0 & 0 & -\frac{\sqrt{110}}{165} & 0 & -\frac{\sqrt{110}i}{330} & 0 & 0 & \frac{5\sqrt{11}}{132} & 0 & 0 & \frac{\sqrt{66}}{66} & 0 \\ 0 & 0 & -\frac{\sqrt{165}}{220} & 0 & 0 & -\frac{\sqrt{110}i}{165} & 0 & -\frac{\sqrt{110}}{330} & 0 & 0 & -\frac{5\sqrt{11}}{132} & 0 & 0 & -\frac{\sqrt{66}i}{66} \\ 0 & 0 & 0 & \frac{\sqrt{165}}{220} & \frac{\sqrt{110}i}{165} & 0 & -\frac{\sqrt{110}}{330} & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{132} & \frac{\sqrt{66}i}{66} & 0 \\ 0 & -\frac{\sqrt{55}}{660} & 0 & -\frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & -\frac{\sqrt{33}i}{44} & \frac{5\sqrt{22}}{132} & 0 \\ -\frac{\sqrt{55}}{660} & 0 & \frac{\sqrt{55}i}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & \frac{\sqrt{33}i}{44} & 0 & 0 & -\frac{5\sqrt{22}}{132} \end{bmatrix}$
821	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$
	$\mathbb{M}_4^{(1,1;a)}(A_u,2)$	$\begin{bmatrix} 0 & -\frac{5\sqrt{231}}{462} & 0 & \frac{5\sqrt{231}i}{462} & -\frac{19\sqrt{154}}{4620} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{1155} & 0 & -\frac{\sqrt{385}i}{1155} & 0 & 0 \\ -\frac{5\sqrt{231}}{462} & 0 & -\frac{5\sqrt{231}i}{462} & 0 & 0 & \frac{19\sqrt{154}}{4620} & 0 & 0 & -\frac{\sqrt{385}}{1155} & 0 & \frac{\sqrt{385}i}{1155} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{231}i}{84} & 0 & \frac{\sqrt{231}}{84} & 0 & 0 & \frac{\sqrt{154}}{105} & 0 & 0 & \frac{\sqrt{385}i}{420} & 0 & -\frac{\sqrt{385}}{420} & 0 & 0 \\ -\frac{\sqrt{231}i}{84} & 0 & \frac{\sqrt{231}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{105} & -\frac{\sqrt{385}i}{420} & 0 & -\frac{\sqrt{385}}{420} & 0 & 0 & 0 \\ -\frac{\sqrt{231}}{220} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{154}}{1155} & 0 & \frac{\sqrt{154}i}{210} & -\frac{5\sqrt{385}}{924} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{462} \\ 0 & \frac{\sqrt{231}}{220} & 0 & 0 & -\frac{2\sqrt{154}}{1155} & 0 & -\frac{\sqrt{154}i}{210} & 0 & 0 & \frac{5\sqrt{385}}{924} & 0 & 0 & \frac{\sqrt{2310}}{462} & 0 \\ 0 & 0 & \frac{\sqrt{231}}{220} & 0 & 0 & -\frac{2\sqrt{154}i}{1155} & 0 & -\frac{\sqrt{154}}{210} & 0 & 0 & -\frac{5\sqrt{385}}{924} & 0 & 0 & -\frac{\sqrt{2310}i}{462} \\ 0 & 0 & 0 & -\frac{\sqrt{231}}{220} & \frac{2\sqrt{154}i}{1155} & 0 & -\frac{\sqrt{154}}{210} & 0 & 0 & 0 & 0 & \frac{5\sqrt{385}}{924} & \frac{\sqrt{2310}i}{462} & 0 \\ 0 & \frac{\sqrt{77}}{660} & 0 & \frac{\sqrt{77}i}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{308} & 0 & -\frac{\sqrt{1155}i}{308} & \frac{5\sqrt{770}}{924} & 0 \\ \frac{\sqrt{77}}{660} & 0 & -\frac{\sqrt{77}i}{660} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{308} & 0 & \frac{\sqrt{1155}i}{308} & 0 & 0 & -\frac{5\sqrt{770}}{924} \end{bmatrix}$
822	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,1;a)}(A_u,3)$	$\begin{bmatrix} 0 & \frac{\sqrt{77}}{1540} & 0 & \frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & 0 & -\frac{17\sqrt{1155}}{4620} & 0 & \frac{17\sqrt{1155}i}{4620} & -\frac{\sqrt{770}}{220} & 0 \\ \frac{\sqrt{77}}{1540} & 0 & -\frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & 0 & -\frac{17\sqrt{1155}}{4620} & 0 & -\frac{17\sqrt{1155}i}{4620} & 0 & 0 & \frac{\sqrt{770}}{220} \\ 0 & -\frac{\sqrt{77}i}{1540} & 0 & \frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{420} & 0 & \frac{\sqrt{1155}}{420} & 0 & 0 \\ \frac{\sqrt{77}i}{1540} & 0 & \frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{420} & 0 & \frac{\sqrt{1155}}{420} & 0 & 0 & 0 \\ \frac{\sqrt{77}}{220} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{462}}{2310} & 0 & \frac{\sqrt{462}i}{210} & -\frac{\sqrt{1155}}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{385} \\ 0 & -\frac{\sqrt{77}}{220} & 0 & 0 & -\frac{17\sqrt{462}}{2310} & 0 & -\frac{\sqrt{462}i}{210} & 0 & 0 & \frac{\sqrt{1155}}{220} & 0 & 0 & \frac{\sqrt{770}}{385} & 0 \\ 0 & 0 & \frac{\sqrt{77}}{220} & 0 & 0 & \frac{17\sqrt{462}i}{2310} & 0 & \frac{\sqrt{462}}{210} & 0 & 0 & \frac{\sqrt{1155}}{220} & 0 & 0 & \frac{\sqrt{770}i}{385} \\ 0 & 0 & 0 & -\frac{\sqrt{77}}{220} & -\frac{17\sqrt{462}i}{2310} & 0 & \frac{\sqrt{462}}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{220} & -\frac{\sqrt{770}i}{385} & 0 \\ 0 & -\frac{\sqrt{231}}{165} & 0 & \frac{\sqrt{231}i}{165} & -\frac{3\sqrt{154}}{220} & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{770} & 0 & \frac{3\sqrt{385}i}{770} & 0 & 0 \\ -\frac{\sqrt{231}}{165} & 0 & -\frac{\sqrt{231}i}{165} & 0 & 0 & \frac{3\sqrt{154}}{220} & 0 & 0 & \frac{3\sqrt{385}}{770} & 0 & -\frac{3\sqrt{385}i}{770} & 0 & 0 & 0 \end{bmatrix}$
823	$\mathbb{M}_4^{(1,1;a)}(A_u,4)$	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{11}}{220} & 0 & 0 & -\frac{7\sqrt{66}i}{660} & 0 & -\frac{3\sqrt{66}}{440} & 0 & 0 & -\frac{\sqrt{165}}{132} & 0 & 0 & -\frac{\sqrt{110}i}{110} \\ 0 & 0 & 0 & \frac{\sqrt{11}}{220} & \frac{7\sqrt{66}i}{660} & 0 & -\frac{3\sqrt{66}}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{132} & \frac{\sqrt{110}i}{110} & 0 \\ \frac{\sqrt{11}}{220} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{66}}{440} & 0 & \frac{\sqrt{66}i}{330} & \frac{\sqrt{165}}{660} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}}{440} \\ 0 & -\frac{\sqrt{11}}{220} & 0 & 0 & -\frac{3\sqrt{66}}{440} & 0 & -\frac{\sqrt{66}i}{330} & 0 & 0 & -\frac{\sqrt{165}}{660} & 0 & 0 & -\frac{3\sqrt{110}}{440} & 0 \\ 0 & -\frac{\sqrt{11}i}{220} & 0 & -\frac{3\sqrt{11}}{440} & 0 & 0 & \frac{\sqrt{66}}{330} & 0 & 0 & -\frac{\sqrt{165}i}{660} & 0 & -\frac{3\sqrt{165}}{440} & 0 & 0 \\ \frac{\sqrt{11}i}{220} & 0 & -\frac{3\sqrt{11}}{440} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{330} & \frac{\sqrt{165}i}{660} & 0 & -\frac{3\sqrt{165}}{440} & 0 & 0 & 0 \\ 0 & -\frac{9\sqrt{11}}{440} & 0 & \frac{\sqrt{11}i}{44} & -\frac{\sqrt{66}}{66} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{165}}{440} & 0 & \frac{\sqrt{165}i}{60} & -\frac{\sqrt{110}}{55} & 0 \\ -\frac{9\sqrt{11}}{440} & 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & \frac{\sqrt{66}}{66} & 0 & 0 & -\frac{3\sqrt{165}}{440} & 0 & -\frac{\sqrt{165}i}{60} & 0 & 0 & \frac{\sqrt{110}}{55} \\ 0 & 0 & -\frac{\sqrt{33}}{165} & 0 & 0 & -\frac{3\sqrt{22}i}{110} & 0 & -\frac{9\sqrt{22}}{440} & 0 & 0 & -\frac{3\sqrt{55}}{110} & 0 & 0 & -\frac{\sqrt{330}i}{132} \\ 0 & 0 & 0 & \frac{\sqrt{33}}{165} & \frac{3\sqrt{22}i}{110} & 0 & -\frac{9\sqrt{22}}{440} & 0 & 0 & 0 & 0 & \frac{3\sqrt{55}}{110} & \frac{\sqrt{330}i}{132} & 0 \end{bmatrix}$
824	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,1;a)}(A_u,5)$	$\begin{bmatrix} \frac{\sqrt{11}}{220} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{66}}{660} & 0 & \frac{3\sqrt{66}i}{440} & -\frac{\sqrt{165}}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{110} \\ 0 & -\frac{\sqrt{11}}{220} & 0 & 0 & -\frac{7\sqrt{66}}{660} & 0 & -\frac{3\sqrt{66}i}{440} & 0 & 0 & \frac{\sqrt{165}}{132} & 0 & 0 & \frac{\sqrt{110}}{110} & 0 \\ 0 & 0 & \frac{\sqrt{11}}{220} & 0 & 0 & \frac{3\sqrt{66}i}{440} & 0 & \frac{\sqrt{66}}{330} & 0 & 0 & -\frac{\sqrt{165}}{660} & 0 & 0 & -\frac{3\sqrt{110}i}{440} \\ 0 & 0 & 0 & -\frac{\sqrt{11}}{220} & -\frac{3\sqrt{66}i}{440} & 0 & \frac{\sqrt{66}}{330} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{660} & \frac{3\sqrt{110}i}{440} & 0 \\ 0 & -\frac{\sqrt{11}}{44} & 0 & \frac{9\sqrt{11}i}{440} & -\frac{\sqrt{66}}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{60} & 0 & -\frac{3\sqrt{165}i}{440} & \frac{\sqrt{110}}{55} & 0 \\ -\frac{\sqrt{11}}{44} & 0 & -\frac{9\sqrt{11}i}{440} & 0 & 0 & \frac{\sqrt{66}}{66} & 0 & 0 & \frac{\sqrt{165}}{60} & 0 & \frac{3\sqrt{165}i}{440} & 0 & 0 & -\frac{\sqrt{110}}{55} \\ 0 & \frac{3\sqrt{11}i}{440} & 0 & \frac{\sqrt{11}}{220} & 0 & 0 & -\frac{\sqrt{66}}{330} & 0 & 0 & -\frac{3\sqrt{165}i}{440} & 0 & -\frac{\sqrt{165}}{660} & 0 & 0 \\ -\frac{3\sqrt{11}i}{440} & 0 & \frac{\sqrt{11}}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{330} & \frac{3\sqrt{165}i}{440} & 0 & -\frac{\sqrt{165}}{660} & 0 & 0 & 0 \\ -\frac{\sqrt{33}}{165} & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{110} & 0 & -\frac{9\sqrt{22}i}{440} & \frac{3\sqrt{55}}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{132} \\ 0 & \frac{\sqrt{33}}{165} & 0 & 0 & \frac{3\sqrt{22}}{110} & 0 & \frac{9\sqrt{22}i}{440} & 0 & 0 & -\frac{3\sqrt{55}}{110} & 0 & 0 & -\frac{\sqrt{330}}{132} & 0 \end{bmatrix}$
825	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
	$\mathbb{M}_4^{(1,1;a)}(A_u,6)$	$\begin{bmatrix} 0 & \frac{3\sqrt{11}i}{44} & 0 & \frac{3\sqrt{11}}{44} & 0 & 0 & \frac{3\sqrt{66}}{220} & 0 & 0 & \frac{\sqrt{165}i}{660} & 0 & -\frac{\sqrt{165}}{660} & 0 & 0 \\ -\frac{3\sqrt{11}i}{44} & 0 & \frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{66}}{220} & -\frac{\sqrt{165}i}{660} & 0 & -\frac{\sqrt{165}}{660} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{11}}{44} & 0 & -\frac{3\sqrt{11}i}{44} & \frac{3\sqrt{66}}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{660} & 0 & -\frac{\sqrt{165}i}{660} & 0 & 0 \\ \frac{3\sqrt{11}}{44} & 0 & \frac{3\sqrt{11}i}{44} & 0 & 0 & -\frac{3\sqrt{66}}{220} & 0 & 0 & -\frac{\sqrt{165}}{660} & 0 & \frac{\sqrt{165}i}{660} & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{11}}{110} & 0 & 0 & \frac{\sqrt{66}i}{330} & 0 & -\frac{\sqrt{66}}{330} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{11}}{110} & -\frac{\sqrt{66}i}{330} & 0 & -\frac{\sqrt{66}}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{11}}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{330} & 0 & -\frac{\sqrt{66}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{11}}{110} & 0 & 0 & -\frac{\sqrt{66}}{330} & 0 & \frac{\sqrt{66}i}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{33}i}{330} & 0 & -\frac{\sqrt{33}}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{33}i}{330} & 0 & -\frac{\sqrt{33}}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
826	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,1;a)}(A_u,7)$	$\begin{bmatrix} 0 & 0 & -\frac{\sqrt{77}}{1540} & 0 & 0 & \frac{29\sqrt{462}i}{4620} & 0 & \frac{3\sqrt{462}}{440} & 0 & 0 & \frac{\sqrt{1155}}{420} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{77}}{1540} & -\frac{29\sqrt{462}i}{4620} & 0 & \frac{3\sqrt{462}}{440} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{420} & 0 & 0 \\ \frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & \frac{3\sqrt{462}}{440} & 0 & -\frac{17\sqrt{462}i}{2310} & \frac{17\sqrt{1155}}{4620} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{440} \\ 0 & -\frac{\sqrt{77}}{1540} & 0 & 0 & \frac{3\sqrt{462}}{440} & 0 & \frac{17\sqrt{462}i}{2310} & 0 & 0 & -\frac{17\sqrt{1155}}{4620} & 0 & 0 & -\frac{\sqrt{770}}{440} & 0 \\ 0 & \frac{3\sqrt{77}i}{220} & 0 & \frac{7\sqrt{77}}{440} & 0 & 0 & \frac{17\sqrt{462}}{2310} & 0 & 0 & \frac{\sqrt{1155}i}{924} & 0 & -\frac{\sqrt{1155}}{440} & 0 & 0 \\ -\frac{3\sqrt{77}i}{220} & 0 & \frac{7\sqrt{77}}{440} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{462}}{2310} & -\frac{\sqrt{1155}i}{924} & 0 & -\frac{\sqrt{1155}}{440} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}}{88} & 0 & -\frac{3\sqrt{77}i}{220} & \frac{\sqrt{462}}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{440} & 0 & \frac{\sqrt{1155}i}{924} & -\frac{\sqrt{770}}{385} & 0 \\ \frac{\sqrt{77}}{88} & 0 & \frac{3\sqrt{77}i}{220} & 0 & 0 & -\frac{\sqrt{462}}{210} & 0 & 0 & -\frac{\sqrt{1155}}{440} & 0 & -\frac{\sqrt{1155}i}{924} & 0 & 0 & \frac{\sqrt{770}}{385} \\ 0 & 0 & \frac{\sqrt{231}}{165} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}}{440} & 0 & 0 & -\frac{3\sqrt{385}}{770} & 0 & 0 & -\frac{\sqrt{2310}i}{924} \\ 0 & 0 & 0 & -\frac{\sqrt{231}}{165} & 0 & 0 & -\frac{3\sqrt{154}}{440} & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{770} & \frac{\sqrt{2310}i}{924} & 0 \end{bmatrix}$
827	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$
	$\mathbb{M}_4^{(1,1;a)}(A_u,8)$	$\begin{bmatrix} -\frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & -\frac{29\sqrt{462}}{4620} & 0 & \frac{3\sqrt{462}i}{440} & -\frac{\sqrt{1155}}{420} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}}{1540} & 0 & 0 & -\frac{29\sqrt{462}}{4620} & 0 & -\frac{3\sqrt{462}i}{440} & 0 & 0 & \frac{\sqrt{1155}}{420} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{77}}{1540} & 0 & 0 & \frac{3\sqrt{462}i}{440} & 0 & \frac{17\sqrt{462}}{2310} & 0 & 0 & \frac{17\sqrt{1155}}{4620} & 0 & 0 & \frac{\sqrt{770}i}{440} \\ 0 & 0 & 0 & \frac{\sqrt{77}}{1540} & -\frac{3\sqrt{462}i}{440} & 0 & \frac{17\sqrt{462}}{2310} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{1155}}{4620} & -\frac{\sqrt{770}i}{440} & 0 \\ 0 & -\frac{3\sqrt{77}}{220} & 0 & \frac{\sqrt{77}i}{88} & -\frac{\sqrt{462}}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{924} & 0 & \frac{\sqrt{1155}i}{440} & -\frac{\sqrt{770}}{385} & 0 \\ -\frac{3\sqrt{77}}{220} & 0 & -\frac{\sqrt{77}i}{88} & 0 & 0 & \frac{\sqrt{462}}{210} & 0 & 0 & -\frac{\sqrt{1155}}{924} & 0 & -\frac{\sqrt{1155}i}{440} & 0 & 0 & \frac{\sqrt{770}}{385} \\ 0 & \frac{7\sqrt{77}i}{440} & 0 & \frac{3\sqrt{77}}{220} & 0 & 0 & \frac{17\sqrt{462}}{2310} & 0 & 0 & \frac{\sqrt{1155}i}{440} & 0 & -\frac{\sqrt{1155}}{924} & 0 & 0 \\ -\frac{7\sqrt{77}i}{440} & 0 & \frac{3\sqrt{77}}{220} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{462}}{2310} & -\frac{\sqrt{1155}i}{440} & 0 & -\frac{\sqrt{1155}}{924} & 0 & 0 & 0 \\ -\frac{\sqrt{231}}{165} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}i}{440} & -\frac{3\sqrt{385}}{770} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{924} \\ 0 & \frac{\sqrt{231}}{165} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}i}{440} & 0 & 0 & \frac{3\sqrt{385}}{770} & 0 & 0 & \frac{\sqrt{2310}}{924} & 0 \end{bmatrix}$
828	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 9

No.	multipole	matrix
	$\mathbb{M}_4^{(1,1;a)}(A_u,9)$	$\begin{bmatrix} 0 & \frac{\sqrt{77}i}{1540} & 0 & -\frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{420} & 0 & \frac{\sqrt{1155}}{420} & 0 & 0 \\ -\frac{\sqrt{77}i}{1540} & 0 & -\frac{\sqrt{77}}{1540} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{420} & 0 & \frac{\sqrt{1155}}{420} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}}{1540} & 0 & \frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{1155}}{4620} & 0 & -\frac{17\sqrt{1155}i}{4620} & \frac{\sqrt{770}}{220} & 0 \\ \frac{\sqrt{77}}{1540} & 0 & -\frac{\sqrt{77}i}{1540} & 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{1155}}{4620} & 0 & \frac{17\sqrt{1155}i}{4620} & 0 & 0 & -\frac{\sqrt{770}}{220} \\ 0 & 0 & -\frac{\sqrt{77}}{220} & 0 & 0 & \frac{\sqrt{462}i}{210} & 0 & \frac{17\sqrt{462}}{2310} & 0 & 0 & \frac{\sqrt{1155}}{220} & 0 & 0 & \frac{\sqrt{770}i}{385} \\ 0 & 0 & 0 & \frac{\sqrt{77}}{220} & -\frac{\sqrt{462}i}{210} & 0 & \frac{17\sqrt{462}}{2310} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{220} & -\frac{\sqrt{770}i}{385} & 0 \\ \frac{\sqrt{77}}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{210} & 0 & -\frac{17\sqrt{462}i}{2310} & \frac{\sqrt{1155}}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{385} \\ 0 & -\frac{\sqrt{77}}{220} & 0 & 0 & \frac{\sqrt{462}}{210} & 0 & \frac{17\sqrt{462}i}{2310} & 0 & 0 & -\frac{\sqrt{1155}}{220} & 0 & 0 & -\frac{\sqrt{770}}{385} & 0 \\ 0 & \frac{\sqrt{231}i}{165} & 0 & \frac{\sqrt{231}}{165} & 0 & 0 & \frac{3\sqrt{154}}{220} & 0 & 0 & \frac{3\sqrt{385}i}{770} & 0 & -\frac{3\sqrt{385}}{770} & 0 & 0 \\ -\frac{\sqrt{231}i}{165} & 0 & \frac{\sqrt{231}}{165} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}}{220} & -\frac{3\sqrt{385}i}{770} & 0 & -\frac{3\sqrt{385}}{770} & 0 & 0 & 0 \end{bmatrix}$

bra: $= \langle f_2,\uparrow|\,,\langle f_2,\downarrow|\,,\langle f_1,\uparrow|\,,\langle f_1,\downarrow|\,,\langle f_{bz},\uparrow|\,,\langle f_{bz},\downarrow|\,,\langle f_3,\uparrow|\,,\langle f_3,\downarrow|\,,\langle f_{3x},\uparrow|\,,\langle f_{3x},\downarrow|\,,\langle f_{3y},\uparrow|\,,\langle f_{3y},\downarrow|\,,\langle f_{az},\uparrow|\,,\langle f_{az},\downarrow|$
ket: $= |f_2,\uparrow\rangle\,,|f_2,\downarrow\rangle\,,|f_1,\uparrow\rangle\,,|f_1,\downarrow\rangle\,,|f_{bz},\uparrow\rangle\,,|f_{bz},\downarrow\rangle\,,|f_3,\uparrow\rangle\,,|f_3,\downarrow\rangle\,,|f_{3x},\uparrow\rangle\,,|f_{3x},\downarrow\rangle\,,|f_{3y},\uparrow\rangle\,,|f_{3y},\downarrow\rangle\,,|f_{az},\uparrow\rangle\,,|f_{az},\downarrow\rangle$

Table 10: (f,f) block.

No.	multipole	matrix
829	symmetry	1

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_0^{(a)}(A_g)$	$\begin{bmatrix} \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} \end{bmatrix}$
830	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_g,1)$	$\begin{bmatrix} -\frac{5\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{21} \end{bmatrix}$
831	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_g,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
832	symmetry	$\sqrt{3}yz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 \\ -\frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 \end{bmatrix}$
833	symmetry	$\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \end{bmatrix}$
834	symmetry	$\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
835	$\mathbb{Q}_2^{(a)}(A_g,5)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} \\ 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 \\ \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,1)$	$\begin{pmatrix} \frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{11} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{11} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{55}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{132} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{55}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{132} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{55}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{55}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{132} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{22} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{22} \end{pmatrix}$
836	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,2)$	$\begin{bmatrix} \frac{\sqrt{1155}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{1155}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{1155}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{1155}}{308} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{77}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{154} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{154} \end{bmatrix}$
837	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{154} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{154} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{77} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{77} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
838	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} \\ 0 & 0 & \frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} & 0 & 0 \\ -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{22}}{88} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{88} \\ 0 & 0 & \frac{3\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{88} & 0 & 0 \end{bmatrix}$
839	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,5)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{88} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{88} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{22}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{88} & 0 & 0 & 0 & 0 \end{pmatrix}$
840	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
841	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{154}}{88} \\ 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{56} & 0 & 0 \\ -\frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{616} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{616} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{616} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} \\ 0 & 0 & -\frac{3\sqrt{154}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{154}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 \end{bmatrix}$
842	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{88} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{616} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{616} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{154}}{616} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{154}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{154}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 \end{bmatrix}$
843	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(a)}(A_g,9)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{154} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{154} \\ 0 & 0 & \frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{77} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{77} & 0 & 0 \\ -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{77} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{77} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
844	symmetry	$\frac{\sqrt{2}\left(2x^6-15x^4y^2-15x^4z^2-15x^2y^4+180x^2y^2z^2-15x^2z^4+2y^6-15y^4z^2-15y^2z^4+2z^6\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,1)$	$\begin{bmatrix} -\frac{\sqrt{231}}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{88} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{231}}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{88} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{231}}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{231}}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{88} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{231}}{77} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{231}}{77} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{385}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{231}}{616} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{385}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{231}}{616} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{385}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{231}}{616} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{385}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{231}}{616} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}}{462} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}}{462} \end{bmatrix}$
845	symmetry	$-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,2)$	$\begin{bmatrix} \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
846	symmetry	$-\frac{\sqrt{14}\left(x^6-15x^4z^2+15x^2z^4+y^6-15y^4z^2+15y^2z^4-2z^6\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,3)$	$\begin{bmatrix} -\frac{\sqrt{33}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{88} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{33}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{88} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{33}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{33}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{88} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{55}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{88} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{55}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{88} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{55}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{55}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{88} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{66} \end{bmatrix}$
847	symmetry	$\frac{\sqrt{42}(x-y)(x+y)\left(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,4)$	$\begin{bmatrix} \frac{\sqrt{11}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{264} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{11}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{264} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{11}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{264} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{11}}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{264} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{66} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{165}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{165}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{165}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{165}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{88} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
848	symmetry	$\frac{3\sqrt{7}yz(y-z)(y+z)\left(10x^2-y^2-z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,5)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} \\ 0 & 0 & -\frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & 0 \\ -\frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{44} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{88} \\ 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{88} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{88} & 0 & 0 \end{pmatrix}$
849	symmetry	$\frac{3\sqrt{7}xz(x-z)(x+z)\left(x^2-10y^2+z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{88} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{44} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{165}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{165}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{88} & 0 & 0 & 0 & 0 \end{bmatrix}$
850	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)\left(x^2+y^2-10z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,7)$	$\begin{matrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{44} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{44} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{44} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{110}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{110}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{110}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{110}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{matrix}$
851	symmetry	$\frac{\sqrt{462}yz\left(y^2-3z^2\right)\left(3y^2-z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} \\ 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} \\ 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} & 0 & 0 \end{bmatrix}$
852	symmetry	$\frac{\sqrt{462}xz\left(x^2-3z^2\right)\left(3x^2-z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,9)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{32} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{32} & 0 & 0 & 0 & 0 \end{pmatrix}$
853	symmetry	$\frac{\sqrt{462}xy\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,10)$	$\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
854	symmetry	$\frac{\sqrt{210}yz\left(16x^4-16x^2y^2-16x^2z^2+y^4+2y^2z^2+z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,11)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{66} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{17\sqrt{330}}{1056} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{22}}{352} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{330}}{1056} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{9\sqrt{22}}{352} \\ 0 & 0 & \frac{17\sqrt{330}}{1056} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{17\sqrt{330}}{1056} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{32} & 0 & 0 \\ \frac{\sqrt{330}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{330}}{1056} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{330}}{1056} \\ 0 & 0 & -\frac{9\sqrt{22}}{352} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{330}}{1056} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{22}}{352} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{330}}{1056} & 0 & 0 \end{pmatrix}$
855	symmetry	$\frac{\sqrt{210}xz\left(x^4-16x^2y^2+2x^2z^2+16y^4-16y^2z^2+z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g,12)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{17\sqrt{330}}{1056} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{22}}{352} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{17\sqrt{330}}{1056} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{9\sqrt{22}}{352} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{66} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{17\sqrt{330}}{1056} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{17\sqrt{330}}{1056} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{32} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{330}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{330}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{22} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{330}}{1056} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{32} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{330}}{1056} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{22} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{22} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{9\sqrt{22}}{352} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{330}}{1056} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{9\sqrt{22}}{352} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{330}}{1056} & 0 & 0 & 0 & 0 \end{pmatrix}$
856	symmetry	$\frac{\sqrt{210}xy\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(a)}(A_g, 13)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{66} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} \\ 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 & 0 \\ \frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{22} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{2\sqrt{33}}{33} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
857	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,1)$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 \\ -\frac{\sqrt{14}}{56} & 0 & -\frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{21} & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{56} & 0 & \frac{\sqrt{14}}{56} & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 \\ \frac{\sqrt{14}i}{56} & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & -\frac{\sqrt{21}i}{21} & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{14}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{28} & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 \end{pmatrix}$
858	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 \\ -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 \end{pmatrix}$
859	symmetry	$\sqrt{3}yz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,3)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 \end{pmatrix}$
860	symmetry	$\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,4)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 \end{pmatrix}$
861	symmetry	$\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,-1;a)}(A_g,5)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 \\ \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 \end{pmatrix}$
862	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,1)$	$\begin{pmatrix} 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} \\ 0 & 0 & 0 & -\frac{i}{6} & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 \\ -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} \\ 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 \\ 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{6} & \frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{6}}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{6} & \frac{\sqrt{6}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{10}}{24} & \frac{i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 \\ 0 & -\frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ \frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 \end{pmatrix}$
863	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{24} & 0 \\ -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{24} \\ 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{24} & 0 \\ 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{14}i}{24} & 0 & 0 \\ \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & -\frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{14}i}{24} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{24} & 0 & -\frac{\sqrt{14}}{24} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{24} & 0 & \frac{\sqrt{14}}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{24} & 0 & -\frac{\sqrt{14}i}{24} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{168} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{24} & 0 & -\frac{\sqrt{14}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & \frac{\sqrt{210}}{168} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{24} & 0 & \frac{\sqrt{14}}{24} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{24} & 0 & -\frac{\sqrt{14}}{24} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 \\ 0 & \frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{14}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 \\ -\frac{\sqrt{14}}{24} & 0 & \frac{\sqrt{14}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 \end{bmatrix}$
864	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{42}}{168} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{42}}{168} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{168} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 \\ 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 \\ -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & \frac{\sqrt{7}i}{14} & 0 \\ -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} \\ 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 \\ 0 & \frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 \\ -\frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \end{bmatrix}$
865	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,4)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & \frac{\sqrt{6}i}{48} & 0 \\ 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{\sqrt{6}i}{48} \\ 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & \frac{1}{8} \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & -\frac{1}{8} & 0 \\ 0 & 0 & 0 & -\frac{1}{8} & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & -\frac{\sqrt{10}i}{16} & 0 \\ 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{10}i}{16} \\ 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 \end{pmatrix}$
866	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 \\ -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} \\ 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 \\ \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & \frac{i}{8} \\ 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & \frac{i}{8} & 0 \\ 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 \\ 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 \\ 0 & \frac{i}{8} & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 \\ \frac{i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} \\ 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 \end{bmatrix}$
867	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
868	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,7)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & -\frac{\sqrt{42}i}{48} & 0 \\ 0 & 0 & \frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{42}i}{48} \\ 0 & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & \frac{3\sqrt{7}}{56} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & \frac{\sqrt{42}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} \\ 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & -\frac{\sqrt{42}i}{48} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{3\sqrt{7}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{112} & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{48} & \frac{3\sqrt{7}}{56} & 0 \\ 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & -\frac{\sqrt{42}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{168} & -\frac{\sqrt{70}i}{112} & 0 \\ -\frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & \frac{\sqrt{70}i}{112} \\ 0 & -\frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{7}}{56} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{48} & \frac{\sqrt{105}}{168} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{3\sqrt{7}}{56} & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 \end{pmatrix}$
869	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,8)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & -\frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{42}i}{48} & 0 \\ \frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{42}i}{48} \\ 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{48} & -\frac{\sqrt{7}}{14} & 0 \\ -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ 0 & \frac{\sqrt{70}i}{112} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{48} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{42}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 \\ \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & \frac{\sqrt{105}i}{168} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{42}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 \\ \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{\sqrt{105}i}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{112} \\ 0 & 0 & \frac{\sqrt{42}i}{48} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{48} & \frac{\sqrt{7}}{14} & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{112} & 0 & 0 \end{pmatrix}$
870	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,-1;a)}(A_g,9)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{168} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{42}}{168} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & -\frac{\sqrt{42}}{168} & 0 \\ 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & \frac{\sqrt{7}i}{14} & 0 \\ \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 \\ -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{168} & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} \\ 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 \\ 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & -\frac{\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 \\ 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{168} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 \\ -\frac{\sqrt{42}i}{168} & 0 & \frac{\sqrt{42}}{168} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 \end{pmatrix}$
871	symmetry	$\frac{\sqrt{2}\left(2x^6-15x^4y^2-15x^4z^2-15x^2y^4+180x^2y^2z^2-15x^2z^4+2y^6-15y^4z^2-15y^2z^4+2z^6\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,1)$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{154}i}{616} & 0 & 0 & \frac{\sqrt{231}}{1848} & 0 & -\frac{\sqrt{231}i}{308} & 0 & 0 & \frac{\sqrt{2310}i}{264} & 0 & 0 & \frac{\sqrt{385}}{88} \\ 0 & 0 & 0 & \frac{\sqrt{154}i}{616} & -\frac{\sqrt{231}}{1848} & 0 & -\frac{\sqrt{231}i}{308} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{264} & -\frac{\sqrt{385}}{88} & 0 \\ \frac{\sqrt{154}i}{616} & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{1848} & 0 & -\frac{\sqrt{231}}{308} & \frac{\sqrt{2310}i}{264} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{88} \\ 0 & -\frac{\sqrt{154}i}{616} & 0 & 0 & -\frac{\sqrt{231}i}{1848} & 0 & \frac{\sqrt{231}}{308} & 0 & 0 & -\frac{\sqrt{2310}i}{264} & 0 & 0 & \frac{\sqrt{385}i}{88} & 0 \\ 0 & -\frac{\sqrt{231}}{1848} & 0 & \frac{\sqrt{231}i}{1848} & 0 & 0 & \frac{\sqrt{154}i}{154} & 0 & 0 & \frac{5\sqrt{385}}{616} & 0 & \frac{5\sqrt{385}i}{616} & 0 & 0 \\ \frac{\sqrt{231}}{1848} & 0 & \frac{\sqrt{231}i}{1848} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}i}{154} & -\frac{5\sqrt{385}}{616} & 0 & \frac{5\sqrt{385}i}{616} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{231}i}{308} & 0 & \frac{\sqrt{231}}{308} & -\frac{\sqrt{154}i}{154} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{308} & 0 & -\frac{\sqrt{385}}{308} & 0 & 0 \\ \frac{\sqrt{231}i}{308} & 0 & -\frac{\sqrt{231}}{308} & 0 & 0 & \frac{\sqrt{154}i}{154} & 0 & 0 & \frac{\sqrt{385}i}{308} & 0 & \frac{\sqrt{385}}{308} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2310}i}{264} & 0 & 0 & -\frac{5\sqrt{385}}{616} & 0 & -\frac{\sqrt{385}i}{308} & 0 & 0 & -\frac{5\sqrt{154}i}{616} & 0 & 0 & -\frac{5\sqrt{231}}{1848} \\ 0 & 0 & 0 & \frac{\sqrt{2310}i}{264} & \frac{5\sqrt{385}}{616} & 0 & -\frac{\sqrt{385}i}{308} & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}i}{616} & \frac{5\sqrt{231}}{1848} & 0 \\ -\frac{\sqrt{2310}i}{264} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{385}i}{616} & 0 & \frac{\sqrt{385}}{308} & \frac{5\sqrt{154}i}{616} & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}i}{1848} \\ 0 & \frac{\sqrt{2310}i}{264} & 0 & 0 & -\frac{5\sqrt{385}i}{616} & 0 & -\frac{\sqrt{385}}{308} & 0 & 0 & -\frac{5\sqrt{154}i}{616} & 0 & 0 & \frac{5\sqrt{231}i}{1848} & 0 \\ 0 & -\frac{\sqrt{385}}{88} & 0 & -\frac{\sqrt{385}i}{88} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}}{1848} & 0 & -\frac{5\sqrt{231}i}{1848} & 0 & 0 \\ \frac{\sqrt{385}}{88} & 0 & -\frac{\sqrt{385}i}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{231}}{1848} & 0 & -\frac{5\sqrt{231}i}{1848} & 0 & 0 & 0 \end{pmatrix}$
872	symmetry	$-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{24} & 0 & -\frac{\sqrt{5}i}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{3}}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{24} & 0 & -\frac{\sqrt{5}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{3}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{24} & 0 & \frac{\sqrt{5}}{12} & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{24} & 0 & -\frac{\sqrt{5}}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 \\ 0 & \frac{\sqrt{5}}{24} & 0 & \frac{\sqrt{5}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 \\ -\frac{\sqrt{5}}{24} & 0 & \frac{\sqrt{5}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{12} & 0 & -\frac{\sqrt{5}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & \frac{\sqrt{2}i}{6} & 0 \\ \frac{\sqrt{5}i}{12} & 0 & \frac{\sqrt{5}}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{6} \\ 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & -\frac{\sqrt{3}}{24} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{24} & 0 \\ -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{24} \\ 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{24} & 0 \\ 0 & -\frac{\sqrt{3}}{24} & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & -\frac{\sqrt{5}}{24} & 0 & -\frac{\sqrt{5}i}{24} & 0 & 0 \\ \frac{\sqrt{3}}{24} & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} & \frac{\sqrt{5}}{24} & 0 & -\frac{\sqrt{5}i}{24} & 0 & 0 & 0 \end{bmatrix}$
873	symmetry	$-\frac{\sqrt{14}\left(x^6-15x^4z^2+15x^2z^4+y^6-15y^4z^2+15y^2z^4-2z^6\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,3)$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{22}i}{88} & 0 & 0 & -\frac{\sqrt{33}}{88} & 0 & -\frac{\sqrt{33}i}{132} & 0 & 0 & -\frac{\sqrt{330}i}{264} & 0 & 0 & -\frac{\sqrt{55}}{88} \\ 0 & 0 & 0 & \frac{\sqrt{22}i}{88} & \frac{\sqrt{33}}{88} & 0 & -\frac{\sqrt{33}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{264} & \frac{\sqrt{55}}{88} & 0 \\ \frac{\sqrt{22}i}{88} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{88} & 0 & -\frac{\sqrt{33}}{132} & -\frac{\sqrt{330}i}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{88} \\ 0 & -\frac{\sqrt{22}i}{88} & 0 & 0 & \frac{\sqrt{33}i}{88} & 0 & \frac{\sqrt{33}}{132} & 0 & 0 & \frac{\sqrt{330}i}{264} & 0 & 0 & -\frac{\sqrt{55}i}{88} & 0 \\ 0 & \frac{\sqrt{33}}{88} & 0 & -\frac{\sqrt{33}i}{88} & 0 & 0 & \frac{\sqrt{22}i}{22} & 0 & 0 & \frac{\sqrt{55}}{88} & 0 & \frac{\sqrt{55}i}{88} & 0 & 0 \\ -\frac{\sqrt{33}}{88} & 0 & -\frac{\sqrt{33}i}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{22} & -\frac{\sqrt{55}}{88} & 0 & \frac{\sqrt{55}i}{88} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{33}i}{132} & 0 & \frac{\sqrt{33}}{132} & -\frac{\sqrt{22}i}{22} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{44} & 0 & \frac{\sqrt{55}}{44} & 0 & 0 \\ \frac{\sqrt{33}i}{132} & 0 & -\frac{\sqrt{33}}{132} & 0 & 0 & \frac{\sqrt{22}i}{22} & 0 & 0 & -\frac{\sqrt{55}i}{44} & 0 & -\frac{\sqrt{55}}{44} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{330}i}{264} & 0 & 0 & -\frac{\sqrt{55}}{88} & 0 & \frac{\sqrt{55}i}{44} & 0 & 0 & -\frac{5\sqrt{22}i}{88} & 0 & 0 & -\frac{5\sqrt{33}}{264} \\ 0 & 0 & 0 & -\frac{\sqrt{330}i}{264} & \frac{\sqrt{55}}{88} & 0 & \frac{\sqrt{55}i}{44} & 0 & 0 & 0 & 0 & \frac{5\sqrt{22}i}{88} & \frac{5\sqrt{33}}{264} & 0 \\ \frac{\sqrt{330}i}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{88} & 0 & -\frac{\sqrt{55}}{44} & \frac{5\sqrt{22}i}{88} & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{264} \\ 0 & -\frac{\sqrt{330}i}{264} & 0 & 0 & -\frac{\sqrt{55}i}{88} & 0 & \frac{\sqrt{55}}{44} & 0 & 0 & -\frac{5\sqrt{22}i}{88} & 0 & 0 & \frac{5\sqrt{33}i}{264} & 0 \\ 0 & \frac{\sqrt{55}}{88} & 0 & \frac{\sqrt{55}i}{88} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{264} & 0 & -\frac{5\sqrt{33}i}{264} & 0 & 0 \\ -\frac{\sqrt{55}}{88} & 0 & \frac{\sqrt{55}i}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{264} & 0 & -\frac{5\sqrt{33}i}{264} & 0 & 0 & 0 \end{pmatrix}$
874	symmetry	$\frac{\sqrt{42}(x-y)(x+y)\left(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{19\sqrt{11}}{264} & 0 & -\frac{7\sqrt{11}i}{132} & 0 & 0 & -\frac{\sqrt{110}i}{132} & 0 & 0 & -\frac{\sqrt{165}}{264} \\ 0 & 0 & 0 & 0 & \frac{19\sqrt{11}}{264} & 0 & -\frac{7\sqrt{11}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{132} & \frac{\sqrt{165}}{264} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{19\sqrt{11}i}{264} & 0 & \frac{7\sqrt{11}}{132} & \frac{\sqrt{110}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{264} \\ 0 & 0 & 0 & 0 & -\frac{19\sqrt{11}i}{264} & 0 & -\frac{7\sqrt{11}}{132} & 0 & 0 & -\frac{\sqrt{110}i}{132} & 0 & 0 & \frac{\sqrt{165}i}{264} & 0 \\ 0 & \frac{19\sqrt{11}}{264} & 0 & \frac{19\sqrt{11}i}{264} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{264} & 0 & -\frac{\sqrt{165}i}{264} & 0 & 0 \\ -\frac{19\sqrt{11}}{264} & 0 & \frac{19\sqrt{11}i}{264} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{264} & 0 & -\frac{\sqrt{165}i}{264} & 0 & 0 & 0 \\ 0 & \frac{7\sqrt{11}i}{132} & 0 & -\frac{7\sqrt{11}}{132} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{132} & 0 & \frac{\sqrt{165}}{132} & -\frac{\sqrt{110}i}{66} & 0 \\ \frac{7\sqrt{11}i}{132} & 0 & \frac{7\sqrt{11}}{132} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{132} & 0 & -\frac{\sqrt{165}}{132} & 0 & 0 & \frac{\sqrt{110}i}{66} \\ 0 & 0 & -\frac{\sqrt{110}i}{132} & 0 & 0 & -\frac{\sqrt{165}}{264} & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{264} \\ 0 & 0 & 0 & \frac{\sqrt{110}i}{132} & \frac{\sqrt{165}}{264} & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{264} & 0 \\ \frac{\sqrt{110}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{264} & 0 & -\frac{\sqrt{165}}{132} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}i}{264} \\ 0 & -\frac{\sqrt{110}i}{132} & 0 & 0 & \frac{\sqrt{165}i}{264} & 0 & \frac{\sqrt{165}}{132} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}i}{264} & 0 \\ 0 & \frac{\sqrt{165}}{264} & 0 & -\frac{\sqrt{165}i}{264} & 0 & 0 & \frac{\sqrt{110}i}{66} & 0 & 0 & \frac{5\sqrt{11}}{264} & 0 & \frac{5\sqrt{11}i}{264} & 0 & 0 \\ -\frac{\sqrt{165}}{264} & 0 & -\frac{\sqrt{165}i}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{66} & -\frac{5\sqrt{11}}{264} & 0 & \frac{5\sqrt{11}i}{264} & 0 & 0 & 0 \end{bmatrix}$
875	symmetry	$\frac{3\sqrt{7}yz(y-z)(y+z)\left(10x^2-y^2-z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,5)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{11}}{176} & -\frac{\sqrt{66}i}{176} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{165}}{176} & -\frac{3\sqrt{110}i}{176} & 0 \\ 0 & 0 & \frac{\sqrt{11}}{176} & 0 & 0 & \frac{\sqrt{66}i}{176} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{165}}{176} & 0 & 0 & \frac{3\sqrt{110}i}{176} \\ 0 & \frac{\sqrt{11}}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 & \frac{5\sqrt{165}}{528} & 0 & \frac{\sqrt{165}i}{66} & 0 & 0 \\ -\frac{\sqrt{11}}{176} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{66} & -\frac{5\sqrt{165}}{528} & 0 & \frac{\sqrt{165}i}{66} & 0 & 0 & 0 \\ \frac{\sqrt{66}i}{176} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{44} & -\frac{3\sqrt{110}i}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{66} \\ 0 & -\frac{\sqrt{66}i}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{44} & 0 & 0 & \frac{3\sqrt{110}i}{176} & 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 \\ 0 & 0 & -\frac{\sqrt{66}i}{66} & 0 & 0 & -\frac{\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{132} \\ 0 & 0 & 0 & \frac{\sqrt{66}i}{66} & \frac{\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{132} & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{165}}{528} & \frac{3\sqrt{110}i}{176} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{176} & \frac{5\sqrt{66}i}{528} & 0 \\ 0 & 0 & \frac{5\sqrt{165}}{528} & 0 & 0 & -\frac{3\sqrt{110}i}{176} & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{176} & 0 & 0 & -\frac{5\sqrt{66}i}{528} \\ 0 & -\frac{3\sqrt{165}}{176} & 0 & -\frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{176} & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{165}}{176} & 0 & -\frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}}{176} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{110}i}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{66} & 0 & -\frac{\sqrt{165}}{132} & -\frac{5\sqrt{66}i}{528} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{110}i}{176} & 0 & 0 & \frac{\sqrt{165}i}{66} & 0 & \frac{\sqrt{165}}{132} & 0 & 0 & \frac{5\sqrt{66}i}{528} & 0 & 0 & 0 & 0 \end{pmatrix}$
876	symmetry	$\frac{3\sqrt{7}xz(x-z)(x+z)\left(x^2-10y^2+z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,6)$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{11}i}{176} & 0 & 0 & -\frac{\sqrt{66}i}{66} & 0 & 0 & -\frac{\sqrt{165}}{66} & 0 & -\frac{5\sqrt{165}i}{528} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{11}i}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} & \frac{\sqrt{165}}{66} & 0 & -\frac{5\sqrt{165}i}{528} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{11}i}{176} & 0 & 0 & -\frac{\sqrt{66}i}{176} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{165}i}{176} & 0 & 0 & \frac{3\sqrt{110}i}{176} & 0 \\ -\frac{\sqrt{11}i}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{176} & 0 & 0 & -\frac{3\sqrt{165}i}{176} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{176} \\ 0 & 0 & \frac{\sqrt{66}i}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & \frac{3\sqrt{110}i}{176} & 0 & 0 & \frac{\sqrt{165}}{66} \\ 0 & 0 & 0 & -\frac{\sqrt{66}i}{176} & 0 & 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{176} & -\frac{\sqrt{165}}{66} & 0 \\ \frac{\sqrt{66}i}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{132} \\ 0 & -\frac{\sqrt{66}i}{66} & 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{132} & 0 \\ 0 & \frac{\sqrt{165}}{66} & 0 & \frac{3\sqrt{165}i}{176} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}i}{176} & 0 & 0 \\ -\frac{\sqrt{165}}{66} & 0 & \frac{3\sqrt{165}i}{176} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}i}{176} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{165}i}{528} & 0 & 0 & -\frac{3\sqrt{110}i}{176} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{11}i}{176} & 0 & 0 & \frac{5\sqrt{66}i}{528} & 0 \\ \frac{5\sqrt{165}i}{528} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}i}{176} & 0 & 0 & -\frac{5\sqrt{11}i}{176} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{66}i}{528} \\ 0 & 0 & -\frac{3\sqrt{110}i}{176} & 0 & 0 & -\frac{\sqrt{165}}{66} & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 & -\frac{5\sqrt{66}i}{528} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{110}i}{176} & \frac{\sqrt{165}}{66} & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 & 0 & 0 & \frac{5\sqrt{66}i}{528} & 0 & 0 \end{pmatrix}$
877	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)\left(x^2+y^2-10z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,7)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{264} & 0 & -\frac{\sqrt{66}}{264} & \frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{44} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{264} & 0 & \frac{\sqrt{66}}{264} & 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 & 0 & \frac{\sqrt{110}i}{44} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{264} & 0 & \frac{\sqrt{66}i}{264} & 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 & 0 & -\frac{\sqrt{110}}{44} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{264} & 0 & \frac{\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{66} & \frac{\sqrt{110}}{44} & 0 \\ 0 & \frac{\sqrt{66}i}{264} & 0 & \frac{\sqrt{66}}{264} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{88} & 0 & -\frac{\sqrt{110}}{88} & 0 & 0 \\ \frac{\sqrt{66}i}{264} & 0 & -\frac{\sqrt{66}}{264} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{88} & 0 & \frac{\sqrt{110}}{88} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{66}}{264} & 0 & -\frac{\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{88} & 0 & -\frac{\sqrt{110}i}{88} & 0 & 0 \\ -\frac{\sqrt{66}}{264} & 0 & -\frac{\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{88} & 0 & -\frac{\sqrt{110}i}{88} & 0 & 0 & 0 \\ -\frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{88} & 0 & \frac{\sqrt{110}}{88} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{165}i}{66} & 0 & 0 & -\frac{\sqrt{110}i}{88} & 0 & -\frac{\sqrt{110}}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{165}i}{66} & 0 & 0 & \frac{\sqrt{110}}{88} & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{165}i}{66} & -\frac{\sqrt{110}}{88} & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{110}i}{44} & 0 & \frac{\sqrt{110}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{110}i}{44} & 0 & -\frac{\sqrt{110}}{44} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
878	symmetry	$\frac{\sqrt{462}yz\left(y^2-3z^2\right)\left(3y^2-z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,8)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{6}}{64} & \frac{3i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{64} & \frac{\sqrt{15}i}{32} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{64} & 0 & 0 & -\frac{3i}{32} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{64} & 0 & 0 & -\frac{\sqrt{15}i}{32} \\ 0 & \frac{\sqrt{6}}{64} & 0 & 0 & 0 & 0 & \frac{i}{16} & 0 & 0 & \frac{\sqrt{10}}{64} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}}{64} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{16} & -\frac{\sqrt{10}}{64} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & -\frac{\sqrt{15}i}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & \frac{\sqrt{15}i}{32} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{i}{16} & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{16} & 0 & 0 & -\frac{\sqrt{10}}{16} \\ 0 & 0 & 0 & \frac{i}{16} & \frac{\sqrt{6}}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{16} & \frac{\sqrt{10}}{16} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}}{64} & \frac{\sqrt{15}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}}{64} & \frac{5i}{32} & 0 \\ 0 & 0 & \frac{\sqrt{10}}{64} & 0 & 0 & -\frac{\sqrt{15}i}{32} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}}{64} & 0 & 0 & -\frac{5i}{32} \\ 0 & \frac{3\sqrt{10}}{64} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{16} & 0 & 0 & \frac{5\sqrt{6}}{64} & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{10}}{64} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{16} & -\frac{5\sqrt{6}}{64} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & -\frac{5i}{32} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & \frac{5i}{32} & 0 & 0 & 0 & 0 \end{pmatrix}$
879	symmetry	$\frac{\sqrt{462}xz\left(x^2-3z^2\right)\left(3x^2-z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,9)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{6}i}{64} & 0 & 0 & \frac{i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{64} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{64} & 0 & 0 & 0 & 0 & -\frac{i}{16} & 0 & 0 & \frac{\sqrt{10}i}{64} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{64} & 0 & 0 & -\frac{3i}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{64} & 0 & 0 & \frac{\sqrt{15}i}{32} & 0 \\ \frac{\sqrt{6}i}{64} & 0 & 0 & 0 & 0 & \frac{3i}{32} & 0 & 0 & -\frac{3\sqrt{10}i}{64} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{32} \\ 0 & 0 & \frac{3i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{\sqrt{15}i}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3i}{32} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{32} & 0 & 0 \\ -\frac{i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{\sqrt{15}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} \\ 0 & \frac{i}{16} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{16} & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{10}i}{64} & 0 & 0 & -\frac{\sqrt{15}i}{16} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{6}i}{64} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{10}i}{64} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{16} & 0 & 0 & -\frac{5\sqrt{6}i}{64} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{64} & 0 & 0 & \frac{\sqrt{15}i}{32} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6}i}{64} & 0 & 0 & -\frac{5i}{32} & 0 \\ -\frac{\sqrt{10}i}{64} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{32} & 0 & 0 & \frac{5\sqrt{6}i}{64} & 0 & 0 & 0 & 0 & \frac{5i}{32} \\ 0 & 0 & -\frac{\sqrt{15}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & \frac{5i}{32} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{32} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{5i}{32} & 0 & 0 \end{pmatrix}$
880	symmetry	$\frac{\sqrt{462}xy\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,10)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{4} & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{4} & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
881	symmetry	$\frac{\sqrt{210}yz\left(16x^4-16x^2y^2-16x^2z^2+y^4+2y^2z^2+z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,11)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{330}}{2112} & \frac{19\sqrt{55}i}{1056} & 0 & 0 & 0 & 0 & \frac{2\sqrt{22}i}{33} & 0 & -\frac{47\sqrt{22}}{2112} & -\frac{9\sqrt{33}i}{352} & 0 \\ 0 & 0 & \frac{\sqrt{330}}{2112} & 0 & 0 & -\frac{19\sqrt{55}i}{1056} & 0 & 0 & \frac{2\sqrt{22}i}{33} & 0 & \frac{47\sqrt{22}}{2112} & 0 & 0 & \frac{9\sqrt{33}i}{352} \\ 0 & \frac{\sqrt{330}}{2112} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{55}i}{528} & 0 & 0 & -\frac{91\sqrt{22}}{2112} & 0 & -\frac{\sqrt{22}i}{33} & 0 & 0 \\ -\frac{\sqrt{330}}{2112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{7\sqrt{55}i}{528} & \frac{91\sqrt{22}}{2112} & 0 & -\frac{\sqrt{22}i}{33} & 0 & 0 & 0 \\ -\frac{19\sqrt{55}i}{1056} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{528} & -\frac{7\sqrt{33}i}{352} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{33} \\ 0 & \frac{19\sqrt{55}i}{1056} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{528} & 0 & 0 & \frac{7\sqrt{33}i}{352} & 0 & 0 & -\frac{\sqrt{22}i}{33} & 0 \\ 0 & 0 & \frac{7\sqrt{55}i}{528} & 0 & 0 & -\frac{\sqrt{330}}{528} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{176} & 0 & 0 & \frac{\sqrt{22}}{48} \\ 0 & 0 & 0 & -\frac{7\sqrt{55}i}{528} & \frac{\sqrt{330}}{528} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{176} & -\frac{\sqrt{22}}{48} & 0 \\ 0 & -\frac{2\sqrt{22}i}{33} & 0 & \frac{91\sqrt{22}}{2112} & \frac{7\sqrt{33}i}{352} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{330}}{2112} & \frac{5\sqrt{55}i}{1056} & 0 \\ -\frac{2\sqrt{22}i}{33} & 0 & -\frac{91\sqrt{22}}{2112} & 0 & 0 & -\frac{7\sqrt{33}i}{352} & 0 & 0 & 0 & 0 & \frac{5\sqrt{330}}{2112} & 0 & 0 & -\frac{5\sqrt{55}i}{1056} \\ 0 & \frac{47\sqrt{22}}{2112} & 0 & \frac{\sqrt{22}i}{33} & 0 & 0 & -\frac{\sqrt{33}i}{176} & 0 & 0 & \frac{5\sqrt{330}}{2112} & 0 & 0 & 0 & 0 \\ -\frac{47\sqrt{22}}{2112} & 0 & \frac{\sqrt{22}i}{33} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{176} & -\frac{5\sqrt{330}}{2112} & 0 & 0 & 0 & 0 & 0 \\ \frac{9\sqrt{33}i}{352} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{33} & 0 & -\frac{\sqrt{22}}{48} & -\frac{5\sqrt{55}i}{1056} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{9\sqrt{33}i}{352} & 0 & 0 & \frac{\sqrt{22}i}{33} & 0 & \frac{\sqrt{22}}{48} & 0 & 0 & \frac{5\sqrt{55}i}{1056} & 0 & 0 & 0 & 0 \end{pmatrix}$
882	symmetry	$\frac{\sqrt{210}xz\left(x^4-16x^2y^2+2x^2z^2+16y^4-16y^2z^2+z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_6^{(1,-1;a)}(A_g,12)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{330}i}{2112} & 0 & 0 & -\frac{7\sqrt{55}i}{528} & 0 & 0 & -\frac{\sqrt{22}}{33} & 0 & -\frac{91\sqrt{22}i}{2112} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{330}i}{2112} & 0 & 0 & 0 & 0 & \frac{7\sqrt{55}i}{528} & \frac{\sqrt{22}}{33} & 0 & -\frac{91\sqrt{22}i}{2112} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{330}i}{2112} & 0 & 0 & -\frac{19\sqrt{55}i}{1056} & 0 & 0 & 0 & 0 & -\frac{47\sqrt{22}i}{2112} & 0 & \frac{2\sqrt{22}}{33} & -\frac{9\sqrt{33}i}{352} & 0 \\ \frac{\sqrt{330}i}{2112} & 0 & 0 & 0 & 0 & \frac{19\sqrt{55}i}{1056} & 0 & 0 & -\frac{47\sqrt{22}i}{2112} & 0 & -\frac{2\sqrt{22}}{33} & 0 & 0 & \frac{9\sqrt{33}i}{352} \\ 0 & 0 & \frac{19\sqrt{55}i}{1056} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{528} & 0 & 0 & -\frac{7\sqrt{33}i}{352} & 0 & 0 & -\frac{\sqrt{22}}{33} \\ 0 & 0 & 0 & -\frac{19\sqrt{55}i}{1056} & 0 & 0 & \frac{\sqrt{330}i}{528} & 0 & 0 & 0 & 0 & \frac{7\sqrt{33}i}{352} & \frac{\sqrt{22}}{33} & 0 \\ \frac{7\sqrt{55}i}{528} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{528} & 0 & 0 & -\frac{\sqrt{33}i}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{48} \\ 0 & -\frac{7\sqrt{55}i}{528} & 0 & 0 & -\frac{\sqrt{330}i}{528} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{176} & 0 & 0 & -\frac{\sqrt{22}i}{48} & 0 \\ 0 & \frac{\sqrt{22}}{33} & 0 & \frac{47\sqrt{22}i}{2112} & 0 & 0 & \frac{\sqrt{33}i}{176} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{330}i}{2112} & 0 & 0 \\ -\frac{\sqrt{22}}{33} & 0 & \frac{47\sqrt{22}i}{2112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{176} & 0 & 0 & -\frac{5\sqrt{330}i}{2112} & 0 & 0 & 0 \\ 0 & \frac{91\sqrt{22}i}{2112} & 0 & -\frac{2\sqrt{22}}{33} & \frac{7\sqrt{33}i}{352} & 0 & 0 & 0 & 0 & \frac{5\sqrt{330}i}{2112} & 0 & 0 & -\frac{5\sqrt{55}i}{1056} & 0 \\ \frac{91\sqrt{22}i}{2112} & 0 & \frac{2\sqrt{22}}{33} & 0 & 0 & -\frac{7\sqrt{33}i}{352} & 0 & 0 & \frac{5\sqrt{330}i}{2112} & 0 & 0 & 0 & 0 & \frac{5\sqrt{55}i}{1056} \\ 0 & 0 & \frac{9\sqrt{33}i}{352} & 0 & 0 & \frac{\sqrt{22}}{33} & 0 & \frac{\sqrt{22}i}{48} & 0 & 0 & \frac{5\sqrt{55}i}{1056} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{9\sqrt{33}i}{352} & -\frac{\sqrt{22}}{33} & 0 & \frac{\sqrt{22}i}{48} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{55}i}{1056} & 0 & 0 \end{pmatrix}$
883	symmetry	$\frac{\sqrt{210}xy\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
884	$\mathbb{Q}_6^{(1,-1;a)}(A_g,13)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{132} & 0 & \frac{\sqrt{55}}{132} & -\frac{\sqrt{22}i}{33} & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{66} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{132} & 0 & -\frac{\sqrt{55}}{132} & 0 & 0 & \frac{\sqrt{22}i}{33} & 0 & 0 & -\frac{\sqrt{33}i}{66} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{132} & 0 & \frac{\sqrt{55}i}{132} & 0 & 0 & -\frac{\sqrt{22}i}{33} & 0 & 0 & -\frac{\sqrt{33}}{66} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{132} & 0 & \frac{\sqrt{55}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{33} & \frac{\sqrt{33}}{66} & 0 \\ 0 & -\frac{\sqrt{55}i}{132} & 0 & \frac{\sqrt{55}}{132} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{33} & 0 & -\frac{\sqrt{33}}{33} & \frac{2\sqrt{22}i}{33} & 0 \\ -\frac{\sqrt{55}i}{132} & 0 & -\frac{\sqrt{55}}{132} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{33} & 0 & \frac{\sqrt{33}}{33} & 0 & 0 & -\frac{2\sqrt{22}i}{33} \\ 0 & -\frac{\sqrt{55}}{132} & 0 & -\frac{\sqrt{55}i}{132} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{66} & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 \\ \frac{\sqrt{55}}{132} & 0 & -\frac{\sqrt{55}i}{132} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{66} & 0 & -\frac{\sqrt{33}i}{66} & 0 & 0 & 0 \\ \frac{\sqrt{22}i}{33} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{33} & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{66} \\ 0 & -\frac{\sqrt{22}i}{33} & 0 & 0 & \frac{\sqrt{33}i}{33} & 0 & \frac{\sqrt{33}}{66} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}i}{66} & 0 \\ 0 & 0 & \frac{\sqrt{22}i}{33} & 0 & 0 & \frac{\sqrt{33}}{33} & 0 & \frac{\sqrt{33}i}{66} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{66} \\ 0 & 0 & 0 & -\frac{\sqrt{22}i}{33} & -\frac{\sqrt{33}}{33} & 0 & \frac{\sqrt{33}i}{66} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{66} & 0 \\ 0 & \frac{\sqrt{33}i}{66} & 0 & \frac{\sqrt{33}}{66} & -\frac{2\sqrt{22}i}{33} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}i}{66} & 0 & \frac{\sqrt{55}}{66} & 0 & 0 \\ \frac{\sqrt{33}i}{66} & 0 & -\frac{\sqrt{33}}{66} & 0 & 0 & \frac{2\sqrt{22}i}{33} & 0 & 0 & -\frac{\sqrt{55}i}{66} & 0 & -\frac{\sqrt{55}}{66} & 0 & 0 & 0 \end{pmatrix}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_0^{(1,1;a)}(A_g)$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 \\ \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 \\ -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & -\frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 \end{pmatrix}$
885	symmetry	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,1;a)}(A_g,1)$	$\begin{pmatrix} 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & \frac{\sqrt{42}}{42} & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{42}i}{42} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{42} & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}}{42} & 0 & -\frac{\sqrt{42}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{42} & 0 & \frac{\sqrt{42}}{42} & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{42} & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{42}}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & -\frac{\sqrt{42}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & 0 \end{pmatrix}$
886	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{84} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{210}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 \\ 0 & \frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 \\ -\frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}i}{84} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & -\frac{\sqrt{35}i}{42} & 0 \\ -\frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} \\ 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 \\ -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} \\ 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 \\ 0 & \frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 \\ -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 \end{bmatrix}$
887	symmetry	$\sqrt{3}yz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 \\ -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{21} & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 \\ \frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} \\ 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{21} & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & \frac{\sqrt{14}i}{21} & 0 \\ -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{14}i}{21} \\ 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 \end{bmatrix}$
888	symmetry	$\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,1;a)}(A_g,4)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{21} & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 \\ \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 \\ \frac{\sqrt{14}i}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 \\ 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 \\ \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 \\ -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{21} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{21} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{21} & 0 & 0 \end{pmatrix}$
889	symmetry	$\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_2^{(1,1;a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & \frac{\sqrt{14}}{84} & \frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{84} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{210}}{84} & 0 \\ 0 & -\frac{\sqrt{14}i}{84} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & \frac{\sqrt{35}i}{42} & 0 \\ -\frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ 0 & -\frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 \\ \frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & -\frac{\sqrt{210}i}{84} & 0 & 0 & 0 \\ -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} \\ 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} \\ 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & \frac{\sqrt{210}}{84} & 0 & \frac{\sqrt{210}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 \\ 0 & \frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & -\frac{\sqrt{35}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 \\ \frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{14}i}{84} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & 0 \end{bmatrix}$
890	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_g,1)$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{110}i}{264} & 0 & 0 & \frac{\sqrt{165}}{66} & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 & -\frac{\sqrt{66}i}{88} & 0 & 0 & \frac{\sqrt{11}}{132} \\ 0 & 0 & 0 & \frac{\sqrt{110}i}{264} & -\frac{\sqrt{165}}{66} & 0 & -\frac{\sqrt{165}i}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{88} & -\frac{\sqrt{11}}{132} & 0 \\ \frac{\sqrt{110}i}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 & -\frac{\sqrt{165}}{132} & -\frac{\sqrt{66}i}{88} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{132} \\ 0 & -\frac{\sqrt{110}i}{264} & 0 & 0 & -\frac{\sqrt{165}i}{66} & 0 & \frac{\sqrt{165}}{132} & 0 & 0 & \frac{\sqrt{66}i}{88} & 0 & 0 & \frac{\sqrt{11}i}{132} & 0 \\ 0 & -\frac{\sqrt{165}}{66} & 0 & \frac{\sqrt{165}i}{66} & 0 & 0 & \frac{\sqrt{110}i}{66} & 0 & 0 & -\frac{\sqrt{11}}{33} & 0 & -\frac{\sqrt{11}i}{33} & 0 & 0 \\ \frac{\sqrt{165}}{66} & 0 & \frac{\sqrt{165}i}{66} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{66} & \frac{\sqrt{11}}{33} & 0 & -\frac{\sqrt{11}i}{33} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{165}i}{132} & 0 & \frac{\sqrt{165}}{132} & -\frac{\sqrt{110}i}{66} & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}i}{132} & 0 & -\frac{5\sqrt{11}}{132} & 0 & 0 \\ \frac{\sqrt{165}i}{132} & 0 & -\frac{\sqrt{165}}{132} & 0 & 0 & \frac{\sqrt{110}i}{66} & 0 & 0 & \frac{5\sqrt{11}i}{132} & 0 & \frac{5\sqrt{11}}{132} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{66}i}{88} & 0 & 0 & \frac{\sqrt{11}}{33} & 0 & -\frac{5\sqrt{11}i}{132} & 0 & 0 & -\frac{5\sqrt{110}i}{264} & 0 & 0 & \frac{\sqrt{165}}{132} \\ 0 & 0 & 0 & -\frac{\sqrt{66}i}{88} & -\frac{\sqrt{11}}{33} & 0 & -\frac{5\sqrt{11}i}{132} & 0 & 0 & 0 & 0 & \frac{5\sqrt{110}i}{264} & -\frac{\sqrt{165}}{132} & 0 \\ \frac{\sqrt{66}i}{88} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{33} & 0 & \frac{5\sqrt{11}}{132} & \frac{5\sqrt{110}i}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{132} \\ 0 & -\frac{\sqrt{66}i}{88} & 0 & 0 & \frac{\sqrt{11}i}{33} & 0 & -\frac{5\sqrt{11}}{132} & 0 & 0 & -\frac{5\sqrt{110}i}{264} & 0 & 0 & -\frac{\sqrt{165}i}{132} & 0 \\ 0 & -\frac{\sqrt{11}}{132} & 0 & -\frac{\sqrt{11}i}{132} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{132} & 0 & \frac{\sqrt{165}i}{132} & 0 & 0 \\ \frac{\sqrt{11}}{132} & 0 & -\frac{\sqrt{11}i}{132} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{132} & 0 & \frac{\sqrt{165}i}{132} & 0 & 0 & 0 \end{pmatrix}$
891	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & -\frac{5\sqrt{154}i}{1848} & 0 & 0 & -\frac{2\sqrt{231}}{231} & 0 & \frac{13\sqrt{231}i}{924} & 0 & 0 & \frac{\sqrt{2310}i}{440} & 0 & 0 & -\frac{\sqrt{385}}{660} \\ 0 & 0 & 0 & \frac{5\sqrt{154}i}{1848} & \frac{2\sqrt{231}}{231} & 0 & \frac{13\sqrt{231}i}{924} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}i}{440} & \frac{\sqrt{385}}{660} & 0 \\ \frac{5\sqrt{154}i}{1848} & 0 & 0 & 0 & 0 & \frac{2\sqrt{231}i}{231} & 0 & \frac{13\sqrt{231}}{924} & \frac{\sqrt{2310}i}{440} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{660} \\ 0 & -\frac{5\sqrt{154}i}{1848} & 0 & 0 & \frac{2\sqrt{231}i}{231} & 0 & -\frac{13\sqrt{231}}{924} & 0 & 0 & -\frac{\sqrt{2310}i}{440} & 0 & 0 & -\frac{\sqrt{385}i}{660} & 0 \\ 0 & \frac{2\sqrt{231}}{231} & 0 & -\frac{2\sqrt{231}i}{231} & 0 & 0 & \frac{5\sqrt{154}i}{462} & 0 & 0 & -\frac{13\sqrt{385}}{2310} & 0 & -\frac{13\sqrt{385}i}{2310} & 0 & 0 \\ -\frac{2\sqrt{231}}{231} & 0 & -\frac{2\sqrt{231}i}{231} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{154}i}{462} & \frac{13\sqrt{385}}{2310} & 0 & -\frac{13\sqrt{385}i}{2310} & 0 & 0 & 0 \\ 0 & -\frac{13\sqrt{231}i}{924} & 0 & -\frac{13\sqrt{231}}{924} & -\frac{5\sqrt{154}i}{462} & 0 & 0 & 0 & 0 & \frac{19\sqrt{385}i}{4620} & 0 & -\frac{19\sqrt{385}}{4620} & 0 & 0 \\ -\frac{13\sqrt{231}i}{924} & 0 & \frac{13\sqrt{231}}{924} & 0 & 0 & \frac{5\sqrt{154}i}{462} & 0 & 0 & \frac{19\sqrt{385}i}{4620} & 0 & \frac{19\sqrt{385}}{4620} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2310}i}{440} & 0 & 0 & \frac{13\sqrt{385}}{2310} & 0 & -\frac{19\sqrt{385}i}{4620} & 0 & 0 & -\frac{25\sqrt{154}i}{1848} & 0 & 0 & \frac{5\sqrt{231}}{924} \\ 0 & 0 & 0 & \frac{\sqrt{2310}i}{440} & -\frac{13\sqrt{385}}{2310} & 0 & -\frac{19\sqrt{385}i}{4620} & 0 & 0 & 0 & 0 & \frac{25\sqrt{154}i}{1848} & -\frac{5\sqrt{231}}{924} & 0 \\ -\frac{\sqrt{2310}i}{440} & 0 & 0 & 0 & 0 & \frac{13\sqrt{385}i}{2310} & 0 & \frac{19\sqrt{385}}{4620} & \frac{25\sqrt{154}i}{1848} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{231}i}{924} \\ 0 & \frac{\sqrt{2310}i}{440} & 0 & 0 & \frac{13\sqrt{385}i}{2310} & 0 & -\frac{19\sqrt{385}}{4620} & 0 & 0 & -\frac{25\sqrt{154}i}{1848} & 0 & 0 & -\frac{5\sqrt{231}i}{924} & 0 \\ 0 & \frac{\sqrt{385}}{660} & 0 & \frac{\sqrt{385}i}{660} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{231}}{924} & 0 & \frac{5\sqrt{231}i}{924} & 0 & 0 \\ -\frac{\sqrt{385}}{660} & 0 & \frac{\sqrt{385}i}{660} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}}{924} & 0 & \frac{5\sqrt{231}i}{924} & 0 & 0 & 0 \end{bmatrix}$
892	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_g,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{308} & 0 & \frac{\sqrt{77}i}{308} & 0 & 0 & \frac{\sqrt{770}i}{220} & 0 & 0 & -\frac{\sqrt{1155}}{165} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{308} & 0 & \frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{220} & \frac{\sqrt{1155}}{165} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{308} & 0 & -\frac{\sqrt{77}}{308} & -\frac{\sqrt{770}i}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{165} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{308} & 0 & \frac{\sqrt{77}}{308} & 0 & 0 & \frac{\sqrt{770}i}{220} & 0 & 0 & \frac{\sqrt{1155}i}{165} & 0 \\ 0 & \frac{\sqrt{77}}{308} & 0 & \frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{924} & 0 & \frac{\sqrt{1155}i}{924} & 0 & 0 \\ -\frac{\sqrt{77}}{308} & 0 & \frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & \frac{\sqrt{1155}i}{924} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{77}i}{308} & 0 & \frac{\sqrt{77}}{308} & 0 & 0 & 0 & 0 & 0 & \frac{23\sqrt{1155}i}{4620} & 0 & \frac{23\sqrt{1155}}{4620} & \frac{\sqrt{770}i}{110} & 0 \\ -\frac{\sqrt{77}i}{308} & 0 & -\frac{\sqrt{77}}{308} & 0 & 0 & 0 & 0 & 0 & \frac{23\sqrt{1155}i}{4620} & 0 & -\frac{23\sqrt{1155}}{4620} & 0 & 0 & -\frac{\sqrt{770}i}{110} \\ 0 & 0 & \frac{\sqrt{770}i}{220} & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & -\frac{23\sqrt{1155}i}{4620} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{154} \\ 0 & 0 & 0 & -\frac{\sqrt{770}i}{220} & -\frac{\sqrt{1155}}{924} & 0 & -\frac{23\sqrt{1155}i}{4620} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{154} & 0 \\ -\frac{\sqrt{770}i}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{924} & 0 & -\frac{23\sqrt{1155}}{4620} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{154} \\ 0 & \frac{\sqrt{770}i}{220} & 0 & 0 & -\frac{\sqrt{1155}i}{924} & 0 & \frac{23\sqrt{1155}}{4620} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{154} & 0 \\ 0 & \frac{\sqrt{1155}}{165} & 0 & -\frac{\sqrt{1155}i}{165} & 0 & 0 & -\frac{\sqrt{770}i}{110} & 0 & 0 & \frac{\sqrt{77}}{154} & 0 & \frac{\sqrt{77}i}{154} & 0 & 0 \\ -\frac{\sqrt{1155}}{165} & 0 & -\frac{\sqrt{1155}i}{165} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{110} & -\frac{\sqrt{77}}{154} & 0 & \frac{\sqrt{77}i}{154} & 0 & 0 & 0 \end{pmatrix}$
893	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_g,4)$	$\begin{matrix} 0 & 0 & 0 & -\frac{\sqrt{66}}{264} & -\frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{7\sqrt{110}}{440} & -\frac{\sqrt{165}i}{165} & 0 \\ 0 & 0 & \frac{\sqrt{66}}{264} & 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & \frac{7\sqrt{110}}{440} & 0 & 0 & \frac{\sqrt{165}i}{165} \\ 0 & \frac{\sqrt{66}}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & \frac{\sqrt{110}}{440} & 0 & \frac{3\sqrt{110}i}{220} & 0 & 0 \\ -\frac{\sqrt{66}}{264} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{44} & -\frac{\sqrt{110}}{440} & 0 & \frac{3\sqrt{110}i}{220} & 0 & 0 & 0 \\ \frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{66} & \frac{7\sqrt{165}i}{660} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}i}{220} \\ 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{66} & 0 & 0 & -\frac{7\sqrt{165}i}{660} & 0 & 0 & -\frac{3\sqrt{110}i}{220} & 0 \\ 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & -\frac{\sqrt{66}}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{60} & 0 & 0 & -\frac{\sqrt{110}}{55} \\ 0 & 0 & 0 & -\frac{\sqrt{11}i}{44} & \frac{\sqrt{66}}{66} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{60} & \frac{\sqrt{110}}{55} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{110}}{440} & -\frac{7\sqrt{165}i}{660} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{66}}{264} & -\frac{\sqrt{11}i}{22} & 0 \\ 0 & 0 & \frac{\sqrt{110}}{440} & 0 & 0 & \frac{7\sqrt{165}i}{660} & 0 & 0 & 0 & 0 & \frac{5\sqrt{66}}{264} & 0 & 0 & \frac{\sqrt{11}i}{22} \\ 0 & \frac{7\sqrt{110}}{440} & 0 & -\frac{3\sqrt{110}i}{220} & 0 & 0 & -\frac{\sqrt{165}i}{60} & 0 & 0 & \frac{5\sqrt{66}}{264} & 0 & 0 & 0 & 0 \\ -\frac{7\sqrt{110}}{440} & 0 & -\frac{3\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{60} & -\frac{5\sqrt{66}}{264} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{165}i}{165} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}i}{220} & 0 & \frac{\sqrt{110}}{55} & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{165}i}{165} & 0 & 0 & \frac{3\sqrt{110}i}{220} & 0 & -\frac{\sqrt{110}}{55} & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & 0 & 0 \end{matrix}$
894	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_g,5)$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{66}i}{264} & 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & -\frac{3\sqrt{110}}{220} & 0 & -\frac{\sqrt{110}i}{440} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{44} & \frac{3\sqrt{110}}{220} & 0 & -\frac{\sqrt{110}i}{440} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{66}i}{264} & 0 & 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & \frac{7\sqrt{110}i}{440} & 0 & 0 & \frac{\sqrt{165}i}{165} & 0 \\ -\frac{\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & \frac{7\sqrt{110}i}{440} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{165} \\ 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}i}{66} & 0 & 0 & -\frac{7\sqrt{165}i}{660} & 0 & 0 & \frac{3\sqrt{110}}{220} \\ 0 & 0 & 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & -\frac{\sqrt{66}i}{66} & 0 & 0 & 0 & 0 & \frac{7\sqrt{165}i}{660} & -\frac{3\sqrt{110}}{220} & 0 \\ -\frac{\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 & \frac{\sqrt{165}i}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{55} \\ 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & \frac{\sqrt{66}i}{66} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{60} & 0 & 0 & -\frac{\sqrt{110}i}{55} & 0 \\ 0 & \frac{3\sqrt{110}}{220} & 0 & -\frac{7\sqrt{110}i}{440} & 0 & 0 & -\frac{\sqrt{165}i}{60} & 0 & 0 & 0 & 0 & \frac{5\sqrt{66}i}{264} & 0 & 0 \\ -\frac{3\sqrt{110}}{220} & 0 & -\frac{7\sqrt{110}i}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{60} & 0 & 0 & \frac{5\sqrt{66}i}{264} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{110}i}{440} & 0 & 0 & \frac{7\sqrt{165}i}{660} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{66}i}{264} & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 \\ \frac{\sqrt{110}i}{440} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{165}i}{660} & 0 & 0 & -\frac{5\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}i}{22} \\ 0 & 0 & -\frac{\sqrt{165}i}{165} & 0 & 0 & -\frac{3\sqrt{110}}{220} & 0 & \frac{\sqrt{110}i}{55} & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{165}i}{165} & \frac{3\sqrt{110}}{220} & 0 & \frac{\sqrt{110}i}{55} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 \end{pmatrix}$
895	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_g,6)$	$\begin{array}{cccccccccccccc} 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{11}i}{44} & 0 & \frac{3\sqrt{11}}{44} & \frac{3\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{330} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{11}i}{44} & 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & -\frac{3\sqrt{110}i}{220} & 0 & 0 & -\frac{\sqrt{165}i}{330} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{11}}{44} & 0 & -\frac{3\sqrt{11}i}{44} & 0 & 0 & -\frac{3\sqrt{110}i}{220} & 0 & 0 & \frac{\sqrt{165}}{330} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{11}}{44} & 0 & -\frac{3\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}i}{220} & -\frac{\sqrt{165}}{330} & 0 \\ 0 & -\frac{3\sqrt{11}i}{44} & 0 & -\frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{660} & 0 & \frac{\sqrt{165}}{660} & 0 & 0 \\ -\frac{3\sqrt{11}i}{44} & 0 & \frac{3\sqrt{11}}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}i}{660} & 0 & -\frac{\sqrt{165}}{660} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{11}}{44} & 0 & \frac{3\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{660} & 0 & \frac{\sqrt{165}i}{660} & 0 & 0 \\ \frac{3\sqrt{11}}{44} & 0 & \frac{3\sqrt{11}i}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{660} & 0 & \frac{\sqrt{165}i}{660} & 0 & 0 & 0 \\ -\frac{3\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}i}{660} & 0 & -\frac{\sqrt{165}}{660} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{110}i}{220} & 0 & 0 & \frac{\sqrt{165}i}{660} & 0 & \frac{\sqrt{165}}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{110}i}{220} & 0 & 0 & -\frac{\sqrt{165}}{660} & 0 & -\frac{\sqrt{165}i}{660} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{110}i}{220} & \frac{\sqrt{165}}{660} & 0 & -\frac{\sqrt{165}i}{660} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{165}i}{330} & 0 & -\frac{\sqrt{165}}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{165}i}{330} & 0 & \frac{\sqrt{165}}{330} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}$
896	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_g,7)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{462}}{1848} & -\frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{110} & 0 & \frac{3\sqrt{770}}{440} & \frac{\sqrt{1155}i}{165} & 0 \\ 0 & 0 & \frac{\sqrt{462}}{1848} & 0 & 0 & \frac{\sqrt{77}i}{308} & 0 & 0 & \frac{\sqrt{770}i}{110} & 0 & -\frac{3\sqrt{770}}{440} & 0 & 0 & -\frac{\sqrt{1155}i}{165} \\ 0 & \frac{\sqrt{462}}{1848} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{308} & 0 & 0 & \frac{3\sqrt{770}}{440} & 0 & -\frac{\sqrt{770}i}{220} & 0 & 0 \\ -\frac{\sqrt{462}}{1848} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{308} & -\frac{3\sqrt{770}}{440} & 0 & -\frac{\sqrt{770}i}{220} & 0 & 0 & 0 \\ \frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{462} & \frac{23\sqrt{1155}i}{4620} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{220} \\ 0 & -\frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{462} & 0 & 0 & -\frac{23\sqrt{1155}i}{4620} & 0 & 0 & -\frac{\sqrt{770}i}{220} & 0 \\ 0 & 0 & \frac{\sqrt{77}i}{308} & 0 & 0 & -\frac{\sqrt{462}}{462} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{924} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{77}i}{308} & \frac{\sqrt{462}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{924} & 0 & 0 \\ 0 & -\frac{\sqrt{770}i}{110} & 0 & -\frac{3\sqrt{770}}{440} & -\frac{23\sqrt{1155}i}{4620} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}}{1848} & -\frac{\sqrt{77}i}{154} & 0 \\ -\frac{\sqrt{770}i}{110} & 0 & \frac{3\sqrt{770}}{440} & 0 & 0 & \frac{23\sqrt{1155}i}{4620} & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{1848} & 0 & 0 & \frac{\sqrt{77}i}{154} \\ 0 & -\frac{3\sqrt{770}}{440} & 0 & \frac{\sqrt{770}i}{220} & 0 & 0 & \frac{\sqrt{1155}i}{924} & 0 & 0 & \frac{5\sqrt{462}}{1848} & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{770}}{440} & 0 & \frac{\sqrt{770}i}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{924} & -\frac{5\sqrt{462}}{1848} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{1155}i}{165} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{220} & 0 & 0 & \frac{\sqrt{77}i}{154} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{1155}i}{165} & 0 & 0 & \frac{\sqrt{770}i}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{154} & 0 & 0 & 0 & 0 \end{pmatrix}$
897	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_g,8)$	$\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{462}i}{1848} & 0 & 0 & -\frac{\sqrt{77}i}{308} & 0 & 0 & -\frac{\sqrt{770}}{220} & 0 & \frac{3\sqrt{770}i}{440} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{462}i}{1848} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{308} & \frac{\sqrt{770}}{220} & 0 & \frac{3\sqrt{770}i}{440} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{462}i}{1848} & 0 & 0 & \frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & \frac{3\sqrt{770}i}{440} & 0 & \frac{\sqrt{770}}{110} & \frac{\sqrt{1155}i}{165} & 0 \\ \frac{\sqrt{462}i}{1848} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{308} & 0 & 0 & \frac{3\sqrt{770}i}{440} & 0 & -\frac{\sqrt{770}}{110} & 0 & 0 & -\frac{\sqrt{1155}i}{165} \\ 0 & 0 & -\frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{462} & 0 & 0 & \frac{23\sqrt{1155}i}{4620} & 0 & 0 & -\frac{\sqrt{770}}{220} \\ 0 & 0 & 0 & \frac{\sqrt{77}i}{308} & 0 & 0 & \frac{\sqrt{462}i}{462} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{1155}i}{4620} & \frac{\sqrt{770}}{220} & 0 \\ \frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{462} & 0 & 0 & \frac{\sqrt{1155}i}{924} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{77}i}{308} & 0 & 0 & -\frac{\sqrt{462}i}{462} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{924} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{770}}{220} & 0 & -\frac{3\sqrt{770}i}{440} & 0 & 0 & -\frac{\sqrt{1155}i}{924} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}i}{1848} & 0 & 0 \\ -\frac{\sqrt{770}}{220} & 0 & -\frac{3\sqrt{770}i}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{924} & 0 & 0 & -\frac{5\sqrt{462}i}{1848} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{770}i}{440} & 0 & -\frac{\sqrt{770}}{110} & -\frac{23\sqrt{1155}i}{4620} & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}i}{1848} & 0 & 0 & \frac{\sqrt{77}i}{154} & 0 \\ -\frac{3\sqrt{770}i}{440} & 0 & \frac{\sqrt{770}}{110} & 0 & 0 & \frac{23\sqrt{1155}i}{4620} & 0 & 0 & \frac{5\sqrt{462}i}{1848} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{154} \\ 0 & 0 & -\frac{\sqrt{1155}i}{165} & 0 & 0 & \frac{\sqrt{770}}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{154} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{1155}i}{165} & -\frac{\sqrt{770}}{220} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{154} & 0 & 0 \end{bmatrix}$
898	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{Q}_4^{(1,1;a)}(A_g,9)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{308} & 0 & -\frac{\sqrt{77}}{308} & -\frac{\sqrt{770}i}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{165} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{308} & 0 & \frac{\sqrt{77}}{308} & 0 & 0 & \frac{\sqrt{770}i}{220} & 0 & 0 & \frac{\sqrt{1155}i}{165} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{308} & 0 & -\frac{\sqrt{77}i}{308} & 0 & 0 & -\frac{\sqrt{770}i}{220} & 0 & 0 & \frac{\sqrt{1155}}{165} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{308} & 0 & -\frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{220} & -\frac{\sqrt{1155}}{165} & 0 \\ 0 & \frac{\sqrt{77}i}{308} & 0 & -\frac{\sqrt{77}}{308} & 0 & 0 & 0 & 0 & 0 & \frac{23\sqrt{1155}i}{4620} & 0 & \frac{23\sqrt{1155}}{4620} & \frac{\sqrt{770}i}{110} & 0 \\ \frac{\sqrt{77}i}{308} & 0 & \frac{\sqrt{77}}{308} & 0 & 0 & 0 & 0 & 0 & \frac{23\sqrt{1155}i}{4620} & 0 & -\frac{23\sqrt{1155}}{4620} & 0 & 0 & -\frac{\sqrt{770}i}{110} \\ 0 & \frac{\sqrt{77}}{308} & 0 & \frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & -\frac{\sqrt{1155}i}{924} & 0 & 0 \\ -\frac{\sqrt{77}}{308} & 0 & \frac{\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{924} & 0 & -\frac{\sqrt{1155}i}{924} & 0 & 0 & 0 \\ \frac{\sqrt{770}i}{220} & 0 & 0 & 0 & 0 & -\frac{23\sqrt{1155}i}{4620} & 0 & -\frac{\sqrt{1155}}{924} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{154} \\ 0 & -\frac{\sqrt{770}i}{220} & 0 & 0 & -\frac{23\sqrt{1155}i}{4620} & 0 & \frac{\sqrt{1155}}{924} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}i}{154} & 0 \\ 0 & 0 & \frac{\sqrt{770}i}{220} & 0 & 0 & -\frac{23\sqrt{1155}}{4620} & 0 & \frac{\sqrt{1155}i}{924} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{154} \\ 0 & 0 & 0 & -\frac{\sqrt{770}i}{220} & \frac{23\sqrt{1155}}{4620} & 0 & \frac{\sqrt{1155}i}{924} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{154} & 0 \\ 0 & -\frac{\sqrt{1155}i}{165} & 0 & -\frac{\sqrt{1155}}{165} & -\frac{\sqrt{770}i}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}i}{154} & 0 & -\frac{\sqrt{77}}{154} & 0 & 0 \\ -\frac{\sqrt{1155}i}{165} & 0 & \frac{\sqrt{1155}}{165} & 0 & 0 & \frac{\sqrt{770}i}{110} & 0 & 0 & \frac{\sqrt{77}i}{154} & 0 & \frac{\sqrt{77}}{154} & 0 & 0 & 0 \end{bmatrix}$
899	symmetry	x

continued ...

Table 10

No.	multipole	matrix
900	symmetry	$\mathbb{G}_1^{(1,0;a)}(A_g,1)$ $\begin{pmatrix} 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & -\frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 \end{pmatrix}$ y

continued ...

Table 10

No.	multipole	matrix
901	symmetry	z

$\mathbb{G}_1^{(1,0;a)}(A_g,2)$

$$\begin{pmatrix}
0 & 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
-\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\
0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 \\
-\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 \\
0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 \\
0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0
\end{pmatrix}$$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_1^{(1,0;a)}(A_g,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 \\ -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 \\ -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{28} & 0 & 0 & 0 \end{pmatrix}$
902	symmetry	$\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{6}}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{6} & -\frac{\sqrt{6}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{10}}{24} & -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 \\ 0 & \frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 \\ -\frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & -\frac{i}{6} & 0 \\ -\frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & \frac{i}{6} \\ 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} \\ 0 & 0 & 0 & -\frac{i}{6} & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 \\ -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} \\ 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 \\ 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{6} & \frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 \end{pmatrix}$
903	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,2)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{1}{8} & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & \frac{\sqrt{10}i}{16} & 0 \\ 0 & 0 & \frac{1}{8} & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{10}i}{16} \\ 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 \\ -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & \frac{\sqrt{15}}{24} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{24} & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & \frac{\sqrt{6}i}{48} & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & -\frac{\sqrt{6}i}{48} \\ 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 \end{pmatrix}$
904	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,3)$	$\begin{pmatrix} 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 \\ 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 \\ 0 & -\frac{i}{8} & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} \\ 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 \\ -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} \\ 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 \\ -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} \\ 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 \end{pmatrix}$
905	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,4)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{pmatrix}$
906	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,5)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{24} & -\frac{\sqrt{6}i}{16} & 0 \\ 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{24} & 0 & 0 & \frac{\sqrt{6}i}{16} \\ 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & -\frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 \\ -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{48} & \frac{1}{24} & 0 & -\frac{i}{6} & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{i}{6} \\ 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{i}{6} & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{1}{24} \\ 0 & 0 & 0 & -\frac{\sqrt{10}i}{48} & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & \frac{1}{24} & 0 \\ 0 & \frac{i}{6} & 0 & \frac{1}{24} & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & \frac{\sqrt{10}i}{48} & 0 \\ \frac{i}{6} & 0 & -\frac{1}{24} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{10}i}{48} \\ 0 & -\frac{1}{24} & 0 & \frac{i}{6} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 \\ \frac{1}{24} & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{24} & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{i}{6} & 0 & -\frac{1}{24} & 0 & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 \end{pmatrix}$
907	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,6)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{48} & \frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & \frac{i}{24} & 0 & -\frac{1}{6} & -\frac{\sqrt{6}i}{16} & 0 \\ \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & \frac{i}{24} & 0 & \frac{1}{6} & 0 & 0 & \frac{\sqrt{6}i}{16} \\ 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{1}{6} \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & \frac{1}{6} & 0 \\ \frac{\sqrt{10}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{i}{24} \\ 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & \frac{i}{24} & 0 \\ 0 & \frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 \\ -\frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 \\ 0 & \frac{i}{24} & 0 & \frac{1}{6} & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 \\ \frac{i}{24} & 0 & -\frac{1}{6} & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{48} \\ 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 & \frac{\sqrt{10}i}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & -\frac{1}{6} & 0 & -\frac{i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{48} & 0 & 0 \end{pmatrix}$
908	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_3^{(1,0;a)}(A_g,7)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{10}}{24} & -\frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{6}}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{24} & 0 & -\frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & \frac{i}{6} & \frac{\sqrt{6}}{24} & 0 \\ 0 & \frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & -\frac{i}{6} & 0 \\ \frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & \frac{i}{6} \\ 0 & \frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 \\ -\frac{\sqrt{10}}{24} & 0 & \frac{\sqrt{10}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 \\ \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} \\ 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{24} & 0 \\ 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{24} \\ 0 & 0 & 0 & -\frac{i}{6} & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{24} & 0 \\ 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & \frac{i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & \frac{\sqrt{10}}{24} & 0 & 0 \\ \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & -\frac{i}{6} & 0 & 0 & -\frac{\sqrt{10}i}{24} & 0 & -\frac{\sqrt{10}}{24} & 0 & 0 & 0 \end{pmatrix}$
909	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_g,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{10}}{20} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & -\frac{\sqrt{10}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 \\ -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & \frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}}{20} & 0 & -\frac{\sqrt{10}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
910	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_g,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{24} & 0 & \frac{\sqrt{2}i}{24} & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & \frac{\sqrt{30}}{30} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{24} & 0 & \frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & -\frac{\sqrt{30}}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{24} & 0 & -\frac{\sqrt{2}}{24} & -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{30} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{24} & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & -\frac{\sqrt{30}i}{30} & 0 \\ 0 & \frac{\sqrt{2}}{24} & 0 & \frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ -\frac{\sqrt{2}}{24} & 0 & \frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{24} & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & \frac{\sqrt{5}i}{15} & 0 \\ -\frac{\sqrt{2}i}{24} & 0 & -\frac{\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & -\frac{\sqrt{5}i}{15} \\ 0 & 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & \frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{120} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 \\ -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & -\frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} \\ 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 \\ 0 & -\frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 \\ \frac{\sqrt{30}}{30} & 0 & \frac{\sqrt{30}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{15} & -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 \end{pmatrix}$
911	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_g,3)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{35}}{224} & -\frac{11\sqrt{210}i}{672} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{96} & \frac{\sqrt{14}i}{32} & 0 \\ 0 & 0 & \frac{\sqrt{35}}{224} & 0 & 0 & \frac{11\sqrt{210}i}{672} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{96} & 0 & 0 & -\frac{\sqrt{14}i}{32} \\ 0 & \frac{\sqrt{35}}{224} & 0 & 0 & 0 & 0 & \frac{5\sqrt{210}i}{336} & 0 & 0 & -\frac{5\sqrt{21}}{96} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{224} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{210}i}{336} & \frac{5\sqrt{21}}{96} & 0 & 0 & 0 & 0 & 0 \\ \frac{11\sqrt{210}i}{672} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{56} & \frac{5\sqrt{14}i}{224} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{11\sqrt{210}i}{672} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & -\frac{5\sqrt{14}i}{224} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 & \frac{\sqrt{21}}{24} \\ 0 & 0 & 0 & \frac{5\sqrt{210}i}{336} & \frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{112} & -\frac{\sqrt{21}}{24} & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{21}}{96} & -\frac{5\sqrt{14}i}{224} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}}{224} & -\frac{\sqrt{210}i}{672} & 0 \\ 0 & 0 & -\frac{5\sqrt{21}}{96} & 0 & 0 & \frac{5\sqrt{14}i}{224} & 0 & 0 & 0 & 0 & \frac{5\sqrt{35}}{224} & 0 & 0 & \frac{\sqrt{210}i}{672} \\ 0 & \frac{\sqrt{21}}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{112} & 0 & 0 & \frac{5\sqrt{35}}{224} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{21}}{96} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{112} & -\frac{5\sqrt{35}}{224} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{14}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{24} & \frac{\sqrt{210}i}{672} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{14}i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{24} & 0 & 0 & -\frac{\sqrt{210}i}{672} & 0 & 0 & 0 & 0 \end{pmatrix}$
912	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{35}i}{224} & 0 & 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}i}{96} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{35}i}{224} & 0 & 0 & 0 & 0 & \frac{5\sqrt{210}i}{336} & 0 & 0 & \frac{5\sqrt{21}i}{96} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{224} & 0 & 0 & -\frac{11\sqrt{210}i}{672} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{96} & 0 & 0 & -\frac{\sqrt{14}i}{32} & 0 \\ -\frac{\sqrt{35}i}{224} & 0 & 0 & 0 & 0 & \frac{11\sqrt{210}i}{672} & 0 & 0 & \frac{\sqrt{21}i}{96} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{32} \\ 0 & 0 & \frac{11\sqrt{210}i}{672} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{5\sqrt{14}i}{224} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{11\sqrt{210}i}{672} & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{224} & 0 & 0 \\ \frac{5\sqrt{210}i}{336} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{24} \\ 0 & -\frac{5\sqrt{210}i}{336} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{112} & 0 & 0 & \frac{\sqrt{21}i}{24} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{96} & 0 & 0 & \frac{\sqrt{14}i}{112} & 0 & 0 & 0 & 0 & \frac{5\sqrt{35}i}{224} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{96} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{112} & 0 & 0 & \frac{5\sqrt{35}i}{224} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{21}i}{96} & 0 & 0 & \frac{5\sqrt{14}i}{224} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}i}{224} & 0 & 0 & -\frac{\sqrt{210}i}{672} & 0 \\ -\frac{5\sqrt{21}i}{96} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{224} & 0 & 0 & -\frac{5\sqrt{35}i}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{672} \\ 0 & 0 & \frac{\sqrt{14}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{24} & 0 & 0 & \frac{\sqrt{210}i}{672} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{32} & 0 & 0 & -\frac{\sqrt{21}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{672} & 0 & 0 \end{bmatrix}$
913	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_g,5)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 \\ -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}i}{56} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 \\ -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & -\frac{3\sqrt{14}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & \frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{14}i}{56} & 0 & -\frac{3\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{84} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{14}}{56} & 0 & \frac{3\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{84} & 0 & \frac{\sqrt{210}}{84} & 0 & 0 & 0 \end{pmatrix}$
914	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_g,6)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{1}{32} & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{15}}{160} & -\frac{9\sqrt{10}i}{160} & 0 \\ 0 & 0 & \frac{1}{32} & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}}{160} & 0 & 0 & \frac{9\sqrt{10}i}{160} \\ 0 & \frac{1}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & 0 & 0 & \frac{13\sqrt{15}}{480} & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 \\ -\frac{1}{32} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{48} & -\frac{13\sqrt{15}}{480} & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & -\frac{3\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} \\ 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & \frac{3\sqrt{10}i}{160} & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}}{120} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & \frac{\sqrt{15}}{120} & 0 \\ 0 & 0 & 0 & -\frac{13\sqrt{15}}{480} & \frac{3\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5}{32} & -\frac{\sqrt{6}i}{96} & 0 \\ 0 & 0 & \frac{13\sqrt{15}}{480} & 0 & 0 & -\frac{3\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & \frac{5}{32} & 0 & 0 & \frac{\sqrt{6}i}{96} \\ 0 & -\frac{3\sqrt{15}}{160} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & \frac{5}{32} & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{15}}{160} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{80} & -\frac{5}{32} & 0 & 0 & 0 & 0 & 0 \\ \frac{9\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{120} & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{9\sqrt{10}i}{160} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & -\frac{\sqrt{15}}{120} & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 & 0 & 0 \end{pmatrix}$
915	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & \frac{i}{32} & 0 & 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & -\frac{13\sqrt{15}i}{480} & 0 & 0 \\ 0 & 0 & \frac{i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{48} & -\frac{\sqrt{15}}{15} & 0 & -\frac{13\sqrt{15}i}{480} & 0 & 0 & 0 \\ 0 & -\frac{i}{32} & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15}i}{160} & 0 & 0 & \frac{9\sqrt{10}i}{160} & 0 \\ -\frac{i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{3\sqrt{15}i}{160} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{10}i}{160} \\ 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{3\sqrt{10}i}{160} & 0 & 0 & -\frac{\sqrt{15}}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{32} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{160} & \frac{\sqrt{15}}{15} & 0 \\ \frac{\sqrt{6}i}{48} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{120} \\ 0 & -\frac{\sqrt{6}i}{48} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & -\frac{\sqrt{15}i}{120} & 0 \\ 0 & -\frac{\sqrt{15}}{15} & 0 & \frac{3\sqrt{15}i}{160} & 0 & 0 & -\frac{3\sqrt{10}i}{80} & 0 & 0 & 0 & 0 & \frac{5i}{32} & 0 & 0 \\ \frac{\sqrt{15}}{15} & 0 & \frac{3\sqrt{15}i}{160} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{80} & 0 & 0 & \frac{5i}{32} & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{15}i}{480} & 0 & 0 & -\frac{3\sqrt{10}i}{160} & 0 & 0 & 0 & 0 & -\frac{5i}{32} & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 \\ \frac{13\sqrt{15}i}{480} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}i}{160} & 0 & 0 & -\frac{5i}{32} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{96} \\ 0 & 0 & -\frac{9\sqrt{10}i}{160} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{15}i}{120} & 0 & 0 & \frac{\sqrt{6}i}{96} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{9\sqrt{10}i}{160} & -\frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{96} & 0 & 0 \end{bmatrix}$
916	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_g,8)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{20} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{10}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{\sqrt{10}}{20} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{24} & 0 & -\frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & \frac{\sqrt{10}}{20} & 0 \\ 0 & -\frac{\sqrt{6}i}{24} & 0 & -\frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 \\ -\frac{\sqrt{6}i}{24} & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 \\ \frac{\sqrt{6}}{24} & 0 & \frac{\sqrt{6}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & -\frac{\sqrt{10}i}{40} & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & \frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & -\frac{\sqrt{10}i}{40} & 0 & -\frac{\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & -\frac{\sqrt{10}}{40} & 0 & \frac{\sqrt{10}i}{40} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{10}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
917	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_g,9)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{3}}{48} & \frac{7\sqrt{2}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & \frac{13\sqrt{5}}{240} & \frac{\sqrt{30}i}{80} & 0 \\ 0 & 0 & \frac{\sqrt{3}}{48} & 0 & 0 & -\frac{7\sqrt{2}i}{48} & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & -\frac{13\sqrt{5}}{240} & 0 & 0 & -\frac{\sqrt{30}i}{80} \\ 0 & \frac{\sqrt{3}}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & -\frac{7\sqrt{5}}{240} & 0 & \frac{\sqrt{5}i}{30} & 0 & 0 \\ -\frac{\sqrt{3}}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} & \frac{7\sqrt{5}}{240} & 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & 0 \\ -\frac{7\sqrt{2}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & \frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{30} \\ 0 & \frac{7\sqrt{2}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & -\frac{\sqrt{30}i}{80} & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{6} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{6} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{12} & 0 \\ 0 & \frac{\sqrt{5}i}{15} & 0 & \frac{7\sqrt{5}}{240} & -\frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}}{48} & -\frac{\sqrt{2}i}{48} & 0 \\ \frac{\sqrt{5}i}{15} & 0 & -\frac{7\sqrt{5}}{240} & 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}}{48} & 0 & 0 & \frac{\sqrt{2}i}{48} \\ 0 & -\frac{13\sqrt{5}}{240} & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}}{48} & 0 & 0 & 0 & 0 \\ \frac{13\sqrt{5}}{240} & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}}{48} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & -\frac{\sqrt{5}}{12} & \frac{\sqrt{2}i}{48} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & \frac{\sqrt{5}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{48} & 0 & 0 & 0 & 0 \end{pmatrix}$
918	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_g,10)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{\sqrt{3}i}{48} & 0 & 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & \frac{\sqrt{5}}{30} & 0 & -\frac{7\sqrt{5}i}{240} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{6} & -\frac{\sqrt{5}}{30} & 0 & -\frac{7\sqrt{5}i}{240} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{48} & 0 & 0 & -\frac{7\sqrt{2}i}{48} & 0 & 0 & 0 & 0 & \frac{13\sqrt{5}i}{240} & 0 & -\frac{\sqrt{5}}{15} & \frac{\sqrt{30}i}{80} & 0 \\ \frac{\sqrt{3}i}{48} & 0 & 0 & 0 & 0 & \frac{7\sqrt{2}i}{48} & 0 & 0 & \frac{13\sqrt{5}i}{240} & 0 & \frac{\sqrt{5}}{15} & 0 & 0 & -\frac{\sqrt{30}i}{80} \\ 0 & 0 & \frac{7\sqrt{2}i}{48} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & \frac{\sqrt{5}}{30} \\ 0 & 0 & 0 & -\frac{7\sqrt{2}i}{48} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{80} & -\frac{\sqrt{5}}{30} & 0 \\ \frac{\sqrt{2}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{12} \\ 0 & -\frac{\sqrt{2}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{12} & 0 \\ 0 & -\frac{\sqrt{5}}{30} & 0 & -\frac{13\sqrt{5}i}{240} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}i}{48} & 0 & 0 \\ \frac{\sqrt{5}}{30} & 0 & -\frac{13\sqrt{5}i}{240} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{3}i}{48} & 0 & 0 & 0 \\ 0 & \frac{7\sqrt{5}i}{240} & 0 & \frac{\sqrt{5}}{15} & -\frac{\sqrt{30}i}{80} & 0 & 0 & 0 & 0 & \frac{5\sqrt{3}i}{48} & 0 & 0 & \frac{\sqrt{2}i}{48} & 0 \\ \frac{7\sqrt{5}i}{240} & 0 & -\frac{\sqrt{5}}{15} & 0 & 0 & \frac{\sqrt{30}i}{80} & 0 & 0 & \frac{5\sqrt{3}i}{48} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{48} \\ 0 & 0 & -\frac{\sqrt{30}i}{80} & 0 & 0 & -\frac{\sqrt{5}}{30} & 0 & \frac{\sqrt{5}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{48} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{80} & \frac{\sqrt{5}}{30} & 0 & \frac{\sqrt{5}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{48} & 0 & 0 \end{pmatrix}$
919	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{G}_5^{(1,0;a)}(A_g,11)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{24} & 0 & \frac{\sqrt{2}}{24} & \frac{\sqrt{5}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{30} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{24} & 0 & -\frac{\sqrt{2}}{24} & 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & \frac{\sqrt{30}i}{30} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{24} & 0 & \frac{\sqrt{2}i}{24} & 0 & 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & \frac{\sqrt{30}}{30} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{24} & 0 & \frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{30} & -\frac{\sqrt{30}}{30} & 0 \\ 0 & -\frac{\sqrt{2}i}{24} & 0 & \frac{\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{120} & -\frac{\sqrt{5}i}{15} & 0 \\ -\frac{\sqrt{2}i}{24} & 0 & -\frac{\sqrt{2}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{120} & 0 & 0 & \frac{\sqrt{5}i}{15} \\ 0 & -\frac{\sqrt{2}}{24} & 0 & -\frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ \frac{\sqrt{2}}{24} & 0 & -\frac{\sqrt{2}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{24} & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & -\frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} \\ 0 & \frac{\sqrt{5}i}{30} & 0 & 0 & \frac{\sqrt{30}i}{120} & 0 & \frac{\sqrt{30}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{30} & 0 & 0 & \frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{30} & -\frac{\sqrt{30}}{120} & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} & 0 \\ 0 & -\frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{30} & \frac{\sqrt{5}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 \\ -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{5}i}{15} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 \end{pmatrix}$
920	symmetry	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_g,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{168} & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{42}i}{168} & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 \\ -\frac{5\sqrt{42}i}{168} & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{42}}{168} & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 \\ -\frac{5\sqrt{42}}{168} & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 \end{pmatrix}$
921	symmetry	$\frac{\sqrt{3}(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_g,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 \\ \frac{5\sqrt{14}i}{168} & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & \frac{\sqrt{35}}{21} & 0 \\ -\frac{5\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{35}}{21} \\ 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{14}i}{84} \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{42} & \frac{\sqrt{210}i}{168} & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & \frac{\sqrt{14}i}{84} & 0 \\ -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} \\ 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & \frac{\sqrt{14}}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{21} & 0 & 0 & -\frac{\sqrt{14}i}{84} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{21} & \frac{\sqrt{14}i}{84} & 0 & \frac{\sqrt{14}}{84} & 0 & 0 & 0 \end{pmatrix}$
922	symmetry	$\sqrt{3}yz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_g,3)$	$\begin{pmatrix} 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 \\ \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & \frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & \frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 \\ \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} \\ 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 \\ 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{42} & 0 \\ 0 & \frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{84} & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{42} & \frac{\sqrt{14}}{84} & 0 \\ \frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{5\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{84} \\ 0 & \frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 \\ -\frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & -\frac{\sqrt{35}i}{42} & \frac{\sqrt{14}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{21} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & \frac{\sqrt{35}i}{42} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 \end{pmatrix}$
923	symmetry	$\sqrt{3}xz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_g,4)$	$\begin{pmatrix} 0 & \frac{5\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 \\ -\frac{5\sqrt{21}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & \frac{\sqrt{35}i}{84} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{21}i}{84} & -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{21}i}{84} & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ 0 & 0 & 0 & \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & \frac{\sqrt{35}i}{42} & 0 \\ \frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \\ 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 \\ 0 & -\frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 \\ \frac{\sqrt{35}i}{84} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{168} & \frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{84} & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & -\frac{5\sqrt{21}i}{84} & -\frac{\sqrt{14}}{84} & 0 \\ \frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & \frac{5\sqrt{21}i}{84} & 0 & 0 & \frac{\sqrt{14}}{84} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & 0 & -\frac{\sqrt{21}i}{21} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{84} & \frac{\sqrt{21}i}{21} & 0 \end{pmatrix}$
924	symmetry	$\sqrt{3}xy$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_2^{(1,0;a)}(A_g,5)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{14}i}{168} & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{14}i}{168} & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & 0 & 0 \\ 0 & -\frac{5\sqrt{14}}{168} & 0 & -\frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & -\frac{\sqrt{35}}{21} & 0 \\ -\frac{5\sqrt{14}}{168} & 0 & \frac{5\sqrt{14}i}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & 0 & 0 & \frac{\sqrt{35}}{21} \\ 0 & \frac{5\sqrt{14}i}{168} & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 \\ -\frac{5\sqrt{14}i}{168} & 0 & -\frac{5\sqrt{14}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 \\ -\frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & -\frac{\sqrt{210}i}{168} & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} \\ 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & \frac{\sqrt{210}i}{168} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & -\frac{\sqrt{14}i}{84} \\ 0 & 0 & 0 & \frac{\sqrt{35}}{42} & -\frac{\sqrt{210}i}{168} & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} & \frac{\sqrt{14}i}{84} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{21} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & -\frac{\sqrt{14}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{21} & 0 & 0 & -\frac{\sqrt{14}}{84} & 0 & \frac{\sqrt{14}i}{84} & 0 & 0 & 0 \end{pmatrix}$
925	symmetry	$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{88} & 0 & \frac{\sqrt{110}}{88} & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & \frac{\sqrt{66}i}{88} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{88} & 0 & \frac{\sqrt{110}}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{22} & -\frac{\sqrt{66}i}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{88} & 0 & -\frac{\sqrt{110}i}{88} & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{88} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{88} & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & -\frac{\sqrt{66}}{88} & 0 \\ 0 & -\frac{\sqrt{110}i}{88} & 0 & -\frac{\sqrt{110}}{88} & 0 & 0 & -\frac{\sqrt{165}}{66} & 0 & 0 & \frac{\sqrt{66}i}{88} & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 \\ \frac{\sqrt{110}i}{88} & 0 & -\frac{\sqrt{110}}{88} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{66} & -\frac{\sqrt{66}i}{88} & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{110}}{88} & 0 & -\frac{\sqrt{110}i}{88} & -\frac{\sqrt{165}}{66} & 0 & 0 & 0 & 0 & \frac{5\sqrt{66}}{264} & 0 & \frac{5\sqrt{66}i}{264} & 0 & 0 \\ \frac{\sqrt{110}}{88} & 0 & \frac{\sqrt{110}i}{88} & 0 & 0 & \frac{\sqrt{165}}{66} & 0 & 0 & \frac{5\sqrt{66}}{264} & 0 & -\frac{5\sqrt{66}i}{264} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & \frac{\sqrt{66}i}{88} & 0 & \frac{5\sqrt{66}}{264} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{88} \\ 0 & 0 & 0 & -\frac{\sqrt{11}}{22} & -\frac{\sqrt{66}i}{88} & 0 & \frac{5\sqrt{66}}{264} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{88} & 0 \\ \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{88} & 0 & \frac{5\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{88} \\ 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & -\frac{\sqrt{66}}{88} & 0 & -\frac{5\sqrt{66}i}{264} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{88} & 0 \\ 0 & \frac{\sqrt{66}i}{88} & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{110}i}{88} & 0 & \frac{\sqrt{110}}{88} & 0 & 0 \\ -\frac{\sqrt{66}i}{88} & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}i}{88} & 0 & \frac{\sqrt{110}}{88} & 0 & 0 & 0 \end{bmatrix}$
926	symmetry	$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{154}i}{616} & 0 & \frac{5\sqrt{154}}{616} & 0 & 0 & -\frac{\sqrt{385}}{110} & 0 & 0 & -\frac{\sqrt{2310}i}{440} \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{154}i}{616} & 0 & \frac{5\sqrt{154}}{616} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{110} & \frac{\sqrt{2310}i}{440} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{154}}{616} & 0 & -\frac{5\sqrt{154}i}{616} & -\frac{\sqrt{385}}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{440} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{154}}{616} & 0 & \frac{5\sqrt{154}i}{616} & 0 & 0 & \frac{\sqrt{385}}{110} & 0 & 0 & \frac{\sqrt{2310}}{440} & 0 \\ 0 & -\frac{5\sqrt{154}i}{616} & 0 & -\frac{5\sqrt{154}}{616} & 0 & 0 & \frac{\sqrt{231}}{66} & 0 & 0 & \frac{9\sqrt{2310}i}{3080} & 0 & -\frac{9\sqrt{2310}}{3080} & 0 & 0 \\ \frac{5\sqrt{154}i}{616} & 0 & -\frac{5\sqrt{154}}{616} & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{66} & -\frac{9\sqrt{2310}i}{3080} & 0 & -\frac{9\sqrt{2310}}{3080} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{154}}{616} & 0 & -\frac{5\sqrt{154}i}{616} & \frac{\sqrt{231}}{66} & 0 & 0 & 0 & 0 & \frac{13\sqrt{2310}}{9240} & 0 & \frac{13\sqrt{2310}i}{9240} & 0 & 0 \\ \frac{5\sqrt{154}}{616} & 0 & \frac{5\sqrt{154}i}{616} & 0 & 0 & -\frac{\sqrt{231}}{66} & 0 & 0 & \frac{13\sqrt{2310}}{9240} & 0 & -\frac{13\sqrt{2310}i}{9240} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{385}}{110} & 0 & 0 & \frac{9\sqrt{2310}i}{3080} & 0 & \frac{13\sqrt{2310}}{9240} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}i}{616} \\ 0 & 0 & 0 & \frac{\sqrt{385}}{110} & -\frac{9\sqrt{2310}i}{3080} & 0 & \frac{13\sqrt{2310}}{9240} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{154}i}{616} & 0 \\ -\frac{\sqrt{385}}{110} & 0 & 0 & 0 & 0 & -\frac{9\sqrt{2310}}{3080} & 0 & \frac{13\sqrt{2310}i}{9240} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}}{616} \\ 0 & \frac{\sqrt{385}}{110} & 0 & 0 & -\frac{9\sqrt{2310}}{3080} & 0 & -\frac{13\sqrt{2310}i}{9240} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}}{616} & 0 \\ 0 & -\frac{\sqrt{2310}i}{440} & 0 & \frac{\sqrt{2310}}{440} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}i}{616} & 0 & \frac{5\sqrt{154}}{616} & 0 & 0 \\ \frac{\sqrt{2310}i}{440} & 0 & \frac{\sqrt{2310}}{440} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{154}i}{616} & 0 & \frac{5\sqrt{154}}{616} & 0 & 0 & 0 \end{pmatrix}$
927	symmetry	$\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{462}i}{616} & 0 & -\frac{3\sqrt{462}}{616} & 0 & 0 & -\frac{3\sqrt{1155}}{770} & 0 & 0 & \frac{3\sqrt{770}i}{440} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{462}i}{616} & 0 & -\frac{3\sqrt{462}}{616} & 0 & 0 & 0 & 0 & \frac{3\sqrt{1155}}{770} & -\frac{3\sqrt{770}i}{440} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{462}}{616} & 0 & -\frac{3\sqrt{462}i}{616} & \frac{3\sqrt{1155}}{770} & 0 & 0 & 0 & 0 & \frac{3\sqrt{770}}{440} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{462}}{616} & 0 & \frac{3\sqrt{462}i}{616} & 0 & 0 & -\frac{3\sqrt{1155}}{770} & 0 & 0 & \frac{3\sqrt{770}}{440} & 0 \\ 0 & -\frac{3\sqrt{462}i}{616} & 0 & \frac{3\sqrt{462}}{616} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{616} & 0 & \frac{\sqrt{770}}{616} & 0 & 0 \\ \frac{3\sqrt{462}i}{616} & 0 & \frac{3\sqrt{462}}{616} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{616} & 0 & \frac{\sqrt{770}}{616} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{462}}{616} & 0 & -\frac{3\sqrt{462}i}{616} & 0 & 0 & 0 & 0 & 0 & -\frac{19\sqrt{770}}{3080} & 0 & \frac{19\sqrt{770}i}{3080} & -\frac{\sqrt{1155}}{770} & 0 \\ -\frac{3\sqrt{462}}{616} & 0 & \frac{3\sqrt{462}i}{616} & 0 & 0 & 0 & 0 & 0 & -\frac{19\sqrt{770}}{3080} & 0 & -\frac{19\sqrt{770}i}{3080} & 0 & 0 & \frac{\sqrt{1155}}{770} \\ 0 & 0 & \frac{3\sqrt{1155}}{770} & 0 & 0 & \frac{\sqrt{770}i}{616} & 0 & -\frac{19\sqrt{770}}{3080} & 0 & 0 & \frac{\sqrt{77}}{77} & 0 & 0 & \frac{3\sqrt{462}i}{616} \\ 0 & 0 & 0 & -\frac{3\sqrt{1155}}{770} & -\frac{\sqrt{770}i}{616} & 0 & -\frac{19\sqrt{770}}{3080} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{77} & -\frac{3\sqrt{462}i}{616} & 0 \\ -\frac{3\sqrt{1155}}{770} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{616} & 0 & \frac{19\sqrt{770}i}{3080} & \frac{\sqrt{77}}{77} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{462}}{616} \\ 0 & \frac{3\sqrt{1155}}{770} & 0 & 0 & \frac{\sqrt{770}}{616} & 0 & -\frac{19\sqrt{770}i}{3080} & 0 & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & -\frac{3\sqrt{462}}{616} & 0 \\ 0 & \frac{3\sqrt{770}i}{440} & 0 & \frac{3\sqrt{770}}{440} & 0 & 0 & -\frac{\sqrt{1155}}{770} & 0 & 0 & \frac{3\sqrt{462}i}{616} & 0 & -\frac{3\sqrt{462}}{616} & 0 & 0 \\ -\frac{3\sqrt{770}i}{440} & 0 & \frac{3\sqrt{770}}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{770} & -\frac{3\sqrt{462}i}{616} & 0 & -\frac{3\sqrt{462}}{616} & 0 & 0 & 0 \end{pmatrix}$
928	symmetry	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,4)$	$\begin{pmatrix} 0 & \frac{3\sqrt{11}}{88} & 0 & 0 & \frac{\sqrt{66}}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{88} & 0 & \frac{\sqrt{165}i}{110} & \frac{9\sqrt{110}}{880} & 0 \\ \frac{3\sqrt{11}}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{176} & 0 & 0 & \frac{\sqrt{165}}{88} & 0 & -\frac{\sqrt{165}i}{110} & 0 & 0 & -\frac{9\sqrt{110}}{880} \\ 0 & 0 & 0 & \frac{3\sqrt{11}}{88} & 0 & 0 & \frac{\sqrt{66}}{176} & 0 & 0 & -\frac{\sqrt{165}i}{220} & 0 & \frac{7\sqrt{165}}{440} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{11}}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{176} & \frac{\sqrt{165}i}{220} & 0 & \frac{7\sqrt{165}}{440} & 0 & 0 & 0 \\ \frac{\sqrt{66}}{176} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{11}}{44} & 0 & -\frac{\sqrt{11}i}{88} & -\frac{7\sqrt{110}}{880} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{220} \\ 0 & -\frac{\sqrt{66}}{176} & 0 & 0 & -\frac{3\sqrt{11}}{44} & 0 & \frac{\sqrt{11}i}{88} & 0 & 0 & \frac{7\sqrt{110}}{880} & 0 & 0 & -\frac{\sqrt{165}}{220} & 0 \\ 0 & 0 & \frac{\sqrt{66}}{176} & 0 & 0 & -\frac{\sqrt{11}i}{88} & 0 & -\frac{\sqrt{11}}{11} & 0 & 0 & -\frac{\sqrt{110}}{880} & 0 & 0 & \frac{\sqrt{165}i}{440} \\ 0 & 0 & 0 & -\frac{\sqrt{66}}{176} & \frac{\sqrt{11}i}{88} & 0 & -\frac{\sqrt{11}}{11} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{880} & -\frac{\sqrt{165}i}{440} & 0 \\ 0 & \frac{\sqrt{165}}{88} & 0 & -\frac{\sqrt{165}i}{220} & -\frac{7\sqrt{110}}{880} & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{88} & 0 & -\frac{\sqrt{11}i}{44} & -\frac{\sqrt{66}}{176} & 0 \\ \frac{\sqrt{165}}{88} & 0 & \frac{\sqrt{165}i}{220} & 0 & 0 & \frac{7\sqrt{110}}{880} & 0 & 0 & \frac{5\sqrt{11}}{88} & 0 & \frac{\sqrt{11}i}{44} & 0 & 0 & \frac{\sqrt{66}}{176} \\ 0 & \frac{\sqrt{165}i}{110} & 0 & \frac{7\sqrt{165}}{440} & 0 & 0 & -\frac{\sqrt{110}}{880} & 0 & 0 & -\frac{\sqrt{11}i}{44} & 0 & -\frac{3\sqrt{11}}{88} & 0 & 0 \\ -\frac{\sqrt{165}i}{110} & 0 & \frac{7\sqrt{165}}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{880} & \frac{\sqrt{11}i}{44} & 0 & -\frac{3\sqrt{11}}{88} & 0 & 0 & 0 \\ \frac{9\sqrt{110}}{880} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{220} & 0 & \frac{\sqrt{165}i}{440} & -\frac{\sqrt{66}}{176} & 0 & 0 & 0 & 0 & \frac{3\sqrt{11}}{44} \\ 0 & -\frac{9\sqrt{110}}{880} & 0 & 0 & -\frac{\sqrt{165}}{220} & 0 & -\frac{\sqrt{165}i}{440} & 0 & 0 & \frac{\sqrt{66}}{176} & 0 & 0 & \frac{3\sqrt{11}}{44} & 0 \end{pmatrix}$
929	symmetry	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,5)$	$\begin{pmatrix} 0 & -\frac{3\sqrt{11}i}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{176} & 0 & 0 & \frac{7\sqrt{165}i}{440} & 0 & -\frac{\sqrt{165}}{220} & 0 & 0 \\ \frac{3\sqrt{11}i}{88} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{176} & -\frac{7\sqrt{165}i}{440} & 0 & -\frac{\sqrt{165}}{220} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{11}i}{88} & \frac{\sqrt{66}}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{110} & 0 & \frac{\sqrt{165}i}{88} & -\frac{9\sqrt{110}}{880} & 0 \\ 0 & 0 & \frac{3\sqrt{11}i}{88} & 0 & 0 & -\frac{\sqrt{66}}{176} & 0 & 0 & \frac{\sqrt{165}}{110} & 0 & -\frac{\sqrt{165}i}{88} & 0 & 0 & \frac{9\sqrt{110}}{880} \\ 0 & 0 & \frac{\sqrt{66}}{176} & 0 & 0 & \frac{3\sqrt{11}i}{44} & 0 & -\frac{\sqrt{11}}{88} & 0 & 0 & \frac{7\sqrt{110}}{880} & 0 & 0 & -\frac{\sqrt{165}i}{220} \\ 0 & 0 & 0 & -\frac{\sqrt{66}}{176} & -\frac{3\sqrt{11}i}{44} & 0 & -\frac{\sqrt{11}}{88} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{110}}{880} & \frac{\sqrt{165}i}{220} & 0 \\ -\frac{\sqrt{66}}{176} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{88} & 0 & \frac{\sqrt{11}i}{11} & -\frac{\sqrt{110}}{880} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{440} \\ 0 & \frac{\sqrt{66}}{176} & 0 & 0 & -\frac{\sqrt{11}}{88} & 0 & -\frac{\sqrt{11}i}{11} & 0 & 0 & \frac{\sqrt{110}}{880} & 0 & 0 & -\frac{\sqrt{165}}{440} & 0 \\ 0 & \frac{7\sqrt{165}i}{440} & 0 & \frac{\sqrt{165}}{110} & 0 & 0 & -\frac{\sqrt{110}}{880} & 0 & 0 & \frac{3\sqrt{11}i}{88} & 0 & \frac{\sqrt{11}}{44} & 0 & 0 \\ -\frac{7\sqrt{165}i}{440} & 0 & \frac{\sqrt{165}}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{880} & -\frac{3\sqrt{11}i}{88} & 0 & \frac{\sqrt{11}}{44} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{165}}{220} & 0 & \frac{\sqrt{165}i}{88} & \frac{7\sqrt{110}}{880} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{44} & 0 & -\frac{5\sqrt{11}i}{88} & -\frac{\sqrt{66}}{176} & 0 \\ -\frac{\sqrt{165}}{220} & 0 & -\frac{\sqrt{165}i}{88} & 0 & 0 & -\frac{7\sqrt{110}}{880} & 0 & 0 & \frac{\sqrt{11}}{44} & 0 & \frac{5\sqrt{11}i}{88} & 0 & 0 & \frac{\sqrt{66}}{176} \\ 0 & 0 & -\frac{9\sqrt{110}}{880} & 0 & 0 & -\frac{\sqrt{165}i}{220} & 0 & -\frac{\sqrt{165}}{440} & 0 & 0 & -\frac{\sqrt{66}}{176} & 0 & 0 & -\frac{3\sqrt{11}i}{44} \\ 0 & 0 & 0 & \frac{9\sqrt{110}}{880} & \frac{\sqrt{165}i}{220} & 0 & -\frac{\sqrt{165}}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{176} & \frac{3\sqrt{11}i}{44} & 0 \end{pmatrix}$
930	symmetry	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,6)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{55} & 0 & 0 & 0 & 0 & \frac{3\sqrt{110}}{220} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{55} & 0 & 0 & \frac{3\sqrt{110}}{220} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{55} & 0 & 0 & \frac{3\sqrt{110}i}{220} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{55} & -\frac{3\sqrt{110}i}{220} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{11} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{220} & 0 & -\frac{\sqrt{110}i}{220} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{11} & 0 & 0 & -\frac{\sqrt{110}}{220} & 0 & \frac{\sqrt{110}i}{220} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{11} & 0 & 0 & -\frac{\sqrt{110}i}{220} & 0 & \frac{\sqrt{110}}{220} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{11} & \frac{\sqrt{110}i}{220} & 0 & \frac{\sqrt{110}}{220} & 0 & 0 & 0 \\ -\frac{\sqrt{165}}{55} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{220} & 0 & -\frac{\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{165}}{55} & 0 & 0 & -\frac{\sqrt{110}}{220} & 0 & \frac{\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{165}}{55} & 0 & 0 & -\frac{\sqrt{110}i}{220} & 0 & \frac{\sqrt{110}}{220} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{165}}{55} & \frac{\sqrt{110}i}{220} & 0 & \frac{\sqrt{110}}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{110}}{220} & 0 & \frac{3\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{110}}{220} & 0 & -\frac{3\sqrt{110}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
931	symmetry	$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,7)$	$\begin{pmatrix} 0 & \frac{3\sqrt{77}}{616} & 0 & 0 & \frac{\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{3080} & 0 & \frac{\sqrt{1155}i}{385} & -\frac{9\sqrt{770}}{880} & 0 \\ \frac{3\sqrt{77}}{616} & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{1232} & 0 & 0 & \frac{\sqrt{1155}}{3080} & 0 & -\frac{\sqrt{1155}i}{385} & 0 & 0 & \frac{9\sqrt{770}}{880} \\ 0 & 0 & 0 & \frac{3\sqrt{77}}{616} & 0 & 0 & \frac{\sqrt{462}}{1232} & 0 & 0 & -\frac{\sqrt{1155}i}{140} & 0 & -\frac{13\sqrt{1155}}{3080} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{77}}{616} & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{1232} & \frac{\sqrt{1155}i}{140} & 0 & -\frac{13\sqrt{1155}}{3080} & 0 & 0 & 0 \\ \frac{\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{44} & 0 & \frac{\sqrt{77}i}{88} & \frac{17\sqrt{770}}{6160} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{1540} \\ 0 & -\frac{\sqrt{462}}{1232} & 0 & 0 & -\frac{\sqrt{77}}{44} & 0 & -\frac{\sqrt{77}i}{88} & 0 & 0 & -\frac{17\sqrt{770}}{6160} & 0 & 0 & \frac{\sqrt{1155}}{1540} & 0 \\ 0 & 0 & \frac{\sqrt{462}}{1232} & 0 & 0 & \frac{\sqrt{77}i}{88} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{\sqrt{1155}i}{616} \\ 0 & 0 & 0 & -\frac{\sqrt{462}}{1232} & -\frac{\sqrt{77}i}{88} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{770}}{1232} & -\frac{\sqrt{1155}i}{616} & 0 \\ 0 & \frac{\sqrt{1155}}{3080} & 0 & -\frac{\sqrt{1155}i}{140} & \frac{17\sqrt{770}}{6160} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}}{616} & 0 & -\frac{5\sqrt{77}i}{308} & -\frac{\sqrt{462}}{1232} & 0 \\ \frac{\sqrt{1155}}{3080} & 0 & \frac{\sqrt{1155}i}{140} & 0 & 0 & -\frac{17\sqrt{770}}{6160} & 0 & 0 & -\frac{3\sqrt{77}}{616} & 0 & \frac{5\sqrt{77}i}{308} & 0 & 0 & \frac{\sqrt{462}}{1232} \\ 0 & \frac{\sqrt{1155}i}{385} & 0 & -\frac{13\sqrt{1155}}{3080} & 0 & 0 & -\frac{5\sqrt{770}}{1232} & 0 & 0 & -\frac{5\sqrt{77}i}{308} & 0 & \frac{5\sqrt{77}}{616} & 0 & 0 \\ -\frac{\sqrt{1155}i}{385} & 0 & -\frac{13\sqrt{1155}}{3080} & 0 & 0 & 0 & 0 & \frac{5\sqrt{770}}{1232} & \frac{5\sqrt{77}i}{308} & 0 & \frac{5\sqrt{77}}{616} & 0 & 0 & 0 \\ -\frac{9\sqrt{770}}{880} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{1540} & 0 & \frac{\sqrt{1155}i}{616} & -\frac{\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{308} \\ 0 & \frac{9\sqrt{770}}{880} & 0 & 0 & \frac{\sqrt{1155}}{1540} & 0 & -\frac{\sqrt{1155}i}{616} & 0 & 0 & \frac{\sqrt{462}}{1232} & 0 & 0 & \frac{3\sqrt{77}}{308} & 0 \end{pmatrix}$
932	symmetry	$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_4^{(1,0;a)}(A_g,8)$	$\begin{pmatrix} 0 & \frac{3\sqrt{77}i}{616} & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{1232} & 0 & 0 & \frac{13\sqrt{1155}i}{3080} & 0 & \frac{\sqrt{1155}}{140} & 0 & 0 \\ -\frac{3\sqrt{77}i}{616} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{1232} & -\frac{13\sqrt{1155}i}{3080} & 0 & \frac{\sqrt{1155}}{140} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{77}i}{616} & -\frac{\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{385} & 0 & -\frac{\sqrt{1155}i}{3080} & -\frac{9\sqrt{770}}{880} & 0 \\ 0 & 0 & -\frac{3\sqrt{77}i}{616} & 0 & 0 & \frac{\sqrt{462}}{1232} & 0 & 0 & -\frac{\sqrt{1155}}{385} & 0 & \frac{\sqrt{1155}i}{3080} & 0 & 0 & \frac{9\sqrt{770}}{880} \\ 0 & 0 & -\frac{\sqrt{462}}{1232} & 0 & 0 & -\frac{\sqrt{77}i}{44} & 0 & -\frac{\sqrt{77}}{88} & 0 & 0 & \frac{17\sqrt{770}}{6160} & 0 & 0 & -\frac{\sqrt{1155}i}{1540} \\ 0 & 0 & 0 & \frac{\sqrt{462}}{1232} & \frac{\sqrt{77}i}{44} & 0 & -\frac{\sqrt{77}}{88} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{770}}{6160} & \frac{\sqrt{1155}i}{1540} & 0 \\ \frac{\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{88} & 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{616} \\ 0 & -\frac{\sqrt{462}}{1232} & 0 & 0 & -\frac{\sqrt{77}}{88} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{\sqrt{1155}}{616} & 0 \\ 0 & \frac{13\sqrt{1155}i}{3080} & 0 & -\frac{\sqrt{1155}}{385} & 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{5\sqrt{77}i}{616} & 0 & -\frac{5\sqrt{77}}{308} & 0 & 0 \\ -\frac{13\sqrt{1155}i}{3080} & 0 & -\frac{\sqrt{1155}}{385} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{770}}{1232} & -\frac{5\sqrt{77}i}{616} & 0 & -\frac{5\sqrt{77}}{308} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{1155}}{140} & 0 & -\frac{\sqrt{1155}i}{3080} & \frac{17\sqrt{770}}{6160} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{308} & 0 & -\frac{3\sqrt{77}i}{616} & \frac{\sqrt{462}}{1232} & 0 \\ \frac{\sqrt{1155}}{140} & 0 & \frac{\sqrt{1155}i}{3080} & 0 & 0 & -\frac{17\sqrt{770}}{6160} & 0 & 0 & -\frac{5\sqrt{77}}{308} & 0 & \frac{3\sqrt{77}i}{616} & 0 & 0 & -\frac{\sqrt{462}}{1232} \\ 0 & 0 & -\frac{9\sqrt{770}}{880} & 0 & 0 & -\frac{\sqrt{1155}i}{1540} & 0 & \frac{\sqrt{1155}}{616} & 0 & 0 & \frac{\sqrt{462}}{1232} & 0 & 0 & \frac{3\sqrt{77}i}{308} \\ 0 & 0 & 0 & \frac{9\sqrt{770}}{880} & \frac{\sqrt{1155}i}{1540} & 0 & \frac{\sqrt{1155}}{616} & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{1232} & -\frac{3\sqrt{77}i}{308} & 0 \end{pmatrix}$
933	symmetry	$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
934	symmetry	$\frac{\sqrt{2}\left(2x^6-15x^4y^2-15x^4z^2-15x^2y^4+180x^2y^2z^2-15x^2z^4+2y^6-15y^4z^2-15y^2z^4+2z^6\right)}{8}$

$\mathbb{T}_4^{(1,0;a)}(A_g,9)$

$$\begin{bmatrix}
0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{462}}{616} & 0 & -\frac{3\sqrt{462}i}{616} & \frac{3\sqrt{1155}}{770} & 0 & 0 & 0 & 0 & \frac{3\sqrt{770}}{440} \\
0 & 0 & 0 & 0 & \frac{3\sqrt{462}}{616} & 0 & \frac{3\sqrt{462}i}{616} & 0 & 0 & -\frac{3\sqrt{1155}}{770} & 0 & 0 & \frac{3\sqrt{770}}{440} & 0 \\
0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{462}i}{616} & 0 & \frac{3\sqrt{462}}{616} & 0 & 0 & \frac{3\sqrt{1155}}{770} & 0 & 0 & -\frac{3\sqrt{770}i}{440} \\
0 & 0 & 0 & 0 & -\frac{3\sqrt{462}i}{616} & 0 & \frac{3\sqrt{462}}{616} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{1155}}{770} & \frac{3\sqrt{770}i}{440} & 0 \\
0 & \frac{3\sqrt{462}}{616} & 0 & \frac{3\sqrt{462}i}{616} & 0 & 0 & 0 & 0 & 0 & -\frac{19\sqrt{770}}{3080} & 0 & \frac{19\sqrt{770}i}{3080} & -\frac{\sqrt{1155}}{770} & 0 \\
\frac{3\sqrt{462}}{616} & 0 & -\frac{3\sqrt{462}i}{616} & 0 & 0 & 0 & 0 & 0 & -\frac{19\sqrt{770}}{3080} & 0 & -\frac{19\sqrt{770}i}{3080} & 0 & 0 & \frac{\sqrt{1155}}{770} \\
0 & -\frac{3\sqrt{462}i}{616} & 0 & \frac{3\sqrt{462}}{616} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{616} & 0 & -\frac{\sqrt{770}}{616} & 0 & 0 \\
\frac{3\sqrt{462}i}{616} & 0 & \frac{3\sqrt{462}}{616} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{616} & 0 & -\frac{\sqrt{770}}{616} & 0 & 0 & 0 \\
\frac{3\sqrt{1155}}{770} & 0 & 0 & 0 & 0 & -\frac{19\sqrt{770}}{3080} & 0 & -\frac{\sqrt{770}i}{616} & \frac{\sqrt{77}}{77} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{462}}{616} \\
0 & -\frac{3\sqrt{1155}}{770} & 0 & 0 & -\frac{19\sqrt{770}}{3080} & 0 & \frac{\sqrt{770}i}{616} & 0 & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & -\frac{3\sqrt{462}}{616} & 0 \\
0 & 0 & \frac{3\sqrt{1155}}{770} & 0 & 0 & \frac{19\sqrt{770}i}{3080} & 0 & -\frac{\sqrt{770}}{616} & 0 & 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & -\frac{3\sqrt{462}i}{616} \\
0 & 0 & 0 & -\frac{3\sqrt{1155}}{770} & -\frac{19\sqrt{770}i}{3080} & 0 & -\frac{\sqrt{770}}{616} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{77} & \frac{3\sqrt{462}i}{616} & 0 \\
0 & \frac{3\sqrt{770}}{440} & 0 & -\frac{3\sqrt{770}i}{440} & -\frac{\sqrt{1155}}{770} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{462}}{616} & 0 & -\frac{3\sqrt{462}i}{616} & 0 & 0 \\
\frac{3\sqrt{770}}{440} & 0 & \frac{3\sqrt{770}i}{440} & 0 & 0 & \frac{\sqrt{1155}}{770} & 0 & 0 & -\frac{3\sqrt{462}}{616} & 0 & \frac{3\sqrt{462}i}{616} & 0 & 0 & 0
\end{bmatrix}$$

continued ...

Table 10

No.	multipole	matrix
935	$\mathbb{T}_6^{(1,0;a)}(A_g,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{264} & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 & \frac{\sqrt{330}}{132} & 0 & 0 & \frac{\sqrt{55}i}{88} \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{264} & 0 & -\frac{\sqrt{33}}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{132} & -\frac{\sqrt{55}i}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{264} & 0 & \frac{\sqrt{33}i}{44} & \frac{\sqrt{330}}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{88} \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}}{264} & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & -\frac{\sqrt{330}}{132} & 0 & 0 & -\frac{\sqrt{55}}{88} & 0 \\ 0 & -\frac{5\sqrt{33}i}{264} & 0 & -\frac{5\sqrt{33}}{264} & 0 & 0 & \frac{\sqrt{22}}{22} & 0 & 0 & \frac{\sqrt{55}i}{88} & 0 & -\frac{\sqrt{55}}{88} & 0 & 0 \\ \frac{5\sqrt{33}i}{264} & 0 & -\frac{5\sqrt{33}}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{22} & -\frac{\sqrt{55}i}{88} & 0 & -\frac{\sqrt{55}}{88} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{33}}{44} & 0 & \frac{\sqrt{33}i}{44} & \frac{\sqrt{22}}{22} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{44} & 0 & -\frac{\sqrt{55}i}{44} & 0 & 0 \\ -\frac{\sqrt{33}}{44} & 0 & -\frac{\sqrt{33}i}{44} & 0 & 0 & -\frac{\sqrt{22}}{22} & 0 & 0 & -\frac{\sqrt{55}}{44} & 0 & \frac{\sqrt{55}i}{44} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{330}}{132} & 0 & 0 & \frac{\sqrt{55}i}{88} & 0 & -\frac{\sqrt{55}}{44} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{264} \\ 0 & 0 & 0 & -\frac{\sqrt{330}}{132} & -\frac{\sqrt{55}i}{88} & 0 & -\frac{\sqrt{55}}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{264} & 0 \\ \frac{\sqrt{330}}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{88} & 0 & -\frac{\sqrt{55}i}{44} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{264} \\ 0 & -\frac{\sqrt{330}}{132} & 0 & 0 & -\frac{\sqrt{55}}{88} & 0 & \frac{\sqrt{55}i}{44} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{264} & 0 \\ 0 & \frac{\sqrt{55}i}{88} & 0 & -\frac{\sqrt{55}}{88} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}i}{264} & 0 & \frac{5\sqrt{33}}{264} & 0 & 0 \\ -\frac{\sqrt{55}i}{88} & 0 & -\frac{\sqrt{55}}{88} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{33}i}{264} & 0 & \frac{5\sqrt{33}}{264} & 0 & 0 & 0 \end{pmatrix}$
	symmetry	$-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$

continued ...

Table 10

No.	multipole	matrix
936	symmetry	$\mathbb{T}_6^{(1,0;a)}(A_g,2)$: $\begin{pmatrix} 0 & 0 & -\frac{\sqrt{210}}{56} & 0 & 0 & -\frac{\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{56} \\ 0 & 0 & 0 & \frac{\sqrt{210}}{56} & \frac{\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{168} & \frac{\sqrt{21}i}{56} & 0 \\ -\frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{168} & 0 & \frac{\sqrt{35}i}{84} & -\frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{56} \\ 0 & \frac{\sqrt{210}}{56} & 0 & 0 & \frac{\sqrt{35}}{168} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & \frac{\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}}{56} & 0 \\ 0 & -\frac{\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{168} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{24} & 0 & -\frac{\sqrt{21}}{24} & 0 & 0 \\ \frac{\sqrt{35}i}{168} & 0 & \frac{\sqrt{35}}{168} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{24} & 0 & -\frac{\sqrt{21}}{24} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & \frac{\sqrt{21}i}{84} & \frac{\sqrt{14}}{42} & 0 \\ \frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{84} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{14}}{42} \\ 0 & 0 & -\frac{\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}i}{24} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & \frac{\sqrt{210}}{168} & 0 & 0 & \frac{5\sqrt{35}i}{168} \\ 0 & 0 & 0 & \frac{\sqrt{14}}{168} & \frac{\sqrt{21}i}{24} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{168} & -\frac{5\sqrt{35}i}{168} & 0 \\ \frac{\sqrt{14}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{24} & 0 & \frac{\sqrt{21}i}{84} & \frac{\sqrt{210}}{168} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{35}}{168} \\ 0 & -\frac{\sqrt{14}}{168} & 0 & 0 & -\frac{\sqrt{21}}{24} & 0 & -\frac{\sqrt{21}i}{84} & 0 & 0 & -\frac{\sqrt{210}}{168} & 0 & 0 & -\frac{5\sqrt{35}}{168} & 0 \\ 0 & -\frac{\sqrt{21}i}{56} & 0 & -\frac{\sqrt{21}}{56} & 0 & 0 & \frac{\sqrt{14}}{42} & 0 & 0 & \frac{5\sqrt{35}i}{168} & 0 & -\frac{5\sqrt{35}}{168} & 0 & 0 \\ \frac{\sqrt{21}i}{56} & 0 & -\frac{\sqrt{21}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{42} & -\frac{5\sqrt{35}i}{168} & 0 & -\frac{5\sqrt{35}}{168} & 0 & 0 & 0 \end{pmatrix}$; $-\frac{\sqrt{14}\left(x^6-15x^4z^2+15x^2z^4+y^6-15y^4z^2+15y^2z^4-2z^6\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{231}i}{616} & 0 & \frac{\sqrt{231}}{924} & 0 & 0 & -\frac{\sqrt{2310}}{924} & 0 & 0 & -\frac{\sqrt{385}i}{616} \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{231}i}{616} & 0 & \frac{\sqrt{231}}{924} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{924} & \frac{\sqrt{385}i}{616} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{231}}{616} & 0 & -\frac{\sqrt{231}i}{924} & -\frac{\sqrt{2310}}{924} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{616} \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{231}}{616} & 0 & \frac{\sqrt{231}i}{924} & 0 & 0 & \frac{\sqrt{2310}}{924} & 0 & 0 & \frac{\sqrt{385}}{616} & 0 \\ 0 & \frac{3\sqrt{231}i}{616} & 0 & \frac{3\sqrt{231}}{616} & 0 & 0 & -\frac{\sqrt{154}}{154} & 0 & 0 & -\frac{5\sqrt{385}i}{616} & 0 & \frac{5\sqrt{385}}{616} & 0 & 0 \\ -\frac{3\sqrt{231}i}{616} & 0 & \frac{3\sqrt{231}}{616} & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{154} & \frac{5\sqrt{385}i}{616} & 0 & \frac{5\sqrt{385}}{616} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{231}}{924} & 0 & -\frac{\sqrt{231}i}{924} & -\frac{\sqrt{154}}{154} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{308} & 0 & -\frac{\sqrt{385}i}{308} & 0 & 0 \\ \frac{\sqrt{231}}{924} & 0 & \frac{\sqrt{231}i}{924} & 0 & 0 & \frac{\sqrt{154}}{154} & 0 & 0 & -\frac{\sqrt{385}}{308} & 0 & \frac{\sqrt{385}i}{308} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2310}}{924} & 0 & 0 & -\frac{5\sqrt{385}i}{616} & 0 & -\frac{\sqrt{385}}{308} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}i}{264} \\ 0 & 0 & 0 & \frac{\sqrt{2310}}{924} & \frac{5\sqrt{385}i}{616} & 0 & -\frac{\sqrt{385}}{308} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{231}i}{264} & 0 \\ -\frac{\sqrt{2310}}{924} & 0 & 0 & 0 & 0 & \frac{5\sqrt{385}}{616} & 0 & -\frac{\sqrt{385}i}{308} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}}{264} \\ 0 & \frac{\sqrt{2310}}{924} & 0 & 0 & \frac{5\sqrt{385}}{616} & 0 & \frac{\sqrt{385}i}{308} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}}{264} & 0 \\ 0 & -\frac{\sqrt{385}i}{616} & 0 & \frac{\sqrt{385}}{616} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}i}{264} & 0 & \frac{5\sqrt{231}}{264} & 0 & 0 \\ \frac{\sqrt{385}i}{616} & 0 & \frac{\sqrt{385}}{616} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{231}i}{264} & 0 & \frac{5\sqrt{231}}{264} & 0 & 0 & 0 \end{bmatrix}$
937	symmetry	$\frac{\sqrt{42}(x-y)(x+y)\left(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_g,4)$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{462}}{56} & 0 & 0 & -\frac{19\sqrt{77}i}{1848} & 0 & \frac{\sqrt{77}}{132} & 0 & 0 & -\frac{\sqrt{770}}{1848} & 0 & 0 & \frac{\sqrt{1155}i}{616} \\ 0 & 0 & 0 & \frac{\sqrt{462}}{56} & \frac{19\sqrt{77}i}{1848} & 0 & \frac{\sqrt{77}}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{1848} & -\frac{\sqrt{1155}i}{616} & 0 \\ -\frac{\sqrt{462}}{56} & 0 & 0 & 0 & 0 & \frac{19\sqrt{77}}{1848} & 0 & \frac{\sqrt{77}i}{132} & \frac{\sqrt{770}}{1848} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{616} \\ 0 & \frac{\sqrt{462}}{56} & 0 & 0 & \frac{19\sqrt{77}}{1848} & 0 & -\frac{\sqrt{77}i}{132} & 0 & 0 & -\frac{\sqrt{770}}{1848} & 0 & 0 & \frac{\sqrt{1155}}{616} & 0 \\ 0 & -\frac{19\sqrt{77}i}{1848} & 0 & \frac{19\sqrt{77}}{1848} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{264} & 0 & \frac{\sqrt{1155}}{264} & 0 & 0 \\ \frac{19\sqrt{77}i}{1848} & 0 & \frac{19\sqrt{77}}{1848} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{264} & 0 & \frac{\sqrt{1155}}{264} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}}{132} & 0 & \frac{\sqrt{77}i}{132} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & -\frac{\sqrt{1155}i}{924} & -\frac{\sqrt{770}}{462} & 0 \\ \frac{\sqrt{77}}{132} & 0 & -\frac{\sqrt{77}i}{132} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & \frac{\sqrt{1155}i}{924} & 0 & 0 & \frac{\sqrt{770}}{462} \\ 0 & 0 & \frac{\sqrt{770}}{1848} & 0 & 0 & \frac{\sqrt{1155}i}{264} & 0 & \frac{\sqrt{1155}}{924} & 0 & 0 & -\frac{5\sqrt{462}}{1848} & 0 & 0 & -\frac{25\sqrt{77}i}{1848} \\ 0 & 0 & 0 & -\frac{\sqrt{770}}{1848} & -\frac{\sqrt{1155}i}{264} & 0 & \frac{\sqrt{1155}}{924} & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{1848} & \frac{25\sqrt{77}i}{1848} & 0 \\ -\frac{\sqrt{770}}{1848} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{264} & 0 & -\frac{\sqrt{1155}i}{924} & -\frac{5\sqrt{462}}{1848} & 0 & 0 & 0 & 0 & \frac{25\sqrt{77}}{1848} \\ 0 & \frac{\sqrt{770}}{1848} & 0 & 0 & \frac{\sqrt{1155}}{264} & 0 & \frac{\sqrt{1155}i}{924} & 0 & 0 & \frac{5\sqrt{462}}{1848} & 0 & 0 & \frac{25\sqrt{77}}{1848} & 0 \\ 0 & \frac{\sqrt{1155}i}{616} & 0 & \frac{\sqrt{1155}}{616} & 0 & 0 & -\frac{\sqrt{770}}{462} & 0 & 0 & -\frac{25\sqrt{77}i}{1848} & 0 & \frac{25\sqrt{77}}{1848} & 0 & 0 \\ -\frac{\sqrt{1155}i}{616} & 0 & \frac{\sqrt{1155}}{616} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{462} & \frac{25\sqrt{77}i}{1848} & 0 & \frac{25\sqrt{77}}{1848} & 0 & 0 & 0 \end{pmatrix}$
938	symmetry	$\frac{3\sqrt{7}yz(y-z)(y+z)\left(10x^2-y^2-z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_g,5)$	$\begin{pmatrix} 0 & \frac{3\sqrt{77}}{308} & 0 & -\frac{\sqrt{77}i}{112} & -\frac{9\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{308} & 0 & \frac{\sqrt{1155}i}{1232} & -\frac{3\sqrt{770}}{1232} & 0 \\ \frac{3\sqrt{77}}{308} & 0 & \frac{\sqrt{77}i}{112} & 0 & 0 & \frac{9\sqrt{462}}{1232} & 0 & 0 & \frac{\sqrt{1155}}{308} & 0 & -\frac{\sqrt{1155}i}{1232} & 0 & 0 & \frac{3\sqrt{770}}{1232} \\ 0 & -\frac{\sqrt{77}i}{112} & 0 & -\frac{5\sqrt{77}}{616} & 0 & 0 & \frac{\sqrt{462}}{132} & 0 & 0 & -\frac{\sqrt{1155}i}{528} & 0 & -\frac{\sqrt{1155}}{264} & 0 & 0 \\ \frac{\sqrt{77}i}{112} & 0 & -\frac{5\sqrt{77}}{616} & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{132} & \frac{\sqrt{1155}i}{528} & 0 & -\frac{\sqrt{1155}}{264} & 0 & 0 & 0 \\ -\frac{9\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}}{308} & 0 & -\frac{\sqrt{77}i}{308} & -\frac{5\sqrt{770}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} \\ 0 & \frac{9\sqrt{462}}{1232} & 0 & 0 & \frac{5\sqrt{77}}{308} & 0 & \frac{\sqrt{77}i}{308} & 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 \\ 0 & 0 & \frac{\sqrt{462}}{132} & 0 & 0 & -\frac{\sqrt{77}i}{308} & 0 & -\frac{2\sqrt{77}}{77} & 0 & 0 & \frac{\sqrt{770}}{308} & 0 & 0 & \frac{5\sqrt{1155}i}{924} \\ 0 & 0 & 0 & -\frac{\sqrt{462}}{132} & \frac{\sqrt{77}i}{308} & 0 & -\frac{2\sqrt{77}}{77} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{308} & -\frac{5\sqrt{1155}i}{924} & 0 \\ 0 & \frac{\sqrt{1155}}{308} & 0 & -\frac{\sqrt{1155}i}{528} & -\frac{5\sqrt{770}}{1232} & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}}{308} & 0 & \frac{25\sqrt{77}i}{1232} & \frac{5\sqrt{462}}{3696} & 0 \\ \frac{\sqrt{1155}}{308} & 0 & \frac{\sqrt{1155}i}{528} & 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{5\sqrt{77}}{308} & 0 & -\frac{25\sqrt{77}i}{1232} & 0 & 0 & -\frac{5\sqrt{462}}{3696} \\ 0 & \frac{\sqrt{1155}i}{1232} & 0 & -\frac{\sqrt{1155}}{264} & 0 & 0 & \frac{\sqrt{770}}{308} & 0 & 0 & \frac{25\sqrt{77}i}{1232} & 0 & \frac{5\sqrt{77}}{616} & 0 & 0 \\ -\frac{\sqrt{1155}i}{1232} & 0 & -\frac{\sqrt{1155}}{264} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{308} & -\frac{25\sqrt{77}i}{1232} & 0 & \frac{5\sqrt{77}}{616} & 0 & 0 & 0 \\ -\frac{3\sqrt{770}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & \frac{5\sqrt{1155}i}{924} & \frac{5\sqrt{462}}{3696} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{308} \\ 0 & \frac{3\sqrt{770}}{1232} & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & -\frac{5\sqrt{1155}i}{924} & 0 & 0 & -\frac{5\sqrt{462}}{3696} & 0 & 0 & -\frac{5\sqrt{77}}{308} & 0 \end{pmatrix}$
939	symmetry	$\frac{3\sqrt{7}xz(x-z)(x+z)\left(x^2-10y^2+z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_g,6)$	$\begin{pmatrix} 0 & \frac{5\sqrt{77}i}{616} & 0 & \frac{\sqrt{77}}{112} & 0 & 0 & -\frac{\sqrt{462}}{132} & 0 & 0 & -\frac{\sqrt{1155}i}{264} & 0 & -\frac{\sqrt{1155}}{528} & 0 & 0 \\ -\frac{5\sqrt{77}i}{616} & 0 & \frac{\sqrt{77}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{132} & \frac{\sqrt{1155}i}{264} & 0 & -\frac{\sqrt{1155}}{528} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{77}}{112} & 0 & -\frac{3\sqrt{77}i}{308} & -\frac{9\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{1232} & 0 & \frac{\sqrt{1155}i}{308} & \frac{3\sqrt{770}}{1232} & 0 \\ \frac{\sqrt{77}}{112} & 0 & \frac{3\sqrt{77}i}{308} & 0 & 0 & \frac{9\sqrt{462}}{1232} & 0 & 0 & \frac{\sqrt{1155}}{1232} & 0 & -\frac{\sqrt{1155}i}{308} & 0 & 0 & -\frac{3\sqrt{770}}{1232} \\ 0 & 0 & -\frac{9\sqrt{462}}{1232} & 0 & 0 & -\frac{5\sqrt{77}i}{308} & 0 & -\frac{\sqrt{77}}{308} & 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{\sqrt{1155}i}{924} \\ 0 & 0 & 0 & \frac{9\sqrt{462}}{1232} & \frac{5\sqrt{77}i}{308} & 0 & -\frac{\sqrt{77}}{308} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{770}}{1232} & -\frac{\sqrt{1155}i}{924} & 0 \\ -\frac{\sqrt{462}}{132} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{308} & 0 & \frac{2\sqrt{77}i}{77} & \frac{\sqrt{770}}{308} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{1155}}{924} \\ 0 & \frac{\sqrt{462}}{132} & 0 & 0 & -\frac{\sqrt{77}}{308} & 0 & -\frac{2\sqrt{77}i}{77} & 0 & 0 & -\frac{\sqrt{770}}{308} & 0 & 0 & -\frac{5\sqrt{1155}}{924} & 0 \\ 0 & -\frac{\sqrt{1155}i}{264} & 0 & \frac{\sqrt{1155}}{1232} & 0 & 0 & \frac{\sqrt{770}}{308} & 0 & 0 & -\frac{5\sqrt{77}i}{616} & 0 & -\frac{25\sqrt{77}}{1232} & 0 & 0 \\ \frac{\sqrt{1155}i}{264} & 0 & \frac{\sqrt{1155}}{1232} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{308} & \frac{5\sqrt{77}i}{616} & 0 & -\frac{25\sqrt{77}}{1232} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{1155}}{528} & 0 & \frac{\sqrt{1155}i}{308} & \frac{5\sqrt{770}}{1232} & 0 & 0 & 0 & 0 & -\frac{25\sqrt{77}}{1232} & 0 & -\frac{5\sqrt{77}i}{308} & \frac{5\sqrt{462}}{3696} & 0 \\ -\frac{\sqrt{1155}}{528} & 0 & -\frac{\sqrt{1155}i}{308} & 0 & 0 & -\frac{5\sqrt{770}}{1232} & 0 & 0 & -\frac{25\sqrt{77}}{1232} & 0 & \frac{5\sqrt{77}i}{308} & 0 & 0 & -\frac{5\sqrt{462}}{3696} \\ 0 & 0 & \frac{3\sqrt{770}}{1232} & 0 & 0 & \frac{\sqrt{1155}i}{924} & 0 & -\frac{5\sqrt{1155}}{924} & 0 & 0 & \frac{5\sqrt{462}}{3696} & 0 & 0 & \frac{5\sqrt{77}i}{308} \\ 0 & 0 & 0 & -\frac{3\sqrt{770}}{1232} & -\frac{\sqrt{1155}i}{924} & 0 & -\frac{5\sqrt{1155}}{924} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}}{3696} & -\frac{5\sqrt{77}i}{308} & 0 \end{pmatrix}$
940	symmetry	$-\frac{3\sqrt{7}xy(x-y)(x+y)\left(x^2+y^2-10z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_g,7)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{168} & 0 & \frac{\sqrt{462}i}{168} & \frac{\sqrt{1155}}{231} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{308} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{168} & 0 & -\frac{\sqrt{462}i}{168} & 0 & 0 & -\frac{\sqrt{1155}}{231} & 0 & 0 & -\frac{\sqrt{770}}{308} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{168} & 0 & \frac{\sqrt{462}}{168} & 0 & 0 & -\frac{\sqrt{1155}}{231} & 0 & 0 & -\frac{\sqrt{770}i}{308} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{168} & 0 & \frac{\sqrt{462}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{231} & \frac{\sqrt{770}i}{308} & 0 \\ 0 & -\frac{\sqrt{462}}{168} & 0 & \frac{\sqrt{462}i}{168} & \frac{2\sqrt{77}}{77} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{770}}{616} & 0 & -\frac{3\sqrt{770}i}{616} & 0 & 0 \\ -\frac{\sqrt{462}}{168} & 0 & -\frac{\sqrt{462}i}{168} & 0 & 0 & -\frac{2\sqrt{77}}{77} & 0 & 0 & -\frac{3\sqrt{770}}{616} & 0 & \frac{3\sqrt{770}i}{616} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{462}i}{168} & 0 & \frac{\sqrt{462}}{168} & 0 & 0 & -\frac{2\sqrt{77}}{77} & 0 & 0 & -\frac{3\sqrt{770}i}{616} & 0 & \frac{3\sqrt{770}}{616} & 0 & 0 \\ -\frac{\sqrt{462}i}{168} & 0 & \frac{\sqrt{462}}{168} & 0 & 0 & 0 & 0 & \frac{2\sqrt{77}}{77} & \frac{3\sqrt{770}i}{616} & 0 & \frac{3\sqrt{770}}{616} & 0 & 0 & 0 \\ \frac{\sqrt{1155}}{231} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{770}}{616} & 0 & -\frac{3\sqrt{770}i}{616} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{1155}}{231} & 0 & 0 & -\frac{3\sqrt{770}}{616} & 0 & \frac{3\sqrt{770}i}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{1155}}{231} & 0 & 0 & -\frac{3\sqrt{770}i}{616} & 0 & \frac{3\sqrt{770}}{616} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{1155}}{231} & \frac{3\sqrt{770}i}{616} & 0 & \frac{3\sqrt{770}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{770}}{308} & 0 & -\frac{\sqrt{770}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{770}}{308} & 0 & \frac{\sqrt{770}i}{308} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
941	symmetry	$\frac{\sqrt{462}yz\left(y^2-3z^2\right)\left(3y^2-z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_g,8)$	$\begin{pmatrix} 0 & 0 & 0 & \frac{\sqrt{42}i}{448} & \frac{3\sqrt{7}}{224} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}i}{448} & \frac{\sqrt{105}}{224} & 0 \\ 0 & 0 & -\frac{\sqrt{42}i}{448} & 0 & 0 & -\frac{3\sqrt{7}}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}i}{448} & 0 & 0 & -\frac{\sqrt{105}}{224} \\ 0 & \frac{\sqrt{42}i}{448} & 0 & \frac{\sqrt{42}}{224} & 0 & 0 & -\frac{\sqrt{7}}{112} & 0 & 0 & \frac{\sqrt{70}i}{448} & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 \\ -\frac{\sqrt{42}i}{448} & 0 & \frac{\sqrt{42}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{112} & -\frac{\sqrt{70}i}{448} & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & 0 \\ \frac{3\sqrt{7}}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & \frac{\sqrt{42}i}{112} & \frac{\sqrt{105}}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{112} \\ 0 & -\frac{3\sqrt{7}}{224} & 0 & 0 & -\frac{3\sqrt{42}}{112} & 0 & -\frac{\sqrt{42}i}{112} & 0 & 0 & -\frac{\sqrt{105}}{224} & 0 & 0 & -\frac{3\sqrt{70}}{112} & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{112} & 0 & 0 & \frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & 0 & \frac{\sqrt{70}i}{112} \\ 0 & 0 & 0 & \frac{\sqrt{7}}{112} & -\frac{\sqrt{42}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{112} & -\frac{\sqrt{70}i}{112} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}i}{448} & \frac{\sqrt{105}}{224} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{448} & \frac{5\sqrt{7}}{224} & 0 \\ 0 & 0 & -\frac{\sqrt{70}i}{448} & 0 & 0 & -\frac{\sqrt{105}}{224} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{448} & 0 & 0 & -\frac{5\sqrt{7}}{224} \\ 0 & \frac{3\sqrt{70}i}{448} & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & 0 & \frac{5\sqrt{42}i}{448} & 0 & \frac{15\sqrt{42}}{224} & 0 & 0 \\ -\frac{3\sqrt{70}i}{448} & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{112} & -\frac{5\sqrt{42}i}{448} & 0 & \frac{15\sqrt{42}}{224} & 0 & 0 & 0 \\ \frac{\sqrt{105}}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{112} & 0 & \frac{\sqrt{70}i}{112} & \frac{5\sqrt{7}}{224} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{112} \\ 0 & -\frac{\sqrt{105}}{224} & 0 & 0 & -\frac{3\sqrt{70}}{112} & 0 & -\frac{\sqrt{70}i}{112} & 0 & 0 & -\frac{5\sqrt{7}}{224} & 0 & 0 & -\frac{5\sqrt{42}}{112} & 0 \end{pmatrix}$
942	symmetry	$\frac{\sqrt{462}xz\left(x^2-3z^2\right)\left(3x^2-z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_g,9)$	$\begin{pmatrix} 0 & \frac{\sqrt{42}i}{224} & 0 & \frac{\sqrt{42}}{448} & 0 & 0 & -\frac{\sqrt{7}}{112} & 0 & 0 & -\frac{3\sqrt{70}i}{224} & 0 & -\frac{\sqrt{70}}{448} & 0 & 0 \\ -\frac{\sqrt{42}i}{224} & 0 & \frac{\sqrt{42}}{448} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{112} & \frac{3\sqrt{70}i}{224} & 0 & -\frac{\sqrt{70}}{448} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{448} & 0 & 0 & -\frac{3\sqrt{7}}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{448} & 0 & 0 & \frac{\sqrt{105}}{224} & 0 \\ \frac{\sqrt{42}}{448} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{224} & 0 & 0 & -\frac{3\sqrt{70}}{448} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{224} \\ 0 & 0 & -\frac{3\sqrt{7}}{224} & 0 & 0 & -\frac{3\sqrt{42}i}{112} & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & \frac{\sqrt{105}}{224} & 0 & 0 & \frac{3\sqrt{70}i}{112} \\ 0 & 0 & 0 & \frac{3\sqrt{7}}{224} & \frac{3\sqrt{42}i}{112} & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{224} & -\frac{3\sqrt{70}i}{112} & 0 \\ -\frac{\sqrt{7}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & \frac{\sqrt{105}}{112} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{112} \\ 0 & \frac{\sqrt{7}}{112} & 0 & 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & 0 & \frac{\sqrt{70}}{112} & 0 \\ 0 & -\frac{3\sqrt{70}i}{224} & 0 & -\frac{3\sqrt{70}}{448} & 0 & 0 & \frac{\sqrt{105}}{112} & 0 & 0 & \frac{15\sqrt{42}i}{224} & 0 & \frac{5\sqrt{42}}{448} & 0 & 0 \\ \frac{3\sqrt{70}i}{224} & 0 & -\frac{3\sqrt{70}}{448} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{112} & -\frac{15\sqrt{42}i}{224} & 0 & \frac{5\sqrt{42}}{448} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{448} & 0 & 0 & \frac{\sqrt{105}}{224} & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{448} & 0 & 0 & -\frac{5\sqrt{7}}{224} & 0 \\ -\frac{\sqrt{70}}{448} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{224} & 0 & 0 & \frac{5\sqrt{42}}{448} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{224} \\ 0 & 0 & \frac{\sqrt{105}}{224} & 0 & 0 & \frac{3\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & -\frac{5\sqrt{7}}{224} & 0 & 0 & -\frac{5\sqrt{42}i}{112} \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{224} & -\frac{3\sqrt{70}i}{112} & 0 & \frac{\sqrt{70}}{112} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{224} & \frac{5\sqrt{42}i}{112} & 0 \end{pmatrix}$
943	symmetry	$\frac{\sqrt{462}xy\left(x^2-3y^2\right)\left(3x^2-y^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_g, 10)$	$\left[\begin{array}{cccccccccccccc} \frac{\sqrt{42}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{14} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{42}}{14} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{14} & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right]$
944	symmetry	$\frac{\sqrt{210}yz\left(16x^4-16x^2y^2-16x^2z^2+y^4+2y^2z^2+z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_g,11)$	$\begin{pmatrix} 0 & -\frac{\sqrt{2310}}{462} & 0 & \frac{\sqrt{2310}i}{448} & \frac{83\sqrt{385}}{7392} & 0 & 0 & 0 & 0 & -\frac{\sqrt{154}}{462} & 0 & -\frac{113\sqrt{154}i}{14784} & -\frac{9\sqrt{231}}{2464} & 0 \\ -\frac{\sqrt{2310}}{462} & 0 & -\frac{\sqrt{2310}i}{448} & 0 & 0 & -\frac{83\sqrt{385}}{7392} & 0 & 0 & -\frac{\sqrt{154}}{462} & 0 & \frac{113\sqrt{154}i}{14784} & 0 & 0 & \frac{9\sqrt{231}}{2464} \\ 0 & \frac{\sqrt{2310}i}{448} & 0 & \frac{17\sqrt{2310}}{7392} & 0 & 0 & -\frac{41\sqrt{385}}{3696} & 0 & 0 & -\frac{17\sqrt{154}i}{1344} & 0 & -\frac{\sqrt{154}}{7392} & 0 & 0 \\ -\frac{\sqrt{2310}i}{448} & 0 & \frac{17\sqrt{2310}}{7392} & 0 & 0 & 0 & 0 & \frac{41\sqrt{385}}{3696} & \frac{17\sqrt{154}i}{1344} & 0 & -\frac{\sqrt{154}}{7392} & 0 & 0 & 0 \\ \frac{83\sqrt{385}}{7392} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{1232} & 0 & -\frac{5\sqrt{2310}i}{1232} & -\frac{43\sqrt{231}}{7392} & 0 & 0 & 0 & 0 & \frac{17\sqrt{154}}{3696} \\ 0 & -\frac{83\sqrt{385}}{7392} & 0 & 0 & -\frac{\sqrt{2310}}{1232} & 0 & \frac{5\sqrt{2310}i}{1232} & 0 & 0 & \frac{43\sqrt{231}}{7392} & 0 & 0 & \frac{17\sqrt{154}}{3696} & 0 \\ 0 & 0 & -\frac{41\sqrt{385}}{3696} & 0 & 0 & -\frac{5\sqrt{2310}i}{1232} & 0 & 0 & 0 & 0 & \frac{19\sqrt{231}}{3696} & 0 & 0 & \frac{37\sqrt{154}i}{3696} \\ 0 & 0 & 0 & \frac{41\sqrt{385}}{3696} & \frac{5\sqrt{2310}i}{1232} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{19\sqrt{231}}{3696} & -\frac{37\sqrt{154}i}{3696} & 0 \\ 0 & -\frac{\sqrt{154}}{462} & 0 & -\frac{17\sqrt{154}i}{1344} & -\frac{43\sqrt{231}}{7392} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{462} & 0 & \frac{37\sqrt{2310}i}{14784} & \frac{5\sqrt{385}}{7392} & 0 \\ -\frac{\sqrt{154}}{462} & 0 & \frac{17\sqrt{154}i}{1344} & 0 & 0 & \frac{43\sqrt{231}}{7392} & 0 & 0 & \frac{\sqrt{2310}}{462} & 0 & -\frac{37\sqrt{2310}i}{14784} & 0 & 0 & -\frac{5\sqrt{385}}{7392} \\ 0 & -\frac{113\sqrt{154}i}{14784} & 0 & -\frac{\sqrt{154}}{7392} & 0 & 0 & \frac{19\sqrt{231}}{3696} & 0 & 0 & \frac{37\sqrt{2310}i}{14784} & 0 & -\frac{\sqrt{2310}}{7392} & 0 & 0 \\ \frac{113\sqrt{154}i}{14784} & 0 & -\frac{\sqrt{154}}{7392} & 0 & 0 & 0 & 0 & -\frac{19\sqrt{231}}{3696} & -\frac{37\sqrt{2310}i}{14784} & 0 & -\frac{\sqrt{2310}}{7392} & 0 & 0 & 0 \\ -\frac{9\sqrt{231}}{2464} & 0 & 0 & 0 & 0 & \frac{17\sqrt{154}}{3696} & 0 & \frac{37\sqrt{154}i}{3696} & \frac{5\sqrt{385}}{7392} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2310}}{3696} \\ 0 & \frac{9\sqrt{231}}{2464} & 0 & 0 & \frac{17\sqrt{154}}{3696} & 0 & -\frac{37\sqrt{154}i}{3696} & 0 & 0 & -\frac{5\sqrt{385}}{7392} & 0 & 0 & -\frac{5\sqrt{2310}}{3696} & 0 \end{pmatrix}$
945	symmetry	$\frac{\sqrt{210}xz\left(x^4-16x^2y^2+2x^2z^2+16y^4-16y^2z^2+z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{T}_6^{(1,0;a)}(A_g,12)$	$\begin{pmatrix} 0 & \frac{17\sqrt{2310}i}{7392} & 0 & \frac{\sqrt{2310}}{448} & 0 & 0 & -\frac{41\sqrt{385}}{3696} & 0 & 0 & \frac{\sqrt{154}i}{7392} & 0 & \frac{17\sqrt{154}}{1344} & 0 & 0 \\ -\frac{17\sqrt{2310}i}{7392} & 0 & \frac{\sqrt{2310}}{448} & 0 & 0 & 0 & 0 & \frac{41\sqrt{385}}{3696} & -\frac{\sqrt{154}i}{7392} & 0 & \frac{17\sqrt{154}}{1344} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2310}}{448} & 0 & -\frac{\sqrt{2310}i}{462} & -\frac{83\sqrt{385}}{7392} & 0 & 0 & 0 & 0 & \frac{113\sqrt{154}}{14784} & 0 & \frac{\sqrt{154}i}{462} & -\frac{9\sqrt{231}}{2464} & 0 \\ \frac{\sqrt{2310}}{448} & 0 & \frac{\sqrt{2310}i}{462} & 0 & 0 & \frac{83\sqrt{385}}{7392} & 0 & 0 & \frac{113\sqrt{154}}{14784} & 0 & -\frac{\sqrt{154}i}{462} & 0 & 0 & \frac{9\sqrt{231}}{2464} \\ 0 & 0 & -\frac{83\sqrt{385}}{7392} & 0 & 0 & -\frac{\sqrt{2310}i}{1232} & 0 & \frac{5\sqrt{2310}}{1232} & 0 & 0 & -\frac{43\sqrt{231}}{7392} & 0 & 0 & -\frac{17\sqrt{154}i}{3696} \\ 0 & 0 & 0 & \frac{83\sqrt{385}}{7392} & \frac{\sqrt{2310}i}{1232} & 0 & \frac{5\sqrt{2310}}{1232} & 0 & 0 & 0 & 0 & \frac{43\sqrt{231}}{7392} & \frac{17\sqrt{154}i}{3696} & 0 \\ -\frac{41\sqrt{385}}{3696} & 0 & 0 & 0 & 0 & \frac{5\sqrt{2310}}{1232} & 0 & 0 & -\frac{19\sqrt{231}}{3696} & 0 & 0 & 0 & 0 & \frac{37\sqrt{154}}{3696} \\ 0 & \frac{41\sqrt{385}}{3696} & 0 & 0 & \frac{5\sqrt{2310}}{1232} & 0 & 0 & 0 & 0 & \frac{19\sqrt{231}}{3696} & 0 & 0 & \frac{37\sqrt{154}}{3696} & 0 \\ 0 & \frac{\sqrt{154}i}{7392} & 0 & \frac{113\sqrt{154}}{14784} & 0 & 0 & -\frac{19\sqrt{231}}{3696} & 0 & 0 & -\frac{\sqrt{2310}i}{7392} & 0 & \frac{37\sqrt{2310}}{14784} & 0 & 0 \\ -\frac{\sqrt{154}i}{7392} & 0 & \frac{113\sqrt{154}}{14784} & 0 & 0 & 0 & 0 & \frac{19\sqrt{231}}{3696} & \frac{\sqrt{2310}i}{7392} & 0 & \frac{37\sqrt{2310}}{14784} & 0 & 0 & 0 \\ 0 & \frac{17\sqrt{154}}{1344} & 0 & \frac{\sqrt{154}i}{462} & -\frac{43\sqrt{231}}{7392} & 0 & 0 & 0 & 0 & \frac{37\sqrt{2310}}{14784} & 0 & \frac{\sqrt{2310}i}{462} & -\frac{5\sqrt{385}}{7392} & 0 \\ \frac{17\sqrt{154}}{1344} & 0 & -\frac{\sqrt{154}i}{462} & 0 & 0 & \frac{43\sqrt{231}}{7392} & 0 & 0 & \frac{37\sqrt{2310}}{14784} & 0 & -\frac{\sqrt{2310}i}{462} & 0 & 0 & \frac{5\sqrt{385}}{7392} \\ 0 & 0 & -\frac{9\sqrt{231}}{2464} & 0 & 0 & -\frac{17\sqrt{154}i}{3696} & 0 & \frac{37\sqrt{154}}{3696} & 0 & 0 & -\frac{5\sqrt{385}}{7392} & 0 & 0 & -\frac{5\sqrt{2310}i}{3696} \\ 0 & 0 & 0 & \frac{9\sqrt{231}}{2464} & \frac{17\sqrt{154}i}{3696} & 0 & \frac{37\sqrt{154}}{3696} & 0 & 0 & 0 & 0 & \frac{5\sqrt{385}}{7392} & \frac{5\sqrt{2310}i}{3696} & 0 \end{pmatrix}$
946	symmetry	$\frac{\sqrt{210}xy\left(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
947	$\mathbb{T}_6^{(1,0;a)}(A_g,13)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{924} & 0 & \frac{\sqrt{385}i}{924} & -\frac{\sqrt{154}}{462} & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{154} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{924} & 0 & -\frac{\sqrt{385}i}{924} & 0 & 0 & \frac{\sqrt{154}}{462} & 0 & 0 & -\frac{\sqrt{231}}{154} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}i}{924} & 0 & -\frac{\sqrt{385}}{924} & 0 & 0 & -\frac{\sqrt{154}}{462} & 0 & 0 & \frac{\sqrt{231}i}{154} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{385}i}{924} & 0 & -\frac{\sqrt{385}}{924} & 0 & 0 & 0 & 0 & \frac{\sqrt{154}}{462} & -\frac{\sqrt{231}i}{154} & 0 \\ 0 & -\frac{\sqrt{385}}{924} & 0 & -\frac{\sqrt{385}i}{924} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{231} & 0 & \frac{\sqrt{231}i}{231} & \frac{2\sqrt{154}}{231} & 0 \\ -\frac{\sqrt{385}}{924} & 0 & \frac{\sqrt{385}i}{924} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{231} & 0 & -\frac{\sqrt{231}i}{231} & 0 & 0 & -\frac{2\sqrt{154}}{231} \\ 0 & \frac{\sqrt{385}i}{924} & 0 & -\frac{\sqrt{385}}{924} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{231}i}{66} & 0 & \frac{\sqrt{231}}{66} & 0 & 0 \\ -\frac{\sqrt{385}i}{924} & 0 & -\frac{\sqrt{385}}{924} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}i}{66} & 0 & \frac{\sqrt{231}}{66} & 0 & 0 & 0 \\ -\frac{\sqrt{154}}{462} & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{231} & 0 & \frac{\sqrt{231}i}{66} & \frac{\sqrt{2310}}{462} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{385}}{462} \\ 0 & \frac{\sqrt{154}}{462} & 0 & 0 & -\frac{\sqrt{231}}{231} & 0 & -\frac{\sqrt{231}i}{66} & 0 & 0 & -\frac{\sqrt{2310}}{462} & 0 & 0 & -\frac{5\sqrt{385}}{462} & 0 \\ 0 & 0 & -\frac{\sqrt{154}}{462} & 0 & 0 & \frac{\sqrt{231}i}{231} & 0 & \frac{\sqrt{231}}{66} & 0 & 0 & -\frac{\sqrt{2310}}{462} & 0 & 0 & -\frac{5\sqrt{385}i}{462} \\ 0 & 0 & 0 & \frac{\sqrt{154}}{462} & -\frac{\sqrt{231}i}{231} & 0 & \frac{\sqrt{231}}{66} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{462} & \frac{5\sqrt{385}i}{462} & 0 \\ 0 & -\frac{\sqrt{231}}{154} & 0 & \frac{\sqrt{231}i}{154} & \frac{2\sqrt{154}}{231} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{385}}{462} & 0 & -\frac{5\sqrt{385}i}{462} & 0 & 0 \\ -\frac{\sqrt{231}}{154} & 0 & -\frac{\sqrt{231}i}{154} & 0 & 0 & -\frac{2\sqrt{154}}{231} & 0 & 0 & -\frac{5\sqrt{385}}{462} & 0 & \frac{5\sqrt{385}i}{462} & 0 & 0 & 0 \end{bmatrix}$
	symmetry	x

continued ...

Table 10

No.	multipole	matrix
948	symmetry	y

$\mathbb{M}_1^{(a)}(A_g,1)$:

$$\begin{pmatrix}
0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \\
0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 \\
-\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 \\
0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 \\
0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 & 0
\end{pmatrix}$$

continued ...

Table 10

No.	multipole	matrix
949	symmetry	z

$\mathbb{M}_1^{(a)}(A_g, 2)$

$$\begin{pmatrix}
0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\
-\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 \\
0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 \\
0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \\
0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 \\
0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} & 0 \\
0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{14} \\
0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0
\end{pmatrix}$$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_1^{(a)}(A_g,3)$	$\begin{bmatrix} 0 & 0 & -\frac{3\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
950	symmetry	$\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
951	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} \\ 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \\ -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 \end{pmatrix}$
952	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \end{pmatrix}$
953	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,4)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
954	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,5)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} \\ 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \\ -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} \\ 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 \end{bmatrix}$
955	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$
956	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
957	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
958	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
959	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_g,3)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{13\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{48} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{13\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{48} \\ 0 & 0 & \frac{13\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{13\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 \\ \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{112} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{112} \\ 0 & 0 & -\frac{\sqrt{105}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{112} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{112} & 0 & 0 \end{pmatrix}$
960	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_g,4)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{13\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{48} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{13\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{48} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{13\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{13\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{336} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{112} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{336} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{112} \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{105}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{112} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{48} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{112} & 0 & 0 & 0 & 0 \end{pmatrix}$
961	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_g,5)$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{21} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}i}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}i}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
962	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_g,6)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{16} \\ 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{16} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} \\ 0 & 0 & \frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 \end{bmatrix}$
963	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_g,7)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{16} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{3}i}{16} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{16} & 0 & 0 & 0 & 0 \end{bmatrix}$
964	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_g,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
965	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_g,9)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} \\ 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 \\ -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} \\ 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 \end{bmatrix}$
966	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(a)}(A_g,10)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 \end{pmatrix}$
967	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
968	symmetry	x

$\mathbb{M}_5^{(a)}(A_g, 11)$

$$\begin{bmatrix}
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} \\
0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 & 0
\end{bmatrix}$$

continued ...

Table 10

No.	multipole	matrix
969	symmetry	y

$\mathbb{M}_1^{(1,-1;a)}(A_g,1)$

$$\begin{pmatrix}
0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0
\end{pmatrix}$$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_1^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}i}{14} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}i}{14} & 0 \end{bmatrix}$
970	symmetry	z

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_1^{(1,-1;a)}(A_g,3)$	$\begin{bmatrix} \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{14}}{14} \end{bmatrix}$
971	symmetry	$\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{84} & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & -\frac{5\sqrt{7}i}{84} & -\frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & \frac{5\sqrt{7}i}{84} & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{7}i}{84} & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 \\ \frac{5\sqrt{7}i}{84} & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{7}}{84} & 0 & -\frac{5\sqrt{7}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & -\frac{\sqrt{70}}{42} & 0 \\ -\frac{5\sqrt{7}}{84} & 0 & \frac{5\sqrt{7}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{70}}{42} \\ 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{42} \\ 0 & 0 & 0 & \frac{\sqrt{70}}{84} & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & \frac{\sqrt{7}i}{42} & 0 \\ \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{42} \\ 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{42} & 0 & 0 & -\frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{42} & \frac{\sqrt{7}i}{42} & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & 0 \end{pmatrix}$
972	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,2)$	$\begin{pmatrix} 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 \\ \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} \\ 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{42} & 0 \\ 0 & -\frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{84} & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & \frac{\sqrt{70}i}{70} & -\frac{\sqrt{105}}{210} & 0 \\ -\frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{3\sqrt{70}}{280} & 0 & -\frac{\sqrt{70}i}{70} & 0 & 0 & \frac{\sqrt{105}}{210} \\ 0 & \frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{70}i}{70} & 0 & -\frac{9\sqrt{70}}{280} & 0 & 0 \\ -\frac{\sqrt{42}i}{84} & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & -\frac{\sqrt{70}i}{70} & 0 & -\frac{9\sqrt{70}}{280} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{42}i}{42} & -\frac{\sqrt{105}}{210} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{105}}{210} & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 \end{pmatrix}$
973	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,3)$	$\begin{pmatrix} 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 \\ \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & \frac{\sqrt{42}i}{56} & 0 & -\frac{\sqrt{42}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{70}i}{56} & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{42}i}{28} \\ 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & \frac{\sqrt{42}i}{28} & 0 \\ \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} \\ 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}}{42} & 0 \\ 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{9\sqrt{70}i}{280} & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 \\ \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & -\frac{9\sqrt{70}i}{280} & 0 & -\frac{\sqrt{70}}{70} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{56} & \frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & -\frac{3\sqrt{70}i}{280} & -\frac{\sqrt{105}}{210} & 0 \\ -\frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{\sqrt{70}}{70} & 0 & \frac{3\sqrt{70}i}{280} & 0 & 0 & \frac{\sqrt{105}}{210} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & 0 & \frac{\sqrt{70}i}{70} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{210} & -\frac{\sqrt{70}i}{70} & 0 \end{pmatrix}$
974	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,4)$	$\begin{bmatrix} -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{28} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{28} & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\ \frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & \frac{3\sqrt{70}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{3\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{3\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{105}i}{210} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{140} & -\frac{\sqrt{105}i}{210} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & \frac{\sqrt{105}i}{210} & \frac{\sqrt{70}}{35} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 & -\frac{\sqrt{105}i}{210} & 0 & 0 & -\frac{\sqrt{70}}{35} \end{bmatrix}$
975	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,5)$	$\begin{pmatrix} 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{168} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 \\ \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & \frac{\sqrt{70}}{168} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{168} & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{168} & 0 & 0 & 0 \\ -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} \\ 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{70}}{84} & 0 \\ 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{70}i}{42} \\ 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & -\frac{\sqrt{70}i}{42} & 0 \\ 0 & \frac{\sqrt{70}}{168} & 0 & \frac{\sqrt{70}i}{84} & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & -\frac{\sqrt{42}i}{42} & -\frac{\sqrt{7}}{42} & 0 \\ \frac{\sqrt{70}}{168} & 0 & -\frac{\sqrt{70}i}{84} & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & \frac{\sqrt{42}i}{42} & 0 & 0 & \frac{\sqrt{7}}{42} \\ 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{168} & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{42} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 \\ \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & \frac{\sqrt{42}i}{42} & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{42} & -\frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{42} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 \end{pmatrix}$
976	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,6)$	$\begin{pmatrix} 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{\sqrt{70}i}{168} & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 \\ -\frac{5\sqrt{42}i}{168} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & \frac{\sqrt{70}i}{168} & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{42}i}{168} & \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{168} & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{42}i}{168} & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{168} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{70}i}{84} \\ 0 & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & \frac{\sqrt{70}i}{84} & 0 \\ -\frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{42} \\ 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{70}}{42} & 0 \\ 0 & -\frac{\sqrt{70}i}{168} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 \\ \frac{\sqrt{70}i}{168} & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & \frac{\sqrt{42}i}{168} & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{168} & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & -\frac{5\sqrt{42}i}{168} & \frac{\sqrt{7}}{42} & 0 \\ -\frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{168} & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & \frac{5\sqrt{42}i}{168} & 0 & 0 & -\frac{\sqrt{7}}{42} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & 0 & -\frac{\sqrt{42}i}{42} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{84} & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{42} & \frac{\sqrt{42}i}{42} & 0 \end{pmatrix}$
977	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,-1;a)}(A_g,7)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & -\frac{5\sqrt{7}i}{84} & -\frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & 0 & \frac{5\sqrt{7}i}{84} & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}i}{84} & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{84} & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & 0 \\ 0 & \frac{5\sqrt{7}}{84} & 0 & \frac{5\sqrt{7}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & -\frac{\sqrt{70}}{42} & 0 \\ \frac{5\sqrt{7}}{84} & 0 & -\frac{5\sqrt{7}i}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & \frac{\sqrt{70}}{42} \\ 0 & -\frac{5\sqrt{7}i}{84} & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 \\ \frac{5\sqrt{7}i}{84} & 0 & \frac{5\sqrt{7}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 \\ -\frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & \frac{\sqrt{42}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{42} \\ 0 & \frac{\sqrt{70}}{84} & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 \\ 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{42}}{42} & 0 & 0 & \frac{\sqrt{7}i}{42} \\ 0 & 0 & 0 & \frac{\sqrt{70}}{84} & \frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{42} & -\frac{\sqrt{7}i}{42} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{42} & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & -\frac{\sqrt{7}i}{42} & 0 & 0 & 0 \end{pmatrix}$
978	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{110} & 0 & 0 & \frac{3\sqrt{110}i}{110} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{110} & -\frac{3\sqrt{110}i}{110} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{110} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}}{110} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{110} & 0 & 0 & -\frac{3\sqrt{110}}{110} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & -\frac{\sqrt{110}i}{110} & 0 & \frac{\sqrt{110}}{110} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{22} & \frac{\sqrt{110}i}{110} & 0 & \frac{\sqrt{110}}{110} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{110} & 0 & \frac{\sqrt{110}i}{110} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & \frac{\sqrt{110}}{110} & 0 & -\frac{\sqrt{110}i}{110} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{165}}{110} & 0 & 0 & -\frac{\sqrt{110}i}{110} & 0 & \frac{\sqrt{110}}{110} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{165}}{110} & \frac{\sqrt{110}i}{110} & 0 & \frac{\sqrt{110}}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{165}}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{110} & 0 & \frac{\sqrt{110}i}{110} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{165}}{110} & 0 & 0 & \frac{\sqrt{110}}{110} & 0 & -\frac{\sqrt{110}i}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{110}i}{110} & 0 & -\frac{3\sqrt{110}}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{110}i}{110} & 0 & -\frac{3\sqrt{110}}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
979	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & \frac{3\sqrt{55}}{110} & 0 & 0 & -\frac{\sqrt{330}i}{220} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}}{110} & \frac{\sqrt{330}i}{220} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & -\frac{\sqrt{22}i}{44} & -\frac{3\sqrt{55}}{110} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{220} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & \frac{3\sqrt{55}}{110} & 0 & 0 & -\frac{\sqrt{330}}{220} & 0 \\ 0 & -\frac{\sqrt{22}i}{44} & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{132} & 0 & \frac{\sqrt{330}}{132} & 0 & 0 \\ \frac{\sqrt{22}i}{44} & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{132} & 0 & \frac{\sqrt{330}}{132} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{22}}{44} & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{220} & 0 & \frac{\sqrt{330}i}{220} & \frac{\sqrt{55}}{110} & 0 \\ -\frac{\sqrt{22}}{44} & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{220} & 0 & -\frac{\sqrt{330}i}{220} & 0 & 0 & -\frac{\sqrt{55}}{110} \\ 0 & 0 & -\frac{3\sqrt{55}}{110} & 0 & 0 & \frac{\sqrt{330}i}{132} & 0 & -\frac{\sqrt{330}}{220} & 0 & 0 & -\frac{\sqrt{33}}{33} & 0 & 0 & \frac{\sqrt{22}i}{44} \\ 0 & 0 & 0 & \frac{3\sqrt{55}}{110} & -\frac{\sqrt{330}i}{132} & 0 & -\frac{\sqrt{330}}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{33} & -\frac{\sqrt{22}i}{44} & 0 \\ \frac{3\sqrt{55}}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{132} & 0 & \frac{\sqrt{330}i}{220} & -\frac{\sqrt{33}}{33} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} \\ 0 & -\frac{3\sqrt{55}}{110} & 0 & 0 & \frac{\sqrt{330}}{132} & 0 & -\frac{\sqrt{330}i}{220} & 0 & 0 & \frac{\sqrt{33}}{33} & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 \\ 0 & -\frac{\sqrt{330}i}{220} & 0 & -\frac{\sqrt{330}}{220} & 0 & 0 & \frac{\sqrt{55}}{110} & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 \\ \frac{\sqrt{330}i}{220} & 0 & -\frac{\sqrt{330}}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{110} & -\frac{\sqrt{22}i}{44} & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 \end{bmatrix}$
980	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,3)$	$\begin{pmatrix} 0 & \frac{3\sqrt{385}}{1232} & 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & -\frac{65\sqrt{231}}{3696} & 0 & -\frac{\sqrt{231}i}{231} & \frac{\sqrt{154}}{88} & 0 \\ \frac{3\sqrt{385}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & -\frac{65\sqrt{231}}{3696} & 0 & \frac{\sqrt{231}i}{231} & 0 & 0 & -\frac{\sqrt{154}}{88} \\ 0 & 0 & 0 & \frac{3\sqrt{385}}{1232} & 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & -\frac{5\sqrt{231}i}{462} & 0 & \frac{5\sqrt{231}}{3696} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{385}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & \frac{5\sqrt{231}i}{462} & 0 & \frac{5\sqrt{231}}{3696} & 0 & 0 & 0 \\ -\frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{264} & 0 & \frac{\sqrt{385}i}{132} & \frac{5\sqrt{154}}{1848} & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}}{1848} \\ 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & \frac{\sqrt{385}}{264} & 0 & -\frac{\sqrt{385}i}{132} & 0 & 0 & -\frac{5\sqrt{154}}{1848} & 0 & 0 & \frac{5\sqrt{231}}{1848} & 0 \\ 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & \frac{\sqrt{385}i}{132} & 0 & -\frac{\sqrt{385}}{66} & 0 & 0 & \frac{19\sqrt{154}}{1848} & 0 & 0 & \frac{\sqrt{231}i}{924} \\ 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & -\frac{\sqrt{385}i}{132} & 0 & -\frac{\sqrt{385}}{66} & 0 & 0 & 0 & 0 & -\frac{19\sqrt{154}}{1848} & -\frac{\sqrt{231}i}{924} & 0 \\ 0 & -\frac{65\sqrt{231}}{3696} & 0 & -\frac{5\sqrt{231}i}{462} & \frac{5\sqrt{154}}{1848} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{385}}{3696} & 0 & -\frac{\sqrt{385}i}{462} & \frac{\sqrt{2310}}{616} & 0 \\ -\frac{65\sqrt{231}}{3696} & 0 & \frac{5\sqrt{231}i}{462} & 0 & 0 & -\frac{5\sqrt{154}}{1848} & 0 & 0 & -\frac{17\sqrt{385}}{3696} & 0 & \frac{\sqrt{385}i}{462} & 0 & 0 & -\frac{\sqrt{2310}}{616} \\ 0 & -\frac{\sqrt{231}i}{231} & 0 & \frac{5\sqrt{231}}{3696} & 0 & 0 & \frac{19\sqrt{154}}{1848} & 0 & 0 & -\frac{\sqrt{385}i}{462} & 0 & \frac{23\sqrt{385}}{3696} & 0 & 0 \\ \frac{\sqrt{231}i}{231} & 0 & \frac{5\sqrt{231}}{3696} & 0 & 0 & 0 & 0 & -\frac{19\sqrt{154}}{1848} & \frac{\sqrt{385}i}{462} & 0 & \frac{23\sqrt{385}}{3696} & 0 & 0 & 0 \\ \frac{\sqrt{154}}{88} & 0 & 0 & 0 & 0 & \frac{5\sqrt{231}}{1848} & 0 & \frac{\sqrt{231}i}{924} & \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & \frac{3\sqrt{385}}{616} \\ 0 & -\frac{\sqrt{154}}{88} & 0 & 0 & \frac{5\sqrt{231}}{1848} & 0 & -\frac{\sqrt{231}i}{924} & 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & \frac{3\sqrt{385}}{616} & 0 \end{pmatrix}$
981	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,4)$	$\begin{pmatrix} 0 & -\frac{3\sqrt{385}i}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & \frac{5\sqrt{231}i}{3696} & 0 & -\frac{5\sqrt{231}}{462} & 0 & 0 \\ \frac{3\sqrt{385}i}{1232} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} & -\frac{5\sqrt{231}i}{3696} & 0 & -\frac{5\sqrt{231}}{462} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{385}i}{1232} & -\frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{231} & 0 & -\frac{65\sqrt{231}i}{3696} & -\frac{\sqrt{154}}{88} & 0 \\ 0 & 0 & \frac{3\sqrt{385}i}{1232} & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & -\frac{\sqrt{231}}{231} & 0 & \frac{65\sqrt{231}i}{3696} & 0 & 0 & \frac{\sqrt{154}}{88} \\ 0 & 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & -\frac{\sqrt{385}i}{264} & 0 & \frac{\sqrt{385}}{132} & 0 & 0 & -\frac{5\sqrt{154}}{1848} & 0 & 0 & \frac{5\sqrt{231}i}{1848} \\ 0 & 0 & 0 & \frac{\sqrt{2310}}{616} & \frac{\sqrt{385}i}{264} & 0 & \frac{\sqrt{385}}{132} & 0 & 0 & 0 & 0 & \frac{5\sqrt{154}}{1848} & -\frac{5\sqrt{231}i}{1848} & 0 \\ \frac{\sqrt{2310}}{616} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{132} & 0 & \frac{\sqrt{385}i}{66} & \frac{19\sqrt{154}}{1848} & 0 & 0 & 0 & 0 & -\frac{\sqrt{231}}{924} \\ 0 & -\frac{\sqrt{2310}}{616} & 0 & 0 & \frac{\sqrt{385}}{132} & 0 & -\frac{\sqrt{385}i}{66} & 0 & 0 & -\frac{19\sqrt{154}}{1848} & 0 & 0 & -\frac{\sqrt{231}}{924} & 0 \\ 0 & \frac{5\sqrt{231}i}{3696} & 0 & -\frac{\sqrt{231}}{231} & 0 & 0 & \frac{19\sqrt{154}}{1848} & 0 & 0 & -\frac{23\sqrt{385}i}{3696} & 0 & \frac{\sqrt{385}}{462} & 0 & 0 \\ -\frac{5\sqrt{231}i}{3696} & 0 & -\frac{\sqrt{231}}{231} & 0 & 0 & 0 & 0 & -\frac{19\sqrt{154}}{1848} & \frac{23\sqrt{385}i}{3696} & 0 & \frac{\sqrt{385}}{462} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{231}}{462} & 0 & -\frac{65\sqrt{231}i}{3696} & -\frac{5\sqrt{154}}{1848} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{462} & 0 & \frac{17\sqrt{385}i}{3696} & \frac{\sqrt{2310}}{616} & 0 \\ -\frac{5\sqrt{231}}{462} & 0 & \frac{65\sqrt{231}i}{3696} & 0 & 0 & \frac{5\sqrt{154}}{1848} & 0 & 0 & \frac{\sqrt{385}}{462} & 0 & -\frac{17\sqrt{385}i}{3696} & 0 & 0 & -\frac{\sqrt{2310}}{616} \\ 0 & 0 & -\frac{\sqrt{154}}{88} & 0 & 0 & \frac{5\sqrt{231}i}{1848} & 0 & -\frac{\sqrt{231}}{924} & 0 & 0 & \frac{\sqrt{2310}}{616} & 0 & 0 & -\frac{3\sqrt{385}i}{616} \\ 0 & 0 & 0 & \frac{\sqrt{154}}{88} & -\frac{5\sqrt{231}i}{1848} & 0 & -\frac{\sqrt{231}}{924} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{616} & \frac{3\sqrt{385}i}{616} & 0 \end{pmatrix}$
982	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,5)$	$\begin{pmatrix} \frac{\sqrt{385}}{154} & 0 & 0 & 0 & 0 & \frac{\sqrt{2310}}{462} & 0 & \frac{\sqrt{2310}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{385}}{154} & 0 & 0 & \frac{\sqrt{2310}}{462} & 0 & -\frac{\sqrt{2310}i}{462} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{385}}{154} & 0 & 0 & -\frac{\sqrt{2310}i}{462} & 0 & \frac{\sqrt{2310}}{462} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{385}}{154} & \frac{\sqrt{2310}i}{462} & 0 & \frac{\sqrt{2310}}{462} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2310}}{462} & 0 & -\frac{\sqrt{2310}i}{462} & -\frac{\sqrt{385}}{66} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{154}}{231} & 0 & -\frac{2\sqrt{154}i}{231} & 0 & 0 \\ \frac{\sqrt{2310}}{462} & 0 & \frac{\sqrt{2310}i}{462} & 0 & 0 & \frac{\sqrt{385}}{66} & 0 & 0 & -\frac{2\sqrt{154}}{231} & 0 & \frac{2\sqrt{154}i}{231} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2310}i}{462} & 0 & \frac{\sqrt{2310}}{462} & 0 & 0 & -\frac{\sqrt{385}}{66} & 0 & 0 & \frac{2\sqrt{154}i}{231} & 0 & -\frac{2\sqrt{154}}{231} & 0 & 0 \\ -\frac{\sqrt{2310}i}{462} & 0 & \frac{\sqrt{2310}}{462} & 0 & 0 & 0 & 0 & \frac{\sqrt{385}}{66} & -\frac{2\sqrt{154}i}{231} & 0 & -\frac{2\sqrt{154}}{231} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{154}}{231} & 0 & \frac{2\sqrt{154}i}{231} & \frac{\sqrt{385}}{462} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{462} \\ 0 & 0 & 0 & 0 & -\frac{2\sqrt{154}}{231} & 0 & -\frac{2\sqrt{154}i}{231} & 0 & 0 & -\frac{\sqrt{385}}{462} & 0 & 0 & -\frac{\sqrt{2310}}{462} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{2\sqrt{154}i}{231} & 0 & -\frac{2\sqrt{154}}{231} & 0 & 0 & \frac{\sqrt{385}}{462} & 0 & 0 & \frac{\sqrt{2310}i}{462} \\ 0 & 0 & 0 & 0 & \frac{2\sqrt{154}i}{231} & 0 & -\frac{2\sqrt{154}}{231} & 0 & 0 & 0 & 0 & -\frac{\sqrt{385}}{462} & -\frac{\sqrt{2310}i}{462} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{462} & 0 & \frac{\sqrt{2310}i}{462} & \frac{\sqrt{385}}{77} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2310}}{462} & 0 & -\frac{\sqrt{2310}i}{462} & 0 & 0 & -\frac{\sqrt{385}}{77} \end{pmatrix}$
983	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,6)$	$\begin{pmatrix} 0 & \frac{3\sqrt{11}}{176} & 0 & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{176} & 0 & -\frac{\sqrt{165}i}{55} & -\frac{9\sqrt{110}}{440} & 0 \\ \frac{3\sqrt{11}}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{88} & 0 & 0 & \frac{\sqrt{165}}{176} & 0 & \frac{\sqrt{165}i}{55} & 0 & 0 & \frac{9\sqrt{110}}{440} \\ 0 & 0 & 0 & \frac{3\sqrt{11}}{176} & 0 & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & \frac{\sqrt{165}i}{110} & 0 & \frac{7\sqrt{165}}{880} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{11}}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{88} & -\frac{\sqrt{165}i}{110} & 0 & \frac{7\sqrt{165}}{880} & 0 & 0 & 0 \\ -\frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{11}}{88} & 0 & \frac{\sqrt{11}i}{44} & \frac{7\sqrt{110}}{440} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{440} \\ 0 & \frac{\sqrt{66}}{88} & 0 & 0 & -\frac{3\sqrt{11}}{88} & 0 & -\frac{\sqrt{11}i}{44} & 0 & 0 & -\frac{7\sqrt{110}}{440} & 0 & 0 & -\frac{\sqrt{165}}{440} & 0 \\ 0 & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & \frac{\sqrt{11}i}{44} & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & \frac{\sqrt{110}}{440} & 0 & 0 & -\frac{\sqrt{165}i}{220} \\ 0 & 0 & 0 & \frac{\sqrt{66}}{88} & -\frac{\sqrt{11}i}{44} & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{440} & \frac{\sqrt{165}i}{220} & 0 \\ 0 & \frac{\sqrt{165}}{176} & 0 & \frac{\sqrt{165}i}{110} & \frac{7\sqrt{110}}{440} & 0 & 0 & 0 & 0 & \frac{5\sqrt{11}}{176} & 0 & \frac{\sqrt{11}i}{22} & \frac{\sqrt{66}}{88} & 0 \\ \frac{\sqrt{165}}{176} & 0 & -\frac{\sqrt{165}i}{110} & 0 & 0 & -\frac{7\sqrt{110}}{440} & 0 & 0 & \frac{5\sqrt{11}}{176} & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & -\frac{\sqrt{66}}{88} \\ 0 & -\frac{\sqrt{165}i}{55} & 0 & \frac{7\sqrt{165}}{880} & 0 & 0 & \frac{\sqrt{110}}{440} & 0 & 0 & \frac{\sqrt{11}i}{22} & 0 & -\frac{3\sqrt{11}}{176} & 0 & 0 \\ \frac{\sqrt{165}i}{55} & 0 & \frac{7\sqrt{165}}{880} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{440} & -\frac{\sqrt{11}i}{22} & 0 & -\frac{3\sqrt{11}}{176} & 0 & 0 & 0 \\ -\frac{9\sqrt{110}}{440} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{440} & 0 & -\frac{\sqrt{165}i}{220} & \frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & \frac{3\sqrt{11}}{88} \\ 0 & \frac{9\sqrt{110}}{440} & 0 & 0 & -\frac{\sqrt{165}}{440} & 0 & \frac{\sqrt{165}i}{220} & 0 & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & \frac{3\sqrt{11}}{88} & 0 \end{pmatrix}$
984	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,7)$	$\begin{pmatrix} 0 & -\frac{3\sqrt{11}i}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{66}}{88} & 0 & 0 & \frac{7\sqrt{165}i}{880} & 0 & \frac{\sqrt{165}}{110} & 0 & 0 \\ \frac{3\sqrt{11}i}{176} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{88} & -\frac{7\sqrt{165}i}{880} & 0 & \frac{\sqrt{165}}{110} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{11}i}{176} & -\frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{55} & 0 & \frac{\sqrt{165}i}{176} & \frac{9\sqrt{110}}{440} & 0 \\ 0 & 0 & \frac{3\sqrt{11}i}{176} & 0 & 0 & \frac{\sqrt{66}}{88} & 0 & 0 & -\frac{\sqrt{165}}{55} & 0 & -\frac{\sqrt{165}i}{176} & 0 & 0 & -\frac{9\sqrt{110}}{440} \\ 0 & 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & \frac{3\sqrt{11}i}{88} & 0 & \frac{\sqrt{11}}{44} & 0 & 0 & -\frac{7\sqrt{110}}{440} & 0 & 0 & -\frac{\sqrt{165}i}{440} \\ 0 & 0 & 0 & \frac{\sqrt{66}}{88} & -\frac{3\sqrt{11}i}{88} & 0 & \frac{\sqrt{11}}{44} & 0 & 0 & 0 & 0 & \frac{7\sqrt{110}}{440} & \frac{\sqrt{165}i}{440} & 0 \\ \frac{\sqrt{66}}{88} & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{44} & 0 & \frac{\sqrt{11}i}{22} & \frac{\sqrt{110}}{440} & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{220} \\ 0 & -\frac{\sqrt{66}}{88} & 0 & 0 & \frac{\sqrt{11}}{44} & 0 & -\frac{\sqrt{11}i}{22} & 0 & 0 & -\frac{\sqrt{110}}{440} & 0 & 0 & \frac{\sqrt{165}}{220} & 0 \\ 0 & \frac{7\sqrt{165}i}{880} & 0 & -\frac{\sqrt{165}}{55} & 0 & 0 & \frac{\sqrt{110}}{440} & 0 & 0 & \frac{3\sqrt{11}i}{176} & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 \\ -\frac{7\sqrt{165}i}{880} & 0 & -\frac{\sqrt{165}}{55} & 0 & 0 & 0 & 0 & -\frac{\sqrt{110}}{440} & -\frac{3\sqrt{11}i}{176} & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{165}}{110} & 0 & \frac{\sqrt{165}i}{176} & -\frac{7\sqrt{110}}{440} & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{22} & 0 & -\frac{5\sqrt{11}i}{176} & \frac{\sqrt{66}}{88} & 0 \\ \frac{\sqrt{165}}{110} & 0 & -\frac{\sqrt{165}i}{176} & 0 & 0 & \frac{7\sqrt{110}}{440} & 0 & 0 & -\frac{\sqrt{11}}{22} & 0 & \frac{5\sqrt{11}i}{176} & 0 & 0 & -\frac{\sqrt{66}}{88} \\ 0 & 0 & \frac{9\sqrt{110}}{440} & 0 & 0 & -\frac{\sqrt{165}i}{440} & 0 & \frac{\sqrt{165}}{220} & 0 & 0 & \frac{\sqrt{66}}{88} & 0 & 0 & -\frac{3\sqrt{11}i}{88} \\ 0 & 0 & 0 & -\frac{9\sqrt{110}}{440} & \frac{\sqrt{165}i}{440} & 0 & \frac{\sqrt{165}}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{66}}{88} & \frac{3\sqrt{11}i}{88} & 0 \end{pmatrix}$
985	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{110} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{110}}{110} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{110} & 0 & 0 & -\frac{3\sqrt{110}}{110} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{165}}{110} & 0 & 0 & -\frac{3\sqrt{110}i}{110} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{165}}{110} & \frac{3\sqrt{110}i}{110} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{110} & 0 & \frac{\sqrt{110}i}{110} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & \frac{\sqrt{110}}{110} & 0 & -\frac{\sqrt{110}i}{110} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{11}}{22} & 0 & 0 & \frac{\sqrt{110}i}{110} & 0 & -\frac{\sqrt{110}}{110} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{11}}{22} & -\frac{\sqrt{110}i}{110} & 0 & -\frac{\sqrt{110}}{110} & 0 & 0 & 0 \\ -\frac{\sqrt{165}}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{110}}{110} & 0 & \frac{\sqrt{110}i}{110} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{165}}{110} & 0 & 0 & \frac{\sqrt{110}}{110} & 0 & -\frac{\sqrt{110}i}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{165}}{110} & 0 & 0 & \frac{\sqrt{110}i}{110} & 0 & -\frac{\sqrt{110}}{110} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{165}}{110} & -\frac{\sqrt{110}i}{110} & 0 & -\frac{\sqrt{110}}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{110}}{110} & 0 & -\frac{3\sqrt{110}i}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{110}}{110} & 0 & \frac{3\sqrt{110}i}{110} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
986	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,9)$	$\begin{pmatrix} 0 & \frac{\sqrt{33}}{88} & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{440} & 0 & \frac{\sqrt{55}i}{55} & \frac{\sqrt{330}}{220} & 0 \\ \frac{\sqrt{33}}{88} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & \frac{\sqrt{55}}{440} & 0 & -\frac{\sqrt{55}i}{55} & 0 & 0 & -\frac{\sqrt{330}}{220} \\ 0 & 0 & 0 & \frac{\sqrt{33}}{88} & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & \frac{\sqrt{55}i}{55} & 0 & -\frac{13\sqrt{55}}{440} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{33}}{88} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & -\frac{\sqrt{55}i}{55} & 0 & -\frac{13\sqrt{55}}{440} & 0 & 0 & 0 \\ -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{33}}{132} & 0 & -\frac{\sqrt{33}i}{33} & \frac{\sqrt{330}}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{220} \\ 0 & \frac{\sqrt{22}}{44} & 0 & 0 & -\frac{7\sqrt{33}}{132} & 0 & \frac{\sqrt{33}i}{33} & 0 & 0 & -\frac{\sqrt{330}}{220} & 0 & 0 & \frac{\sqrt{55}}{220} & 0 \\ 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & -\frac{\sqrt{33}i}{33} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{132} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{22}}{44} & \frac{\sqrt{33}i}{33} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{132} & 0 & 0 \\ 0 & \frac{\sqrt{55}}{440} & 0 & \frac{\sqrt{55}i}{55} & \frac{\sqrt{330}}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}}{88} & 0 & 0 & \frac{\sqrt{22}}{44} & 0 \\ \frac{\sqrt{55}}{440} & 0 & -\frac{\sqrt{55}i}{55} & 0 & 0 & -\frac{\sqrt{330}}{220} & 0 & 0 & -\frac{\sqrt{33}}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} \\ 0 & \frac{\sqrt{55}i}{55} & 0 & -\frac{13\sqrt{55}}{440} & 0 & 0 & \frac{\sqrt{330}}{132} & 0 & 0 & 0 & 0 & \frac{5\sqrt{33}}{264} & 0 & 0 \\ -\frac{\sqrt{55}i}{55} & 0 & -\frac{13\sqrt{55}}{440} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{132} & 0 & 0 & \frac{5\sqrt{33}}{264} & 0 & 0 & 0 \\ \frac{\sqrt{330}}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{55}}{220} & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{44} \\ 0 & -\frac{\sqrt{330}}{220} & 0 & 0 & \frac{\sqrt{55}}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & \frac{\sqrt{33}}{44} & 0 \end{pmatrix}$
987	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,10)$	$\begin{pmatrix} 0 & \frac{\sqrt{33}i}{88} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & \frac{13\sqrt{55}i}{440} & 0 & -\frac{\sqrt{55}}{55} & 0 & 0 \\ -\frac{\sqrt{33}i}{88} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & -\frac{13\sqrt{55}i}{440} & 0 & -\frac{\sqrt{55}}{55} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{33}i}{88} & \frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & -\frac{\sqrt{55}}{55} & 0 & -\frac{\sqrt{55}i}{440} & \frac{\sqrt{330}}{220} & 0 \\ 0 & 0 & -\frac{\sqrt{33}i}{88} & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & -\frac{\sqrt{55}}{55} & 0 & \frac{\sqrt{55}i}{440} & 0 & 0 & -\frac{\sqrt{330}}{220} \\ 0 & 0 & \frac{\sqrt{22}}{44} & 0 & 0 & -\frac{7\sqrt{33}i}{132} & 0 & \frac{\sqrt{33}}{33} & 0 & 0 & \frac{\sqrt{330}}{220} & 0 & 0 & -\frac{\sqrt{55}i}{220} \\ 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & \frac{7\sqrt{33}i}{132} & 0 & \frac{\sqrt{33}}{33} & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}}{220} & \frac{\sqrt{55}i}{220} & 0 \\ -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{33} & 0 & 0 & -\frac{\sqrt{330}}{132} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{22}}{44} & 0 & 0 & \frac{\sqrt{33}}{33} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{132} & 0 & 0 & 0 & 0 \\ 0 & \frac{13\sqrt{55}i}{440} & 0 & -\frac{\sqrt{55}}{55} & 0 & 0 & -\frac{\sqrt{330}}{132} & 0 & 0 & \frac{5\sqrt{33}i}{264} & 0 & 0 & 0 & 0 \\ -\frac{13\sqrt{55}i}{440} & 0 & -\frac{\sqrt{55}}{55} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{132} & -\frac{5\sqrt{33}i}{264} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{55}}{55} & 0 & -\frac{\sqrt{55}i}{440} & \frac{\sqrt{330}}{220} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{33}i}{88} & -\frac{\sqrt{22}}{44} & 0 \\ -\frac{\sqrt{55}}{55} & 0 & \frac{\sqrt{55}i}{440} & 0 & 0 & -\frac{\sqrt{330}}{220} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}i}{88} & 0 & 0 & \frac{\sqrt{22}}{44} \\ 0 & 0 & \frac{\sqrt{330}}{220} & 0 & 0 & -\frac{\sqrt{55}i}{220} & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & \frac{\sqrt{33}i}{44} \\ 0 & 0 & 0 & -\frac{\sqrt{330}}{220} & \frac{\sqrt{55}i}{220} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & -\frac{\sqrt{33}i}{44} & 0 \end{pmatrix}$
988	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,-1;a)}(A_g,11)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & \frac{\sqrt{22}i}{44} & \frac{3\sqrt{55}}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{220} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{22}}{44} & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & -\frac{3\sqrt{55}}{110} & 0 & 0 & \frac{\sqrt{330}}{220} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{22}i}{44} & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & \frac{3\sqrt{55}}{110} & 0 & 0 & -\frac{\sqrt{330}i}{220} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{22}i}{44} & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{55}}{110} & \frac{\sqrt{330}i}{220} & 0 \\ 0 & -\frac{\sqrt{22}}{44} & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{220} & 0 & -\frac{\sqrt{330}i}{220} & -\frac{\sqrt{55}}{110} & 0 \\ -\frac{\sqrt{22}}{44} & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{220} & 0 & \frac{\sqrt{330}i}{220} & 0 & 0 & \frac{\sqrt{55}}{110} \\ 0 & \frac{\sqrt{22}i}{44} & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{330}i}{132} & 0 & \frac{\sqrt{330}}{132} & 0 & 0 \\ -\frac{\sqrt{22}i}{44} & 0 & -\frac{\sqrt{22}}{44} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{330}i}{132} & 0 & \frac{\sqrt{330}}{132} & 0 & 0 & 0 \\ \frac{3\sqrt{55}}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{330}}{220} & 0 & \frac{\sqrt{330}i}{132} & \frac{\sqrt{33}}{33} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} \\ 0 & -\frac{3\sqrt{55}}{110} & 0 & 0 & \frac{\sqrt{330}}{220} & 0 & -\frac{\sqrt{330}i}{132} & 0 & 0 & -\frac{\sqrt{33}}{33} & 0 & 0 & \frac{\sqrt{22}}{44} & 0 \\ 0 & 0 & \frac{3\sqrt{55}}{110} & 0 & 0 & -\frac{\sqrt{330}i}{220} & 0 & \frac{\sqrt{330}}{132} & 0 & 0 & -\frac{\sqrt{33}}{33} & 0 & 0 & \frac{\sqrt{22}i}{44} \\ 0 & 0 & 0 & -\frac{3\sqrt{55}}{110} & \frac{\sqrt{330}i}{220} & 0 & \frac{\sqrt{330}}{132} & 0 & 0 & 0 & 0 & \frac{\sqrt{33}}{33} & -\frac{\sqrt{22}i}{44} & 0 \\ 0 & \frac{\sqrt{330}}{220} & 0 & -\frac{\sqrt{330}i}{220} & -\frac{\sqrt{55}}{110} & 0 & 0 & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & \frac{\sqrt{22}i}{44} & 0 & 0 \\ \frac{\sqrt{330}}{220} & 0 & \frac{\sqrt{330}i}{220} & 0 & 0 & \frac{\sqrt{55}}{110} & 0 & 0 & \frac{\sqrt{22}}{44} & 0 & -\frac{\sqrt{22}i}{44} & 0 & 0 & 0 \end{pmatrix}$
989	symmetry	$\frac{\sqrt{91}xyz\left(3x^4-5x^2y^2-5x^2z^2+3y^4-5y^2z^2+3z^4\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & \frac{\sqrt{462}}{168} & 0 & 0 & -\frac{3\sqrt{77}i}{154} & 0 & \frac{5\sqrt{77}}{308} & 0 & 0 & \frac{\sqrt{770}}{616} & 0 & 0 & -\frac{\sqrt{1155}i}{924} \\ 0 & 0 & 0 & -\frac{\sqrt{462}}{168} & \frac{3\sqrt{77}i}{154} & 0 & \frac{5\sqrt{77}}{308} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{616} & \frac{\sqrt{1155}i}{924} & 0 \\ \frac{\sqrt{462}}{168} & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{154} & 0 & \frac{5\sqrt{77}i}{308} & -\frac{\sqrt{770}}{616} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{924} \\ 0 & -\frac{\sqrt{462}}{168} & 0 & 0 & \frac{3\sqrt{77}}{154} & 0 & -\frac{5\sqrt{77}i}{308} & 0 & 0 & \frac{\sqrt{770}}{616} & 0 & 0 & -\frac{\sqrt{1155}}{924} & 0 \\ 0 & -\frac{3\sqrt{77}i}{154} & 0 & \frac{3\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{77}i}{154} & 0 & \frac{3\sqrt{77}}{154} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{77}}{308} & 0 & \frac{5\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{308} & 0 & \frac{\sqrt{1155}i}{308} & \frac{\sqrt{770}}{154} & 0 \\ \frac{5\sqrt{77}}{308} & 0 & -\frac{5\sqrt{77}i}{308} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{308} & 0 & -\frac{\sqrt{1155}i}{308} & 0 & 0 & -\frac{\sqrt{770}}{154} \\ 0 & 0 & -\frac{\sqrt{770}}{616} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{308} & 0 & 0 & \frac{5\sqrt{462}}{616} & 0 & 0 & -\frac{5\sqrt{77}i}{308} \\ 0 & 0 & 0 & \frac{\sqrt{770}}{616} & 0 & 0 & -\frac{\sqrt{1155}}{308} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}}{616} & \frac{5\sqrt{77}i}{308} & 0 \\ \frac{\sqrt{770}}{616} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}i}{308} & \frac{5\sqrt{462}}{616} & 0 & 0 & 0 & 0 & \frac{5\sqrt{77}}{308} \\ 0 & -\frac{\sqrt{770}}{616} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}i}{308} & 0 & 0 & -\frac{5\sqrt{462}}{616} & 0 & 0 & \frac{5\sqrt{77}}{308} & 0 \\ 0 & -\frac{\sqrt{1155}i}{924} & 0 & -\frac{\sqrt{1155}}{924} & 0 & 0 & \frac{\sqrt{770}}{154} & 0 & 0 & -\frac{5\sqrt{77}i}{308} & 0 & \frac{5\sqrt{77}}{308} & 0 & 0 \\ \frac{\sqrt{1155}i}{924} & 0 & -\frac{\sqrt{1155}}{924} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{154} & \frac{5\sqrt{77}i}{308} & 0 & \frac{5\sqrt{77}}{308} & 0 & 0 & 0 \end{bmatrix}$
990	symmetry	$-\frac{\sqrt{231}xyz(x-y)(x+y)\left(3x^2+3y^2-10z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,2)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{273}i}{364} & 0 & -\frac{\sqrt{273}}{364} & 0 & 0 & \frac{\sqrt{2730}}{364} & 0 & 0 & -\frac{\sqrt{455}i}{182} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{273}i}{364} & 0 & -\frac{\sqrt{273}}{364} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2730}}{364} & \frac{\sqrt{455}i}{182} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{273}}{364} & 0 & \frac{\sqrt{273}i}{364} & \frac{\sqrt{2730}}{364} & 0 & 0 & 0 & 0 & \frac{\sqrt{455}}{182} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{273}}{364} & 0 & -\frac{\sqrt{273}i}{364} & 0 & 0 & -\frac{\sqrt{2730}}{364} & 0 & 0 & \frac{\sqrt{455}}{182} & 0 \\ 0 & -\frac{\sqrt{273}i}{364} & 0 & -\frac{\sqrt{273}}{364} & 0 & 0 & \frac{3\sqrt{182}}{182} & 0 & 0 & -\frac{3\sqrt{455}i}{364} & 0 & \frac{3\sqrt{455}}{364} & 0 & 0 \\ \frac{\sqrt{273}i}{364} & 0 & -\frac{\sqrt{273}}{364} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{182}}{182} & \frac{3\sqrt{455}i}{364} & 0 & \frac{3\sqrt{455}}{364} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{273}}{364} & 0 & \frac{\sqrt{273}i}{364} & \frac{3\sqrt{182}}{182} & 0 & 0 & 0 & 0 & \frac{3\sqrt{455}}{364} & 0 & \frac{3\sqrt{455}i}{364} & 0 & 0 \\ -\frac{\sqrt{273}}{364} & 0 & -\frac{\sqrt{273}i}{364} & 0 & 0 & -\frac{3\sqrt{182}}{182} & 0 & 0 & \frac{3\sqrt{455}}{364} & 0 & -\frac{3\sqrt{455}i}{364} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2730}}{364} & 0 & 0 & -\frac{3\sqrt{455}i}{364} & 0 & \frac{3\sqrt{455}}{364} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2730}}{364} & \frac{3\sqrt{455}i}{364} & 0 & \frac{3\sqrt{455}}{364} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2730}}{364} & 0 & 0 & 0 & 0 & \frac{3\sqrt{455}}{364} & 0 & \frac{3\sqrt{455}i}{364} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2730}}{364} & 0 & 0 & \frac{3\sqrt{455}}{364} & 0 & -\frac{3\sqrt{455}i}{364} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{455}i}{182} & 0 & \frac{\sqrt{455}}{182} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{455}i}{182} & 0 & \frac{\sqrt{455}}{182} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$
991	symmetry	$-\frac{\sqrt{77}xyz\left(3x^4-20x^2y^2+10x^2z^2+3y^4+10y^2z^2-6z^4\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,3)$	$\begin{pmatrix} 0 & 0 & -\frac{\sqrt{546}}{168} & 0 & 0 & \frac{3\sqrt{91}i}{182} & 0 & -\frac{\sqrt{91}}{52} & 0 & 0 & \frac{\sqrt{910}}{728} & 0 & 0 & -\frac{\sqrt{1365}i}{1092} \\ 0 & 0 & 0 & \frac{\sqrt{546}}{168} & -\frac{3\sqrt{91}i}{182} & 0 & -\frac{\sqrt{91}}{52} & 0 & 0 & 0 & 0 & -\frac{\sqrt{910}}{728} & \frac{\sqrt{1365}i}{1092} & 0 \\ -\frac{\sqrt{546}}{168} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{91}}{182} & 0 & -\frac{\sqrt{91}i}{52} & -\frac{\sqrt{910}}{728} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1365}}{1092} \\ 0 & \frac{\sqrt{546}}{168} & 0 & 0 & -\frac{3\sqrt{91}}{182} & 0 & \frac{\sqrt{91}i}{52} & 0 & 0 & \frac{\sqrt{910}}{728} & 0 & 0 & -\frac{\sqrt{1365}}{1092} & 0 \\ 0 & \frac{3\sqrt{91}i}{182} & 0 & -\frac{3\sqrt{91}}{182} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{91}i}{182} & 0 & -\frac{3\sqrt{91}}{182} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{91}}{52} & 0 & -\frac{\sqrt{91}i}{52} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1365}}{364} & 0 & \frac{\sqrt{1365}i}{364} & \frac{\sqrt{910}}{182} & 0 \\ -\frac{\sqrt{91}}{52} & 0 & \frac{\sqrt{91}i}{52} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1365}}{364} & 0 & -\frac{\sqrt{1365}i}{364} & 0 & 0 & -\frac{\sqrt{910}}{182} \\ 0 & 0 & -\frac{\sqrt{910}}{728} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1365}}{364} & 0 & 0 & \frac{5\sqrt{546}}{728} & 0 & 0 & -\frac{5\sqrt{91}i}{364} \\ 0 & 0 & 0 & \frac{\sqrt{910}}{728} & 0 & 0 & -\frac{\sqrt{1365}}{364} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{546}}{728} & \frac{5\sqrt{91}i}{364} & 0 \\ \frac{\sqrt{910}}{728} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1365}i}{364} & \frac{5\sqrt{546}}{728} & 0 & 0 & 0 & 0 & \frac{5\sqrt{91}}{364} \\ 0 & -\frac{\sqrt{910}}{728} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1365}i}{364} & 0 & 0 & -\frac{5\sqrt{546}}{728} & 0 & 0 & \frac{5\sqrt{91}}{364} & 0 \\ 0 & -\frac{\sqrt{1365}i}{1092} & 0 & -\frac{\sqrt{1365}}{1092} & 0 & 0 & \frac{\sqrt{910}}{182} & 0 & 0 & -\frac{5\sqrt{91}i}{364} & 0 & \frac{5\sqrt{91}}{364} & 0 & 0 \\ \frac{\sqrt{1365}i}{1092} & 0 & -\frac{\sqrt{1365}}{1092} & 0 & 0 & 0 & 0 & -\frac{\sqrt{910}}{182} & \frac{5\sqrt{91}i}{364} & 0 & \frac{5\sqrt{91}}{364} & 0 & 0 & 0 \end{pmatrix}$
992	symmetry	$\frac{x\left(16x^6-168x^4y^2-168x^4z^2+210x^2y^4+420x^2y^2z^2+210x^2z^4-35y^6-105y^4z^2-105y^2z^4-35z^6\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,4)$	$\begin{pmatrix} 0 & \frac{59\sqrt{858}}{6864} & 0 & \frac{3\sqrt{858}i}{416} & -\frac{19\sqrt{143}}{2288} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{1430}}{2288} & 0 & -\frac{5\sqrt{1430}i}{4576} & \frac{3\sqrt{2145}}{2288} & 0 \\ \frac{59\sqrt{858}}{6864} & 0 & -\frac{3\sqrt{858}i}{416} & 0 & 0 & \frac{19\sqrt{143}}{2288} & 0 & 0 & -\frac{7\sqrt{1430}}{2288} & 0 & \frac{5\sqrt{1430}i}{4576} & 0 & 0 & -\frac{3\sqrt{2145}}{2288} \\ 0 & \frac{3\sqrt{858}i}{416} & 0 & -\frac{113\sqrt{858}}{13728} & 0 & 0 & \frac{7\sqrt{143}}{1144} & 0 & 0 & -\frac{7\sqrt{1430}i}{4576} & 0 & \frac{7\sqrt{1430}}{4576} & 0 & 0 \\ -\frac{3\sqrt{858}i}{416} & 0 & -\frac{113\sqrt{858}}{13728} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{143}}{1144} & \frac{7\sqrt{1430}i}{4576} & 0 & \frac{7\sqrt{1430}}{4576} & 0 & 0 & 0 \\ -\frac{19\sqrt{143}}{2288} & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}}{176} & 0 & -\frac{3\sqrt{858}i}{1144} & \frac{7\sqrt{2145}}{2288} & 0 & 0 & 0 & 0 & \frac{7\sqrt{1430}}{2288} \\ 0 & \frac{19\sqrt{143}}{2288} & 0 & 0 & -\frac{\sqrt{858}}{176} & 0 & \frac{3\sqrt{858}i}{1144} & 0 & 0 & -\frac{7\sqrt{2145}}{2288} & 0 & 0 & \frac{7\sqrt{1430}}{2288} & 0 \\ 0 & 0 & \frac{7\sqrt{143}}{1144} & 0 & 0 & -\frac{3\sqrt{858}i}{1144} & 0 & \frac{\sqrt{858}}{286} & 0 & 0 & -\frac{\sqrt{2145}}{1144} & 0 & 0 & \frac{\sqrt{1430}i}{1144} \\ 0 & 0 & 0 & -\frac{7\sqrt{143}}{1144} & \frac{3\sqrt{858}i}{1144} & 0 & \frac{\sqrt{858}}{286} & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}}{1144} & -\frac{\sqrt{1430}i}{1144} & 0 \\ 0 & -\frac{7\sqrt{1430}}{2288} & 0 & -\frac{7\sqrt{1430}i}{4576} & \frac{7\sqrt{2145}}{2288} & 0 & 0 & 0 & 0 & \frac{15\sqrt{858}}{2288} & 0 & \frac{5\sqrt{858}i}{4576} & -\frac{25\sqrt{143}}{2288} & 0 \\ -\frac{7\sqrt{1430}}{2288} & 0 & \frac{7\sqrt{1430}i}{4576} & 0 & 0 & -\frac{7\sqrt{2145}}{2288} & 0 & 0 & \frac{15\sqrt{858}}{2288} & 0 & -\frac{5\sqrt{858}i}{4576} & 0 & 0 & \frac{25\sqrt{143}}{2288} \\ 0 & -\frac{5\sqrt{1430}i}{4576} & 0 & \frac{7\sqrt{1430}}{4576} & 0 & 0 & -\frac{\sqrt{2145}}{1144} & 0 & 0 & \frac{5\sqrt{858}i}{4576} & 0 & -\frac{5\sqrt{858}}{4576} & 0 & 0 \\ \frac{5\sqrt{1430}i}{4576} & 0 & \frac{7\sqrt{1430}}{4576} & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}}{1144} & -\frac{5\sqrt{858}i}{4576} & 0 & -\frac{5\sqrt{858}}{4576} & 0 & 0 & 0 \\ \frac{3\sqrt{2145}}{2288} & 0 & 0 & 0 & 0 & \frac{7\sqrt{1430}}{2288} & 0 & \frac{\sqrt{1430}i}{1144} & -\frac{25\sqrt{143}}{2288} & 0 & 0 & 0 & 0 & -\frac{25\sqrt{858}}{6864} \\ 0 & -\frac{3\sqrt{2145}}{2288} & 0 & 0 & \frac{7\sqrt{1430}}{2288} & 0 & -\frac{\sqrt{1430}i}{1144} & 0 & 0 & \frac{25\sqrt{143}}{2288} & 0 & 0 & -\frac{25\sqrt{858}}{6864} & 0 \end{pmatrix}$
993	symmetry	$-\frac{y\left(35x^6-210x^4y^2+105x^4z^2+168x^2y^4-420x^2y^2z^2+105x^2z^4-16y^6+168y^4z^2-210y^2z^4+35z^6\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,5)$	$\begin{pmatrix} 0 & \frac{113\sqrt{858}i}{13728} & 0 & -\frac{3\sqrt{858}}{416} & 0 & 0 & -\frac{7\sqrt{143}}{1144} & 0 & 0 & \frac{7\sqrt{1430}i}{4576} & 0 & -\frac{7\sqrt{1430}}{4576} & 0 & 0 \\ -\frac{113\sqrt{858}i}{13728} & 0 & -\frac{3\sqrt{858}}{416} & 0 & 0 & 0 & 0 & \frac{7\sqrt{143}}{1144} & -\frac{7\sqrt{1430}i}{4576} & 0 & -\frac{7\sqrt{1430}}{4576} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{858}}{416} & 0 & -\frac{59\sqrt{858}i}{6864} & -\frac{19\sqrt{143}}{2288} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{1430}}{4576} & 0 & -\frac{7\sqrt{1430}i}{2288} & -\frac{3\sqrt{2145}}{2288} & 0 \\ -\frac{3\sqrt{858}}{416} & 0 & \frac{59\sqrt{858}i}{6864} & 0 & 0 & \frac{19\sqrt{143}}{2288} & 0 & 0 & -\frac{5\sqrt{1430}}{4576} & 0 & \frac{7\sqrt{1430}i}{2288} & 0 & 0 & \frac{3\sqrt{2145}}{2288} \\ 0 & 0 & -\frac{19\sqrt{143}}{2288} & 0 & 0 & \frac{\sqrt{858}i}{176} & 0 & -\frac{3\sqrt{858}}{1144} & 0 & 0 & -\frac{7\sqrt{2145}}{2288} & 0 & 0 & \frac{7\sqrt{1430}i}{2288} \\ 0 & 0 & 0 & \frac{19\sqrt{143}}{2288} & -\frac{\sqrt{858}i}{176} & 0 & -\frac{3\sqrt{858}}{1144} & 0 & 0 & 0 & 0 & \frac{7\sqrt{2145}}{2288} & -\frac{7\sqrt{1430}i}{2288} & 0 \\ -\frac{7\sqrt{143}}{1144} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{858}}{1144} & 0 & -\frac{\sqrt{858}i}{286} & -\frac{\sqrt{2145}}{1144} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}}{1144} \\ 0 & \frac{7\sqrt{143}}{1144} & 0 & 0 & -\frac{3\sqrt{858}}{1144} & 0 & \frac{\sqrt{858}i}{286} & 0 & 0 & \frac{\sqrt{2145}}{1144} & 0 & 0 & -\frac{\sqrt{1430}}{1144} & 0 \\ 0 & \frac{7\sqrt{1430}i}{4576} & 0 & -\frac{5\sqrt{1430}}{4576} & 0 & 0 & -\frac{\sqrt{2145}}{1144} & 0 & 0 & \frac{5\sqrt{858}i}{4576} & 0 & -\frac{5\sqrt{858}}{4576} & 0 & 0 \\ -\frac{7\sqrt{1430}i}{4576} & 0 & -\frac{5\sqrt{1430}}{4576} & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}}{1144} & -\frac{5\sqrt{858}i}{4576} & 0 & -\frac{5\sqrt{858}}{4576} & 0 & 0 & 0 \\ 0 & -\frac{7\sqrt{1430}}{4576} & 0 & -\frac{7\sqrt{1430}i}{2288} & -\frac{7\sqrt{2145}}{2288} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{858}}{4576} & 0 & -\frac{15\sqrt{858}i}{2288} & -\frac{25\sqrt{143}}{2288} & 0 \\ -\frac{7\sqrt{1430}}{4576} & 0 & \frac{7\sqrt{1430}i}{2288} & 0 & 0 & \frac{7\sqrt{2145}}{2288} & 0 & 0 & -\frac{5\sqrt{858}}{4576} & 0 & \frac{15\sqrt{858}i}{2288} & 0 & 0 & \frac{25\sqrt{143}}{2288} \\ 0 & 0 & -\frac{3\sqrt{2145}}{2288} & 0 & 0 & \frac{7\sqrt{1430}i}{2288} & 0 & -\frac{\sqrt{1430}}{1144} & 0 & 0 & -\frac{25\sqrt{143}}{2288} & 0 & 0 & \frac{25\sqrt{858}i}{6864} \\ 0 & 0 & 0 & \frac{3\sqrt{2145}}{2288} & -\frac{7\sqrt{1430}i}{2288} & 0 & -\frac{\sqrt{1430}}{1144} & 0 & 0 & 0 & 0 & \frac{25\sqrt{143}}{2288} & -\frac{25\sqrt{858}i}{6864} & 0 \end{pmatrix}$
994	symmetry	$-\frac{z\left(35x^6+105x^4y^2-210x^4z^2+105x^2y^4-420x^2y^2z^2+168x^2z^4+35y^6-210y^4z^2+168y^2z^4-16z^6\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,6)$	$\begin{pmatrix} -\frac{\sqrt{858}}{1716} & 0 & 0 & 0 & 0 & -\frac{\sqrt{143}}{572} & 0 & -\frac{\sqrt{143}i}{572} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{858}}{1716} & 0 & 0 & -\frac{\sqrt{143}}{572} & 0 & \frac{\sqrt{143}i}{572} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{858}}{1716} & 0 & 0 & \frac{\sqrt{143}i}{572} & 0 & -\frac{\sqrt{143}}{572} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{858}}{1716} & -\frac{\sqrt{143}i}{572} & 0 & -\frac{\sqrt{143}}{572} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{143}}{572} & 0 & \frac{\sqrt{143}i}{572} & \frac{\sqrt{858}}{286} & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}}{572} & 0 & \frac{\sqrt{2145}i}{572} & 0 & 0 \\ -\frac{\sqrt{143}}{572} & 0 & -\frac{\sqrt{143}i}{572} & 0 & 0 & -\frac{\sqrt{858}}{286} & 0 & 0 & \frac{\sqrt{2145}}{572} & 0 & -\frac{\sqrt{2145}i}{572} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{143}i}{572} & 0 & -\frac{\sqrt{143}}{572} & 0 & 0 & \frac{\sqrt{858}}{286} & 0 & 0 & -\frac{\sqrt{2145}i}{572} & 0 & \frac{\sqrt{2145}}{572} & 0 & 0 \\ \frac{\sqrt{143}i}{572} & 0 & -\frac{\sqrt{143}}{572} & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}}{286} & \frac{\sqrt{2145}i}{572} & 0 & \frac{\sqrt{2145}}{572} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}}{572} & 0 & -\frac{\sqrt{2145}i}{572} & -\frac{5\sqrt{858}}{572} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{143}}{286} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2145}}{572} & 0 & \frac{\sqrt{2145}i}{572} & 0 & 0 & \frac{5\sqrt{858}}{572} & 0 & 0 & -\frac{5\sqrt{143}}{286} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2145}i}{572} & 0 & \frac{\sqrt{2145}}{572} & 0 & 0 & -\frac{5\sqrt{858}}{572} & 0 & 0 & \frac{5\sqrt{143}i}{286} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}i}{572} & 0 & \frac{\sqrt{2145}}{572} & 0 & 0 & 0 & 0 & \frac{5\sqrt{858}}{572} & -\frac{5\sqrt{143}i}{286} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{143}}{286} & 0 & \frac{5\sqrt{143}i}{286} & \frac{5\sqrt{858}}{429} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{143}}{286} & 0 & -\frac{5\sqrt{143}i}{286} & 0 & 0 & -\frac{5\sqrt{858}}{429} \end{pmatrix}$
995	symmetry	$\frac{\sqrt{231}x\left(10x^2-3y^2-3z^2\right)\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,7)$	$\begin{pmatrix} 0 & \frac{9\sqrt{182}}{1456} & 0 & \frac{29\sqrt{182}i}{2912} & \frac{11\sqrt{273}}{1456} & 0 & 0 & 0 & 0 & \frac{3\sqrt{2730}}{1456} & 0 & \frac{5\sqrt{2730}i}{2912} & -\frac{\sqrt{455}}{1456} & 0 \\ \frac{9\sqrt{182}}{1456} & 0 & -\frac{29\sqrt{182}i}{2912} & 0 & 0 & -\frac{11\sqrt{273}}{1456} & 0 & 0 & \frac{3\sqrt{2730}}{1456} & 0 & -\frac{5\sqrt{2730}i}{2912} & 0 & 0 & \frac{\sqrt{455}}{1456} \\ 0 & \frac{29\sqrt{182}i}{2912} & 0 & -\frac{15\sqrt{182}}{2912} & 0 & 0 & -\frac{\sqrt{273}}{104} & 0 & 0 & \frac{\sqrt{2730}i}{416} & 0 & -\frac{\sqrt{2730}}{416} & 0 & 0 \\ -\frac{29\sqrt{182}i}{2912} & 0 & -\frac{15\sqrt{182}}{2912} & 0 & 0 & 0 & 0 & \frac{\sqrt{273}}{104} & -\frac{\sqrt{2730}i}{416} & 0 & -\frac{\sqrt{2730}}{416} & 0 & 0 & 0 \\ \frac{11\sqrt{273}}{1456} & 0 & 0 & 0 & 0 & \frac{15\sqrt{182}}{1456} & 0 & \frac{9\sqrt{182}i}{728} & \frac{3\sqrt{455}}{1456} & 0 & 0 & 0 & 0 & \frac{\sqrt{2730}}{1456} \\ 0 & -\frac{11\sqrt{273}}{1456} & 0 & 0 & \frac{15\sqrt{182}}{1456} & 0 & -\frac{9\sqrt{182}i}{728} & 0 & 0 & -\frac{3\sqrt{455}}{1456} & 0 & 0 & \frac{\sqrt{2730}}{1456} & 0 \\ 0 & 0 & -\frac{\sqrt{273}}{104} & 0 & 0 & \frac{9\sqrt{182}i}{728} & 0 & -\frac{3\sqrt{182}}{182} & 0 & 0 & \frac{3\sqrt{455}}{728} & 0 & 0 & -\frac{\sqrt{2730}i}{728} \\ 0 & 0 & 0 & \frac{\sqrt{273}}{104} & -\frac{9\sqrt{182}i}{728} & 0 & -\frac{3\sqrt{182}}{182} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{455}}{728} & \frac{\sqrt{2730}i}{728} & 0 \\ 0 & \frac{3\sqrt{2730}}{1456} & 0 & \frac{\sqrt{2730}i}{416} & \frac{3\sqrt{455}}{1456} & 0 & 0 & 0 & 0 & \frac{15\sqrt{182}}{1456} & 0 & -\frac{15\sqrt{182}i}{2912} & -\frac{15\sqrt{273}}{1456} & 0 \\ \frac{3\sqrt{2730}}{1456} & 0 & -\frac{\sqrt{2730}i}{416} & 0 & 0 & -\frac{3\sqrt{455}}{1456} & 0 & 0 & \frac{15\sqrt{182}}{1456} & 0 & \frac{15\sqrt{182}i}{2912} & 0 & 0 & \frac{15\sqrt{273}}{1456} \\ 0 & \frac{5\sqrt{2730}i}{2912} & 0 & -\frac{\sqrt{2730}}{416} & 0 & 0 & \frac{3\sqrt{455}}{728} & 0 & 0 & -\frac{15\sqrt{182}i}{2912} & 0 & \frac{15\sqrt{182}}{2912} & 0 & 0 \\ -\frac{5\sqrt{2730}i}{2912} & 0 & -\frac{\sqrt{2730}}{416} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{455}}{728} & \frac{15\sqrt{182}i}{2912} & 0 & \frac{15\sqrt{182}}{2912} & 0 & 0 & 0 \\ -\frac{\sqrt{455}}{1456} & 0 & 0 & 0 & 0 & \frac{\sqrt{2730}}{1456} & 0 & -\frac{\sqrt{2730}i}{728} & -\frac{15\sqrt{273}}{1456} & 0 & 0 & 0 & 0 & -\frac{15\sqrt{182}}{1456} \\ 0 & \frac{\sqrt{455}}{1456} & 0 & 0 & \frac{\sqrt{2730}}{1456} & 0 & \frac{\sqrt{2730}i}{728} & 0 & 0 & \frac{15\sqrt{273}}{1456} & 0 & 0 & -\frac{15\sqrt{182}}{1456} & 0 \end{pmatrix}$
996	symmetry	$-\frac{\sqrt{231}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)\left(3x^2-10y^2+3z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,8)$	$\begin{pmatrix} 0 & \frac{15\sqrt{182}i}{2912} & 0 & -\frac{29\sqrt{182}}{2912} & 0 & 0 & \frac{\sqrt{273}}{104} & 0 & 0 & -\frac{\sqrt{2730}i}{416} & 0 & \frac{\sqrt{2730}}{416} & 0 & 0 \\ -\frac{15\sqrt{182}i}{2912} & 0 & -\frac{29\sqrt{182}}{2912} & 0 & 0 & 0 & 0 & -\frac{\sqrt{273}}{104} & \frac{\sqrt{2730}i}{416} & 0 & \frac{\sqrt{2730}}{416} & 0 & 0 & 0 \\ 0 & -\frac{29\sqrt{182}}{2912} & 0 & -\frac{9\sqrt{182}i}{1456} & \frac{11\sqrt{273}}{1456} & 0 & 0 & 0 & 0 & \frac{5\sqrt{2730}}{2912} & 0 & \frac{3\sqrt{2730}i}{1456} & \frac{\sqrt{455}}{1456} & 0 \\ -\frac{29\sqrt{182}}{2912} & 0 & \frac{9\sqrt{182}i}{1456} & 0 & 0 & -\frac{11\sqrt{273}}{1456} & 0 & 0 & \frac{5\sqrt{2730}}{2912} & 0 & -\frac{3\sqrt{2730}i}{1456} & 0 & 0 & -\frac{\sqrt{455}}{1456} \\ 0 & 0 & \frac{11\sqrt{273}}{1456} & 0 & 0 & -\frac{15\sqrt{182}i}{1456} & 0 & \frac{9\sqrt{182}}{728} & 0 & 0 & -\frac{3\sqrt{455}}{1456} & 0 & 0 & \frac{\sqrt{2730}i}{1456} \\ 0 & 0 & 0 & -\frac{11\sqrt{273}}{1456} & \frac{15\sqrt{182}i}{1456} & 0 & \frac{9\sqrt{182}}{728} & 0 & 0 & 0 & 0 & \frac{3\sqrt{455}}{1456} & -\frac{\sqrt{2730}i}{1456} & 0 \\ \frac{\sqrt{273}}{104} & 0 & 0 & 0 & 0 & \frac{9\sqrt{182}}{728} & 0 & \frac{3\sqrt{182}i}{182} & \frac{3\sqrt{455}}{728} & 0 & 0 & 0 & 0 & \frac{\sqrt{2730}}{728} \\ 0 & -\frac{\sqrt{273}}{104} & 0 & 0 & \frac{9\sqrt{182}}{728} & 0 & -\frac{3\sqrt{182}i}{182} & 0 & 0 & -\frac{3\sqrt{455}}{728} & 0 & 0 & \frac{\sqrt{2730}}{728} & 0 \\ 0 & -\frac{\sqrt{2730}i}{416} & 0 & \frac{5\sqrt{2730}}{2912} & 0 & 0 & \frac{3\sqrt{455}}{728} & 0 & 0 & -\frac{15\sqrt{182}i}{2912} & 0 & \frac{15\sqrt{182}}{2912} & 0 & 0 \\ \frac{\sqrt{2730}i}{416} & 0 & \frac{5\sqrt{2730}}{2912} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{455}}{728} & \frac{15\sqrt{182}i}{2912} & 0 & \frac{15\sqrt{182}}{2912} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2730}}{416} & 0 & \frac{3\sqrt{2730}i}{1456} & -\frac{3\sqrt{455}}{1456} & 0 & 0 & 0 & 0 & \frac{15\sqrt{182}}{2912} & 0 & -\frac{15\sqrt{182}i}{1456} & -\frac{15\sqrt{273}}{1456} & 0 \\ \frac{\sqrt{2730}}{416} & 0 & -\frac{3\sqrt{2730}i}{1456} & 0 & 0 & \frac{3\sqrt{455}}{1456} & 0 & 0 & \frac{15\sqrt{182}}{2912} & 0 & \frac{15\sqrt{182}i}{1456} & 0 & 0 & \frac{15\sqrt{273}}{1456} \\ 0 & 0 & \frac{\sqrt{455}}{1456} & 0 & 0 & \frac{\sqrt{2730}i}{1456} & 0 & \frac{\sqrt{2730}}{728} & 0 & 0 & -\frac{15\sqrt{273}}{1456} & 0 & 0 & \frac{15\sqrt{182}i}{1456} \\ 0 & 0 & 0 & -\frac{\sqrt{455}}{1456} & -\frac{\sqrt{2730}i}{1456} & 0 & \frac{\sqrt{2730}}{728} & 0 & 0 & 0 & 0 & \frac{15\sqrt{273}}{1456} & -\frac{15\sqrt{182}i}{1456} & 0 \end{pmatrix}$
997	symmetry	$-\frac{\sqrt{231}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)\left(3x^2+3y^2-10z^2\right)}{16}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,9)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{273}}{364} & 0 & \frac{\sqrt{273}i}{364} & \frac{\sqrt{2730}}{364} & 0 & 0 & 0 & 0 & \frac{\sqrt{455}}{182} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{273}}{364} & 0 & -\frac{\sqrt{273}i}{364} & 0 & 0 & -\frac{\sqrt{2730}}{364} & 0 & 0 & \frac{\sqrt{455}}{182} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{273}i}{364} & 0 & \frac{\sqrt{273}}{364} & 0 & 0 & -\frac{\sqrt{2730}}{364} & 0 & 0 & \frac{\sqrt{455}i}{182} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{273}i}{364} & 0 & \frac{\sqrt{273}}{364} & 0 & 0 & 0 & 0 & \frac{\sqrt{2730}}{364} & -\frac{\sqrt{455}i}{182} & 0 \\ 0 & -\frac{\sqrt{273}}{364} & 0 & \frac{\sqrt{273}i}{364} & \frac{3\sqrt{182}}{182} & 0 & 0 & 0 & 0 & \frac{3\sqrt{455}}{364} & 0 & \frac{3\sqrt{455}i}{364} & 0 & 0 \\ -\frac{\sqrt{273}}{364} & 0 & -\frac{\sqrt{273}i}{364} & 0 & 0 & -\frac{3\sqrt{182}}{182} & 0 & 0 & \frac{3\sqrt{455}}{364} & 0 & -\frac{3\sqrt{455}i}{364} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{273}i}{364} & 0 & \frac{\sqrt{273}}{364} & 0 & 0 & -\frac{3\sqrt{182}}{182} & 0 & 0 & \frac{3\sqrt{455}i}{364} & 0 & -\frac{3\sqrt{455}}{364} & 0 & 0 \\ -\frac{\sqrt{273}i}{364} & 0 & \frac{\sqrt{273}}{364} & 0 & 0 & 0 & 0 & \frac{3\sqrt{182}}{182} & -\frac{3\sqrt{455}i}{364} & 0 & -\frac{3\sqrt{455}}{364} & 0 & 0 & 0 \\ \frac{\sqrt{2730}}{364} & 0 & 0 & 0 & 0 & \frac{3\sqrt{455}}{364} & 0 & \frac{3\sqrt{455}i}{364} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2730}}{364} & 0 & 0 & \frac{3\sqrt{455}}{364} & 0 & -\frac{3\sqrt{455}i}{364} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2730}}{364} & 0 & 0 & \frac{3\sqrt{455}i}{364} & 0 & -\frac{3\sqrt{455}}{364} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2730}}{364} & -\frac{3\sqrt{455}i}{364} & 0 & -\frac{3\sqrt{455}}{364} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{455}}{182} & 0 & \frac{\sqrt{455}i}{182} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{455}}{182} & 0 & -\frac{\sqrt{455}i}{182} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
998	symmetry	$\frac{\sqrt{6006}x(y-z)(y+z)\left(y^2-4yz+z^2\right)\left(y^2+4yz+z^2\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,10)$	$\begin{pmatrix} 0 & 0 & 0 & -\frac{3\sqrt{7}i}{224} & -\frac{3\sqrt{42}}{224} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}i}{224} & -\frac{3\sqrt{70}}{224} & 0 \\ 0 & 0 & \frac{3\sqrt{7}i}{224} & 0 & 0 & \frac{3\sqrt{42}}{224} & 0 & 0 & 0 & 0 & \frac{3\sqrt{105}i}{224} & 0 & 0 & \frac{3\sqrt{70}}{224} \\ 0 & -\frac{3\sqrt{7}i}{224} & 0 & \frac{\sqrt{7}}{224} & 0 & 0 & \frac{\sqrt{42}}{112} & 0 & 0 & -\frac{\sqrt{105}i}{224} & 0 & \frac{\sqrt{105}}{224} & 0 & 0 \\ \frac{3\sqrt{7}i}{224} & 0 & \frac{\sqrt{7}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & \frac{\sqrt{105}i}{224} & 0 & \frac{\sqrt{105}}{224} & 0 & 0 & 0 \\ -\frac{3\sqrt{42}}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{112} & 0 & -\frac{3\sqrt{7}i}{56} & -\frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{112} \\ 0 & \frac{3\sqrt{42}}{224} & 0 & 0 & -\frac{3\sqrt{7}}{112} & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}}{112} & 0 \\ 0 & 0 & \frac{\sqrt{42}}{112} & 0 & 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{112} & 0 & 0 & -\frac{\sqrt{105}i}{56} \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{112} & \frac{\sqrt{105}i}{56} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{224} & -\frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{15\sqrt{7}i}{224} & -\frac{5\sqrt{42}}{224} & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{224} & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 & \frac{15\sqrt{7}i}{224} & 0 & 0 & \frac{5\sqrt{42}}{224} \\ 0 & -\frac{3\sqrt{105}i}{224} & 0 & \frac{\sqrt{105}}{224} & 0 & 0 & \frac{3\sqrt{70}}{112} & 0 & 0 & -\frac{15\sqrt{7}i}{224} & 0 & \frac{15\sqrt{7}}{224} & 0 & 0 \\ \frac{3\sqrt{105}i}{224} & 0 & \frac{\sqrt{105}}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{70}}{112} & \frac{15\sqrt{7}i}{224} & 0 & \frac{15\sqrt{7}}{224} & 0 & 0 & 0 \\ -\frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & -\frac{\sqrt{105}i}{56} & -\frac{5\sqrt{42}}{224} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}}{112} \\ 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & \frac{5\sqrt{42}}{224} & 0 & 0 & -\frac{5\sqrt{7}}{112} & 0 \end{pmatrix}$
999	symmetry	$-\frac{\sqrt{6006}y(x-z)(x+z)\left(x^2-4xz+z^2\right)\left(x^2+4xz+z^2\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,11)$	$\begin{bmatrix} 0 & \frac{\sqrt{7}i}{224} & 0 & -\frac{3\sqrt{7}}{224} & 0 & 0 & \frac{\sqrt{42}}{112} & 0 & 0 & -\frac{\sqrt{105}i}{224} & 0 & \frac{\sqrt{105}}{224} & 0 & 0 \\ -\frac{\sqrt{7}i}{224} & 0 & -\frac{3\sqrt{7}}{224} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{112} & \frac{\sqrt{105}i}{224} & 0 & \frac{\sqrt{105}}{224} & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{7}}{224} & 0 & 0 & \frac{3\sqrt{42}}{224} & 0 & 0 & 0 & 0 & \frac{3\sqrt{105}}{224} & 0 & 0 & -\frac{3\sqrt{70}}{224} & 0 \\ -\frac{3\sqrt{7}}{224} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{42}}{224} & 0 & 0 & \frac{3\sqrt{105}}{224} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{224} \\ 0 & 0 & \frac{3\sqrt{42}}{224} & 0 & 0 & -\frac{3\sqrt{7}i}{112} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{3\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}i}{112} \\ 0 & 0 & 0 & -\frac{3\sqrt{42}}{224} & \frac{3\sqrt{7}i}{112} & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{224} & -\frac{\sqrt{105}i}{112} & 0 \\ \frac{\sqrt{42}}{112} & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & -\frac{3\sqrt{70}}{112} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} \\ 0 & -\frac{\sqrt{42}}{112} & 0 & 0 & \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{112} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 \\ 0 & -\frac{\sqrt{105}i}{224} & 0 & \frac{3\sqrt{105}}{224} & 0 & 0 & -\frac{3\sqrt{70}}{112} & 0 & 0 & \frac{15\sqrt{7}i}{224} & 0 & -\frac{15\sqrt{7}}{224} & 0 & 0 \\ \frac{\sqrt{105}i}{224} & 0 & \frac{3\sqrt{105}}{224} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{112} & -\frac{15\sqrt{7}i}{224} & 0 & -\frac{15\sqrt{7}}{224} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{224} & 0 & 0 & -\frac{3\sqrt{70}}{224} & 0 & 0 & 0 & 0 & -\frac{15\sqrt{7}}{224} & 0 & 0 & \frac{5\sqrt{42}}{224} & 0 \\ \frac{\sqrt{105}}{224} & 0 & 0 & 0 & 0 & \frac{3\sqrt{70}}{224} & 0 & 0 & -\frac{15\sqrt{7}}{224} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{224} \\ 0 & 0 & -\frac{3\sqrt{70}}{224} & 0 & 0 & \frac{\sqrt{105}i}{112} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & \frac{5\sqrt{42}}{224} & 0 & 0 & -\frac{5\sqrt{7}i}{112} \\ 0 & 0 & 0 & \frac{3\sqrt{70}}{224} & -\frac{\sqrt{105}i}{112} & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{224} & \frac{5\sqrt{7}i}{112} & 0 \end{bmatrix}$
1000	symmetry	$\frac{\sqrt{6006}z(x-y)(x+y)\left(x^2-4xy+y^2\right)\left(x^2+4xy+y^2\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g, 12)$	$\left[\begin{array}{cccccccccccccc} \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{28} & 0 & \frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{42}}{28} & 0 & -\frac{\sqrt{42}i}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{42}i}{28} & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}\right]$
1001	symmetry	$\frac{\sqrt{42}x(y-z)(y+z)\left(48x^4-80x^2y^2-80x^2z^2+15y^4+30y^2z^2+15z^4\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
1002	symmetry	$-\frac{\sqrt{42}y(x-z)(x+z)\left(15x^4-80x^2y^2+30x^2z^2+48y^4-80y^2z^2+15z^4\right)}{32}$

$\mathbb{M}_7^{(1,-1;a)}(A_g,13)$

$$\begin{pmatrix}
0 & -\frac{15\sqrt{1001}}{2002} & 0 & -\frac{23\sqrt{1001}i}{2912} & -\frac{\sqrt{6006}}{2464} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15015}}{2002} & 0 & \frac{3\sqrt{15015}i}{32032} & \frac{19\sqrt{10010}}{32032} & 0 \\
-\frac{15\sqrt{1001}}{2002} & 0 & \frac{23\sqrt{1001}i}{2912} & 0 & 0 & \frac{\sqrt{6006}}{2464} & 0 & 0 & -\frac{\sqrt{15015}}{2002} & 0 & -\frac{3\sqrt{15015}i}{32032} & 0 & 0 & -\frac{19\sqrt{10010}}{32032} \\
0 & -\frac{23\sqrt{1001}i}{2912} & 0 & \frac{255\sqrt{1001}}{32032} & 0 & 0 & -\frac{\sqrt{6006}}{16016} & 0 & 0 & \frac{\sqrt{15015}i}{32032} & 0 & -\frac{\sqrt{15015}}{32032} & 0 & 0 \\
\frac{23\sqrt{1001}i}{2912} & 0 & \frac{255\sqrt{1001}}{32032} & 0 & 0 & 0 & 0 & \frac{\sqrt{6006}}{16016} & -\frac{\sqrt{15015}i}{32032} & 0 & -\frac{\sqrt{15015}}{32032} & 0 & 0 & 0 \\
-\frac{\sqrt{6006}}{2464} & 0 & 0 & 0 & 0 & -\frac{45\sqrt{1001}}{16016} & 0 & \frac{3\sqrt{1001}i}{8008} & \frac{51\sqrt{10010}}{32032} & 0 & 0 & 0 & 0 & \frac{17\sqrt{15015}}{16016} \\
0 & \frac{\sqrt{6006}}{2464} & 0 & 0 & -\frac{45\sqrt{1001}}{16016} & 0 & -\frac{3\sqrt{1001}i}{8008} & 0 & 0 & -\frac{51\sqrt{10010}}{32032} & 0 & 0 & \frac{17\sqrt{15015}}{16016} & 0 \\
0 & 0 & -\frac{\sqrt{6006}}{16016} & 0 & 0 & \frac{3\sqrt{1001}i}{8008} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10010}}{16016} & 0 & 0 & \frac{\sqrt{15015}i}{8008} \\
0 & 0 & 0 & \frac{\sqrt{6006}}{16016} & -\frac{3\sqrt{1001}i}{8008} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10010}}{16016} & -\frac{\sqrt{15015}i}{8008} & 0 \\
0 & -\frac{\sqrt{15015}}{2002} & 0 & \frac{\sqrt{15015}i}{32032} & \frac{51\sqrt{10010}}{32032} & 0 & 0 & 0 & 0 & \frac{15\sqrt{1001}}{2002} & 0 & \frac{15\sqrt{1001}i}{32032} & -\frac{75\sqrt{6006}}{32032} & 0 \\
-\frac{\sqrt{15015}}{2002} & 0 & -\frac{\sqrt{15015}i}{32032} & 0 & 0 & -\frac{51\sqrt{10010}}{32032} & 0 & 0 & \frac{15\sqrt{1001}}{2002} & 0 & -\frac{15\sqrt{1001}i}{32032} & 0 & 0 & \frac{75\sqrt{6006}}{32032} \\
0 & \frac{3\sqrt{15015}i}{32032} & 0 & -\frac{\sqrt{15015}}{32032} & 0 & 0 & -\frac{3\sqrt{10010}}{16016} & 0 & 0 & \frac{15\sqrt{1001}i}{32032} & 0 & -\frac{15\sqrt{1001}}{32032} & 0 & 0 \\
-\frac{3\sqrt{15015}i}{32032} & 0 & -\frac{\sqrt{15015}}{32032} & 0 & 0 & 0 & 0 & \frac{3\sqrt{10010}}{16016} & -\frac{15\sqrt{1001}i}{32032} & 0 & -\frac{15\sqrt{1001}}{32032} & 0 & 0 & 0 \\
\frac{19\sqrt{10010}}{32032} & 0 & 0 & 0 & 0 & \frac{17\sqrt{15015}}{16016} & 0 & \frac{\sqrt{15015}i}{8008} & -\frac{75\sqrt{6006}}{32032} & 0 & 0 & 0 & 0 & -\frac{75\sqrt{1001}}{16016} \\
0 & -\frac{19\sqrt{10010}}{32032} & 0 & 0 & \frac{17\sqrt{15015}}{16016} & 0 & -\frac{\sqrt{15015}i}{8008} & 0 & 0 & \frac{75\sqrt{6006}}{32032} & 0 & 0 & -\frac{75\sqrt{1001}}{16016} & 0
\end{pmatrix}$$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_7^{(1,-1;a)}(A_g,14)$	$\begin{bmatrix} 0 & \frac{255\sqrt{1001}i}{32032} & 0 & -\frac{23\sqrt{1001}}{2912} & 0 & 0 & -\frac{\sqrt{6006}}{16016} & 0 & 0 & \frac{\sqrt{15015}i}{32032} & 0 & -\frac{\sqrt{15015}}{32032} & 0 & 0 \\ -\frac{255\sqrt{1001}i}{32032} & 0 & -\frac{23\sqrt{1001}}{2912} & 0 & 0 & 0 & 0 & \frac{\sqrt{6006}}{16016} & -\frac{\sqrt{15015}i}{32032} & 0 & -\frac{\sqrt{15015}}{32032} & 0 & 0 & 0 \\ 0 & -\frac{23\sqrt{1001}}{2912} & 0 & -\frac{15\sqrt{1001}i}{2002} & \frac{\sqrt{6006}}{2464} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{15015}}{32032} & 0 & \frac{\sqrt{15015}i}{2002} & \frac{19\sqrt{10010}}{32032} & 0 \\ -\frac{23\sqrt{1001}}{2912} & 0 & \frac{15\sqrt{1001}i}{2002} & 0 & 0 & -\frac{\sqrt{6006}}{2464} & 0 & 0 & -\frac{3\sqrt{15015}}{32032} & 0 & -\frac{\sqrt{15015}i}{2002} & 0 & 0 & -\frac{19\sqrt{10010}}{32032} \\ 0 & 0 & \frac{\sqrt{6006}}{2464} & 0 & 0 & -\frac{45\sqrt{1001}i}{16016} & 0 & -\frac{3\sqrt{1001}}{8008} & 0 & 0 & \frac{51\sqrt{10010}}{32032} & 0 & 0 & -\frac{17\sqrt{15015}i}{16016} \\ 0 & 0 & 0 & -\frac{\sqrt{6006}}{2464} & \frac{45\sqrt{1001}i}{16016} & 0 & -\frac{3\sqrt{1001}}{8008} & 0 & 0 & 0 & 0 & -\frac{51\sqrt{10010}}{32032} & \frac{17\sqrt{15015}i}{16016} & 0 \\ -\frac{\sqrt{6006}}{16016} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{1001}}{8008} & 0 & 0 & \frac{3\sqrt{10010}}{16016} & 0 & 0 & 0 & 0 & \frac{\sqrt{15015}}{8008} \\ 0 & \frac{\sqrt{6006}}{16016} & 0 & 0 & -\frac{3\sqrt{1001}}{8008} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10010}}{16016} & 0 & 0 & \frac{\sqrt{15015}}{8008} & 0 \\ 0 & \frac{\sqrt{15015}i}{32032} & 0 & -\frac{3\sqrt{15015}}{32032} & 0 & 0 & \frac{3\sqrt{10010}}{16016} & 0 & 0 & -\frac{15\sqrt{1001}i}{32032} & 0 & \frac{15\sqrt{1001}}{32032} & 0 & 0 \\ -\frac{\sqrt{15015}i}{32032} & 0 & -\frac{3\sqrt{15015}}{32032} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10010}}{16016} & \frac{15\sqrt{1001}i}{32032} & 0 & \frac{15\sqrt{1001}}{32032} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15015}}{32032} & 0 & \frac{\sqrt{15015}i}{2002} & \frac{51\sqrt{10010}}{32032} & 0 & 0 & 0 & 0 & \frac{15\sqrt{1001}}{32032} & 0 & \frac{15\sqrt{1001}i}{2002} & \frac{75\sqrt{6006}}{32032} & 0 \\ -\frac{\sqrt{15015}}{32032} & 0 & -\frac{\sqrt{15015}i}{2002} & 0 & 0 & -\frac{51\sqrt{10010}}{32032} & 0 & 0 & \frac{15\sqrt{1001}}{32032} & 0 & -\frac{15\sqrt{1001}i}{2002} & 0 & 0 & -\frac{75\sqrt{6006}}{32032} \\ 0 & 0 & \frac{19\sqrt{10010}}{32032} & 0 & 0 & -\frac{17\sqrt{15015}i}{16016} & 0 & \frac{\sqrt{15015}}{8008} & 0 & 0 & \frac{75\sqrt{6006}}{32032} & 0 & 0 & -\frac{75\sqrt{1001}i}{16016} \\ 0 & 0 & 0 & -\frac{19\sqrt{10010}}{32032} & \frac{17\sqrt{15015}i}{16016} & 0 & \frac{\sqrt{15015}}{8008} & 0 & 0 & 0 & 0 & -\frac{75\sqrt{6006}}{32032} & \frac{75\sqrt{1001}i}{16016} & 0 \end{bmatrix}$
1003	symmetry	$\frac{\sqrt{42}z(x-y)(x+y)\left(15x^4+30x^2y^2-80x^2z^2+15y^4-80y^2z^2+48z^4\right)}{32}$

continued ...

Table 10

No.	multipole	matrix
1004	$\mathbb{M}_7^{(1,-1;a)}(A_g,15)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6006}}{4004} & 0 & -\frac{\sqrt{6006}i}{4004} & -\frac{\sqrt{15015}}{2002} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}}{2002} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6006}}{4004} & 0 & \frac{\sqrt{6006}i}{4004} & 0 & 0 & \frac{\sqrt{15015}}{2002} & 0 & 0 & -\frac{\sqrt{10010}}{2002} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6006}i}{4004} & 0 & \frac{\sqrt{6006}}{4004} & 0 & 0 & -\frac{\sqrt{15015}}{2002} & 0 & 0 & \frac{\sqrt{10010}i}{2002} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6006}i}{4004} & 0 & \frac{\sqrt{6006}}{4004} & 0 & 0 & 0 & 0 & \frac{\sqrt{15015}}{2002} & -\frac{\sqrt{10010}i}{2002} & 0 \\ 0 & \frac{\sqrt{6006}}{4004} & 0 & \frac{\sqrt{6006}i}{4004} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10010}}{2002} & 0 & \frac{3\sqrt{10010}i}{2002} & \frac{2\sqrt{15015}}{1001} & 0 \\ \frac{\sqrt{6006}}{4004} & 0 & -\frac{\sqrt{6006}i}{4004} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10010}}{2002} & 0 & -\frac{3\sqrt{10010}i}{2002} & 0 & 0 & -\frac{2\sqrt{15015}}{1001} \\ 0 & -\frac{\sqrt{6006}i}{4004} & 0 & \frac{\sqrt{6006}}{4004} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6006}i}{4004} & 0 & \frac{\sqrt{6006}}{4004} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15015}}{2002} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10010}}{2002} & 0 & 0 & \frac{15\sqrt{1001}}{2002} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6006}}{2002} \\ 0 & \frac{\sqrt{15015}}{2002} & 0 & 0 & -\frac{3\sqrt{10010}}{2002} & 0 & 0 & 0 & 0 & -\frac{15\sqrt{1001}}{2002} & 0 & 0 & \frac{5\sqrt{6006}}{2002} & 0 \\ 0 & 0 & -\frac{\sqrt{15015}}{2002} & 0 & 0 & \frac{3\sqrt{10010}i}{2002} & 0 & 0 & 0 & 0 & -\frac{15\sqrt{1001}}{2002} & 0 & 0 & \frac{5\sqrt{6006}i}{2002} \\ 0 & 0 & 0 & \frac{\sqrt{15015}}{2002} & -\frac{3\sqrt{10010}i}{2002} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{15\sqrt{1001}}{2002} & -\frac{5\sqrt{6006}i}{2002} & 0 \\ 0 & -\frac{\sqrt{10010}}{2002} & 0 & \frac{\sqrt{10010}i}{2002} & \frac{2\sqrt{15015}}{1001} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6006}}{2002} & 0 & \frac{5\sqrt{6006}i}{2002} & 0 & 0 \\ -\frac{\sqrt{10010}}{2002} & 0 & -\frac{\sqrt{10010}i}{2002} & 0 & 0 & -\frac{2\sqrt{15015}}{1001} & 0 & 0 & \frac{5\sqrt{6006}}{2002} & 0 & -\frac{5\sqrt{6006}i}{2002} & 0 & 0 & 0 \end{bmatrix}$
	symmetry	x

continued ...

Table 10

No.	multipole	matrix
1005	symmetry	y

$\mathbb{M}_1^{(1,1;a)}(A_g,1)$

$$\begin{pmatrix}
0 & \frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\
\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\
0 & 0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 \\
0 & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 \\
\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\
0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\
0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{7}i}{14} \\
0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & -\frac{\sqrt{7}i}{14} & 0 \\
0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & -\frac{\sqrt{105}i}{70} & \frac{\sqrt{70}}{140} & 0 \\
-\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{105}}{140} & 0 & \frac{\sqrt{105}i}{70} & 0 & 0 & -\frac{\sqrt{70}}{140} \\
0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{105}i}{70} & 0 & -\frac{3\sqrt{105}}{140} & 0 & 0 \\
\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & \frac{\sqrt{105}i}{70} & 0 & -\frac{3\sqrt{105}}{140} & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{14} & \frac{\sqrt{70}}{140} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{105} \\
0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & -\frac{\sqrt{70}}{140} & 0 & 0 & -\frac{\sqrt{105}}{105} & 0
\end{pmatrix}$$

continued ...

Table 10

No.	multipole	matrix
1006	symmetry	$\mathbb{M}_1^{(1,1;a)}(A_g,2)$ $\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 \\ \frac{\sqrt{105}i}{84} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & \frac{\sqrt{7}i}{14} & 0 \\ -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} \\ 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 \\ 0 & -\frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{3\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{70} & 0 & 0 \\ \frac{\sqrt{7}i}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & -\frac{3\sqrt{105}i}{140} & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{28} & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & -\frac{\sqrt{105}i}{140} & \frac{\sqrt{70}}{140} & 0 \\ \frac{\sqrt{7}}{28} & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & \frac{\sqrt{105}i}{140} & 0 & 0 & -\frac{\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & 0 & \frac{\sqrt{105}i}{105} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{140} & -\frac{\sqrt{105}i}{105} & 0 \end{bmatrix}$ z

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_1^{(1,1;a)}(A_g,3)$	$\begin{pmatrix} -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}}{42} & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}}{56} & 0 & -\frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 \\ \frac{\sqrt{70}}{56} & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 \\ -\frac{\sqrt{70}i}{56} & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & -\frac{\sqrt{42}i}{56} & \frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{56} & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & \frac{\sqrt{70}}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{70}i}{140} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{42}i}{56} & 0 & \frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & \frac{\sqrt{70}i}{140} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & -\frac{\sqrt{70}i}{140} & \frac{2\sqrt{105}}{105} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{140} & 0 & \frac{\sqrt{70}i}{140} & 0 & 0 & -\frac{2\sqrt{105}}{105} \end{pmatrix}$
1007	symmetry	$\sqrt{15}xyz$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,1)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{616} & 0 & -\frac{\sqrt{770}}{616} & 0 & 0 & -\frac{3\sqrt{77}}{154} & 0 & 0 & -\frac{\sqrt{462}i}{88} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{616} & 0 & -\frac{\sqrt{770}}{616} & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{154} & \frac{\sqrt{462}i}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{616} & 0 & -\frac{\sqrt{770}i}{616} & \frac{3\sqrt{77}}{154} & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{88} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{616} & 0 & \frac{\sqrt{770}i}{616} & 0 & 0 & -\frac{3\sqrt{77}}{154} & 0 & 0 & -\frac{\sqrt{462}}{88} & 0 \\ 0 & -\frac{\sqrt{770}i}{616} & 0 & \frac{\sqrt{770}}{616} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{168} & 0 & \frac{\sqrt{462}}{168} & 0 & 0 \\ \frac{\sqrt{770}i}{616} & 0 & \frac{\sqrt{770}}{616} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{168} & 0 & \frac{\sqrt{462}}{168} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{770}}{616} & 0 & -\frac{\sqrt{770}i}{616} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{616} & 0 & -\frac{\sqrt{462}i}{616} & -\frac{\sqrt{77}}{154} & 0 \\ -\frac{\sqrt{770}}{616} & 0 & \frac{\sqrt{770}i}{616} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{616} & 0 & \frac{\sqrt{462}i}{616} & 0 & 0 & \frac{\sqrt{77}}{154} \\ 0 & 0 & \frac{3\sqrt{77}}{154} & 0 & 0 & \frac{\sqrt{462}i}{168} & 0 & \frac{\sqrt{462}}{616} & 0 & 0 & \frac{\sqrt{1155}}{231} & 0 & 0 & \frac{\sqrt{770}i}{616} \\ 0 & 0 & 0 & -\frac{3\sqrt{77}}{154} & -\frac{\sqrt{462}i}{168} & 0 & \frac{\sqrt{462}}{616} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{231} & -\frac{\sqrt{770}i}{616} & 0 \\ -\frac{3\sqrt{77}}{154} & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{168} & 0 & -\frac{\sqrt{462}i}{616} & \frac{\sqrt{1155}}{231} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{616} \\ 0 & \frac{3\sqrt{77}}{154} & 0 & 0 & \frac{\sqrt{462}}{168} & 0 & \frac{\sqrt{462}i}{616} & 0 & 0 & -\frac{\sqrt{1155}}{231} & 0 & 0 & -\frac{\sqrt{770}}{616} & 0 \\ 0 & -\frac{\sqrt{462}i}{88} & 0 & -\frac{\sqrt{462}}{88} & 0 & 0 & -\frac{\sqrt{77}}{154} & 0 & 0 & \frac{\sqrt{770}i}{616} & 0 & -\frac{\sqrt{770}}{616} & 0 & 0 \\ \frac{\sqrt{462}i}{88} & 0 & -\frac{\sqrt{462}}{88} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{154} & -\frac{\sqrt{770}i}{616} & 0 & -\frac{\sqrt{770}}{616} & 0 & 0 & 0 \end{pmatrix}$
1008	symmetry	$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & \frac{3\sqrt{77}}{616} & 0 & 0 & \frac{5\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{1155}}{1848} & 0 & \frac{\sqrt{1155}i}{462} & -\frac{\sqrt{770}}{176} & 0 \\ \frac{3\sqrt{77}}{616} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}}{1232} & 0 & 0 & -\frac{13\sqrt{1155}}{1848} & 0 & -\frac{\sqrt{1155}i}{462} & 0 & 0 & \frac{\sqrt{770}}{176} \\ 0 & 0 & 0 & \frac{3\sqrt{77}}{616} & 0 & 0 & \frac{5\sqrt{462}}{1232} & 0 & 0 & \frac{5\sqrt{1155}i}{924} & 0 & \frac{\sqrt{1155}}{1848} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{77}}{616} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}}{1232} & -\frac{5\sqrt{1155}i}{924} & 0 & \frac{\sqrt{1155}}{1848} & 0 & 0 & 0 \\ \frac{5\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{132} & 0 & -\frac{5\sqrt{77}i}{264} & -\frac{5\sqrt{770}}{3696} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} \\ 0 & -\frac{5\sqrt{462}}{1232} & 0 & 0 & \frac{\sqrt{77}}{132} & 0 & \frac{5\sqrt{77}i}{264} & 0 & 0 & \frac{5\sqrt{770}}{3696} & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 \\ 0 & 0 & \frac{5\sqrt{462}}{1232} & 0 & 0 & -\frac{5\sqrt{77}i}{264} & 0 & -\frac{\sqrt{77}}{33} & 0 & 0 & -\frac{19\sqrt{770}}{3696} & 0 & 0 & -\frac{\sqrt{1155}i}{1848} \\ 0 & 0 & 0 & -\frac{5\sqrt{462}}{1232} & \frac{5\sqrt{77}i}{264} & 0 & -\frac{\sqrt{77}}{33} & 0 & 0 & 0 & 0 & \frac{19\sqrt{770}}{3696} & \frac{\sqrt{1155}i}{1848} & 0 \\ 0 & -\frac{13\sqrt{1155}}{1848} & 0 & \frac{5\sqrt{1155}i}{924} & -\frac{5\sqrt{770}}{3696} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{77}}{1848} & 0 & \frac{5\sqrt{77}i}{924} & -\frac{5\sqrt{462}}{1232} & 0 \\ -\frac{13\sqrt{1155}}{1848} & 0 & -\frac{5\sqrt{1155}i}{924} & 0 & 0 & \frac{5\sqrt{770}}{3696} & 0 & 0 & -\frac{17\sqrt{77}}{1848} & 0 & -\frac{5\sqrt{77}i}{924} & 0 & 0 & \frac{5\sqrt{462}}{1232} \\ 0 & \frac{\sqrt{1155}i}{462} & 0 & \frac{\sqrt{1155}}{1848} & 0 & 0 & -\frac{19\sqrt{770}}{3696} & 0 & 0 & \frac{5\sqrt{77}i}{924} & 0 & \frac{23\sqrt{77}}{1848} & 0 & 0 \\ -\frac{\sqrt{1155}i}{462} & 0 & \frac{\sqrt{1155}}{1848} & 0 & 0 & 0 & 0 & \frac{19\sqrt{770}}{3696} & -\frac{5\sqrt{77}i}{924} & 0 & \frac{23\sqrt{77}}{1848} & 0 & 0 & 0 \\ -\frac{\sqrt{770}}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & -\frac{\sqrt{1155}i}{1848} & -\frac{5\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & \frac{3\sqrt{77}}{308} \\ 0 & \frac{\sqrt{770}}{176} & 0 & 0 & \frac{\sqrt{1155}}{924} & 0 & \frac{\sqrt{1155}i}{1848} & 0 & 0 & \frac{5\sqrt{462}}{1232} & 0 & 0 & \frac{3\sqrt{77}}{308} & 0 \end{bmatrix}$
1009	symmetry	$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,3)$	$\begin{pmatrix} 0 & -\frac{3\sqrt{77}i}{616} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}}{1232} & 0 & 0 & \frac{\sqrt{1155}i}{1848} & 0 & \frac{5\sqrt{1155}}{924} & 0 & 0 \\ \frac{3\sqrt{77}i}{616} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{1232} & -\frac{\sqrt{1155}i}{1848} & 0 & \frac{5\sqrt{1155}}{924} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{77}i}{616} & \frac{5\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{462} & 0 & -\frac{13\sqrt{1155}i}{1848} & \frac{\sqrt{770}}{176} & 0 \\ 0 & 0 & \frac{3\sqrt{77}i}{616} & 0 & 0 & -\frac{5\sqrt{462}}{1232} & 0 & 0 & \frac{\sqrt{1155}}{462} & 0 & \frac{13\sqrt{1155}i}{1848} & 0 & 0 & -\frac{\sqrt{770}}{176} \\ 0 & 0 & \frac{5\sqrt{462}}{1232} & 0 & 0 & -\frac{\sqrt{77}i}{132} & 0 & -\frac{5\sqrt{77}}{264} & 0 & 0 & \frac{5\sqrt{770}}{3696} & 0 & 0 & \frac{\sqrt{1155}i}{924} \\ 0 & 0 & 0 & -\frac{5\sqrt{462}}{1232} & \frac{\sqrt{77}i}{132} & 0 & -\frac{5\sqrt{77}}{264} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{770}}{3696} & -\frac{\sqrt{1155}i}{924} & 0 \\ -\frac{5\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{264} & 0 & \frac{\sqrt{77}i}{33} & -\frac{19\sqrt{770}}{3696} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{1848} \\ 0 & \frac{5\sqrt{462}}{1232} & 0 & 0 & -\frac{5\sqrt{77}}{264} & 0 & -\frac{\sqrt{77}i}{33} & 0 & 0 & \frac{19\sqrt{770}}{3696} & 0 & 0 & \frac{\sqrt{1155}}{1848} & 0 \\ 0 & \frac{\sqrt{1155}i}{1848} & 0 & \frac{\sqrt{1155}}{462} & 0 & 0 & -\frac{19\sqrt{770}}{3696} & 0 & 0 & -\frac{23\sqrt{77}i}{1848} & 0 & -\frac{5\sqrt{77}}{924} & 0 & 0 \\ -\frac{\sqrt{1155}i}{1848} & 0 & \frac{\sqrt{1155}}{462} & 0 & 0 & 0 & 0 & \frac{19\sqrt{770}}{3696} & \frac{23\sqrt{77}i}{1848} & 0 & -\frac{5\sqrt{77}}{924} & 0 & 0 & 0 \\ 0 & \frac{5\sqrt{1155}}{924} & 0 & -\frac{13\sqrt{1155}i}{1848} & \frac{5\sqrt{770}}{3696} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{77}}{924} & 0 & \frac{17\sqrt{77}i}{1848} & -\frac{5\sqrt{462}}{1232} & 0 \\ \frac{5\sqrt{1155}}{924} & 0 & \frac{13\sqrt{1155}i}{1848} & 0 & 0 & -\frac{5\sqrt{770}}{3696} & 0 & 0 & -\frac{5\sqrt{77}}{924} & 0 & -\frac{17\sqrt{77}i}{1848} & 0 & 0 & \frac{5\sqrt{462}}{1232} \\ 0 & 0 & \frac{\sqrt{770}}{176} & 0 & 0 & \frac{\sqrt{1155}i}{924} & 0 & \frac{\sqrt{1155}}{1848} & 0 & 0 & -\frac{5\sqrt{462}}{1232} & 0 & 0 & -\frac{3\sqrt{77}i}{308} \\ 0 & 0 & 0 & -\frac{\sqrt{770}}{176} & -\frac{\sqrt{1155}i}{924} & 0 & \frac{\sqrt{1155}}{1848} & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{1232} & \frac{3\sqrt{77}i}{308} & 0 \end{pmatrix}$
1010	symmetry	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,4)$	$\begin{pmatrix} \frac{\sqrt{77}}{77} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{462}}{924} & 0 & -\frac{5\sqrt{462}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{77}}{77} & 0 & 0 & -\frac{5\sqrt{462}}{924} & 0 & \frac{5\sqrt{462}i}{924} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{77}}{77} & 0 & 0 & \frac{5\sqrt{462}i}{924} & 0 & -\frac{5\sqrt{462}}{924} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{77}}{77} & -\frac{5\sqrt{462}i}{924} & 0 & -\frac{5\sqrt{462}}{924} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{462}}{924} & 0 & \frac{5\sqrt{462}i}{924} & -\frac{\sqrt{77}}{33} & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{231} & 0 & \frac{\sqrt{770}i}{231} & 0 & 0 \\ -\frac{5\sqrt{462}}{924} & 0 & -\frac{5\sqrt{462}i}{924} & 0 & 0 & \frac{\sqrt{77}}{33} & 0 & 0 & \frac{\sqrt{770}}{231} & 0 & -\frac{\sqrt{770}i}{231} & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{462}i}{924} & 0 & -\frac{5\sqrt{462}}{924} & 0 & 0 & -\frac{\sqrt{77}}{33} & 0 & 0 & -\frac{\sqrt{770}i}{231} & 0 & \frac{\sqrt{770}}{231} & 0 & 0 \\ \frac{5\sqrt{462}i}{924} & 0 & -\frac{5\sqrt{462}}{924} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{33} & \frac{\sqrt{770}i}{231} & 0 & \frac{\sqrt{770}}{231} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{231} & 0 & -\frac{\sqrt{770}i}{231} & \frac{\sqrt{77}}{231} & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{924} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{231} & 0 & \frac{\sqrt{770}i}{231} & 0 & 0 & -\frac{\sqrt{77}}{231} & 0 & 0 & \frac{5\sqrt{462}}{924} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{231} & 0 & \frac{\sqrt{770}}{231} & 0 & 0 & \frac{\sqrt{77}}{231} & 0 & 0 & -\frac{5\sqrt{462}i}{924} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{231} & 0 & \frac{\sqrt{770}}{231} & 0 & 0 & 0 & 0 & -\frac{\sqrt{77}}{231} & \frac{5\sqrt{462}i}{924} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{924} & 0 & -\frac{5\sqrt{462}i}{924} & \frac{2\sqrt{77}}{77} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{462}}{924} & 0 & \frac{5\sqrt{462}i}{924} & 0 & 0 & -\frac{2\sqrt{77}}{77} \end{pmatrix}$
1011	symmetry	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,5)$	$\begin{bmatrix} 0 & \frac{\sqrt{1155}}{616} & 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{616} & 0 & -\frac{2\sqrt{77}i}{77} & \frac{\sqrt{462}}{176} & 0 \\ \frac{\sqrt{1155}}{616} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{\sqrt{77}}{616} & 0 & \frac{2\sqrt{77}i}{77} & 0 & 0 & -\frac{\sqrt{462}}{176} \\ 0 & 0 & 0 & \frac{\sqrt{1155}}{616} & 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{\sqrt{77}i}{308} & 0 & -\frac{13\sqrt{77}}{616} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{1155}}{616} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{770}}{1232} & -\frac{\sqrt{77}i}{308} & 0 & -\frac{13\sqrt{77}}{616} & 0 & 0 & 0 \\ \frac{5\sqrt{770}}{1232} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{132} & 0 & \frac{\sqrt{1155}i}{264} & -\frac{9\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{308} \\ 0 & -\frac{5\sqrt{770}}{1232} & 0 & 0 & -\frac{\sqrt{1155}}{132} & 0 & -\frac{\sqrt{1155}i}{264} & 0 & 0 & \frac{9\sqrt{462}}{1232} & 0 & 0 & \frac{\sqrt{77}}{308} & 0 \\ 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{\sqrt{1155}i}{264} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{462}}{3696} & 0 & 0 & -\frac{3\sqrt{77}i}{616} \\ 0 & 0 & 0 & -\frac{5\sqrt{770}}{1232} & -\frac{\sqrt{1155}i}{264} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{13\sqrt{462}}{3696} & \frac{3\sqrt{77}i}{616} & 0 \\ 0 & \frac{\sqrt{77}}{616} & 0 & \frac{\sqrt{77}i}{308} & -\frac{9\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{616} & 0 & \frac{\sqrt{1155}i}{308} & -\frac{5\sqrt{770}}{1232} & 0 \\ \frac{\sqrt{77}}{616} & 0 & -\frac{\sqrt{77}i}{308} & 0 & 0 & \frac{9\sqrt{462}}{1232} & 0 & 0 & -\frac{\sqrt{1155}}{616} & 0 & -\frac{\sqrt{1155}i}{308} & 0 & 0 & \frac{5\sqrt{770}}{1232} \\ 0 & -\frac{2\sqrt{77}i}{77} & 0 & -\frac{13\sqrt{77}}{616} & 0 & 0 & -\frac{13\sqrt{462}}{3696} & 0 & 0 & \frac{\sqrt{1155}i}{308} & 0 & \frac{5\sqrt{1155}}{1848} & 0 & 0 \\ \frac{2\sqrt{77}i}{77} & 0 & -\frac{13\sqrt{77}}{616} & 0 & 0 & 0 & 0 & \frac{13\sqrt{462}}{3696} & -\frac{\sqrt{1155}i}{308} & 0 & \frac{5\sqrt{1155}}{1848} & 0 & 0 & 0 \\ \frac{\sqrt{462}}{176} & 0 & 0 & 0 & 0 & \frac{\sqrt{77}}{308} & 0 & -\frac{3\sqrt{77}i}{616} & -\frac{5\sqrt{770}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{308} \\ 0 & -\frac{\sqrt{462}}{176} & 0 & 0 & \frac{\sqrt{77}}{308} & 0 & \frac{3\sqrt{77}i}{616} & 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{\sqrt{1155}}{308} & 0 \end{bmatrix}$
1012	symmetry	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,6)$	$\begin{pmatrix} 0 & \frac{\sqrt{1155}i}{616} & 0 & 0 & 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{13\sqrt{77}i}{616} & 0 & -\frac{\sqrt{77}}{308} & 0 & 0 \\ -\frac{\sqrt{1155}i}{616} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{770}}{1232} & -\frac{13\sqrt{77}i}{616} & 0 & -\frac{\sqrt{77}}{308} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{1155}i}{616} & -\frac{5\sqrt{770}}{1232} & 0 & 0 & 0 & 0 & \frac{2\sqrt{77}}{77} & 0 & -\frac{\sqrt{77}i}{616} & \frac{\sqrt{462}}{176} & 0 \\ 0 & 0 & -\frac{\sqrt{1155}i}{616} & 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{2\sqrt{77}}{77} & 0 & \frac{\sqrt{77}i}{616} & 0 & 0 & -\frac{\sqrt{462}}{176} \\ 0 & 0 & -\frac{5\sqrt{770}}{1232} & 0 & 0 & -\frac{\sqrt{1155}i}{132} & 0 & -\frac{\sqrt{1155}}{264} & 0 & 0 & -\frac{9\sqrt{462}}{1232} & 0 & 0 & -\frac{\sqrt{77}i}{308} \\ 0 & 0 & 0 & \frac{5\sqrt{770}}{1232} & \frac{\sqrt{1155}i}{132} & 0 & -\frac{\sqrt{1155}}{264} & 0 & 0 & 0 & 0 & \frac{9\sqrt{462}}{1232} & \frac{\sqrt{77}i}{308} & 0 \\ \frac{5\sqrt{770}}{1232} & 0 & 0 & 0 & 0 & -\frac{\sqrt{1155}}{264} & 0 & 0 & \frac{13\sqrt{462}}{3696} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}}{616} \\ 0 & -\frac{5\sqrt{770}}{1232} & 0 & 0 & -\frac{\sqrt{1155}}{264} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{462}}{3696} & 0 & 0 & -\frac{3\sqrt{77}}{616} & 0 \\ 0 & \frac{13\sqrt{77}i}{616} & 0 & \frac{2\sqrt{77}}{77} & 0 & 0 & \frac{13\sqrt{462}}{3696} & 0 & 0 & \frac{5\sqrt{1155}i}{1848} & 0 & \frac{\sqrt{1155}}{308} & 0 & 0 \\ -\frac{13\sqrt{77}i}{616} & 0 & \frac{2\sqrt{77}}{77} & 0 & 0 & 0 & 0 & -\frac{13\sqrt{462}}{3696} & -\frac{5\sqrt{1155}i}{1848} & 0 & \frac{\sqrt{1155}}{308} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{77}}{308} & 0 & -\frac{\sqrt{77}i}{616} & -\frac{9\sqrt{462}}{1232} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{308} & 0 & -\frac{\sqrt{1155}i}{616} & \frac{5\sqrt{770}}{1232} & 0 \\ -\frac{\sqrt{77}}{308} & 0 & \frac{\sqrt{77}i}{616} & 0 & 0 & \frac{9\sqrt{462}}{1232} & 0 & 0 & \frac{\sqrt{1155}}{308} & 0 & \frac{\sqrt{1155}i}{616} & 0 & 0 & -\frac{5\sqrt{770}}{1232} \\ 0 & 0 & \frac{\sqrt{462}}{176} & 0 & 0 & -\frac{\sqrt{77}i}{308} & 0 & -\frac{3\sqrt{77}}{616} & 0 & 0 & \frac{5\sqrt{770}}{1232} & 0 & 0 & \frac{\sqrt{1155}i}{308} \\ 0 & 0 & 0 & -\frac{\sqrt{462}}{176} & \frac{\sqrt{77}i}{308} & 0 & -\frac{3\sqrt{77}}{616} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{770}}{1232} & -\frac{\sqrt{1155}i}{308} & 0 \end{pmatrix}$
1013	symmetry	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_3^{(1,1;a)}(A_g,7)$	$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{616} & 0 & -\frac{\sqrt{770}i}{616} & \frac{3\sqrt{77}}{154} & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}}{88} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{770}}{616} & 0 & \frac{\sqrt{770}i}{616} & 0 & 0 & -\frac{3\sqrt{77}}{154} & 0 & 0 & -\frac{\sqrt{462}}{88} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{770}i}{616} & 0 & \frac{\sqrt{770}}{616} & 0 & 0 & \frac{3\sqrt{77}}{154} & 0 & 0 & \frac{\sqrt{462}i}{88} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{770}i}{616} & 0 & \frac{\sqrt{770}}{616} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{77}}{154} & -\frac{\sqrt{462}i}{88} & 0 \\ 0 & \frac{\sqrt{770}}{616} & 0 & \frac{\sqrt{770}i}{616} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{616} & 0 & -\frac{\sqrt{462}i}{616} & -\frac{\sqrt{77}}{154} & 0 \\ \frac{\sqrt{770}}{616} & 0 & -\frac{\sqrt{770}i}{616} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{616} & 0 & \frac{\sqrt{462}i}{616} & 0 & 0 & \frac{\sqrt{77}}{154} \\ 0 & -\frac{\sqrt{770}i}{616} & 0 & \frac{\sqrt{770}}{616} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{462}i}{168} & 0 & -\frac{\sqrt{462}}{168} & 0 & 0 \\ \frac{\sqrt{770}i}{616} & 0 & \frac{\sqrt{770}}{616} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{462}i}{168} & 0 & -\frac{\sqrt{462}}{168} & 0 & 0 & 0 \\ \frac{3\sqrt{77}}{154} & 0 & 0 & 0 & 0 & \frac{\sqrt{462}}{616} & 0 & -\frac{\sqrt{462}i}{168} & \frac{\sqrt{1155}}{231} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{616} \\ 0 & -\frac{3\sqrt{77}}{154} & 0 & 0 & \frac{\sqrt{462}}{616} & 0 & \frac{\sqrt{462}i}{168} & 0 & 0 & -\frac{\sqrt{1155}}{231} & 0 & 0 & -\frac{\sqrt{770}}{616} & 0 \\ 0 & 0 & \frac{3\sqrt{77}}{154} & 0 & 0 & -\frac{\sqrt{462}i}{616} & 0 & -\frac{\sqrt{462}}{168} & 0 & 0 & -\frac{\sqrt{1155}}{231} & 0 & 0 & -\frac{\sqrt{770}i}{616} \\ 0 & 0 & 0 & -\frac{3\sqrt{77}}{154} & \frac{\sqrt{462}i}{616} & 0 & -\frac{\sqrt{462}}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{1155}}{231} & \frac{\sqrt{770}i}{616} & 0 \\ 0 & -\frac{\sqrt{462}}{88} & 0 & \frac{\sqrt{462}i}{88} & -\frac{\sqrt{77}}{154} & 0 & 0 & 0 & 0 & -\frac{\sqrt{770}}{616} & 0 & -\frac{\sqrt{770}i}{616} & 0 & 0 \\ -\frac{\sqrt{462}}{88} & 0 & -\frac{\sqrt{462}i}{88} & 0 & 0 & \frac{\sqrt{77}}{154} & 0 & 0 & -\frac{\sqrt{770}}{616} & 0 & \frac{\sqrt{770}i}{616} & 0 & 0 & 0 \end{pmatrix}$
1014	symmetry	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_g,1)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{4290}i}{312} & 0 & \frac{\sqrt{4290}}{312} & 0 & 0 & \frac{5\sqrt{429}}{858} & 0 & 0 & \frac{\sqrt{286}i}{572} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{4290}i}{312} & 0 & \frac{\sqrt{4290}}{312} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{429}}{858} & -\frac{\sqrt{286}i}{572} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{4290}}{312} & 0 & -\frac{\sqrt{4290}i}{312} & \frac{5\sqrt{429}}{858} & 0 & 0 & 0 & 0 & -\frac{\sqrt{286}}{572} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{4290}}{312} & 0 & \frac{\sqrt{4290}i}{312} & 0 & 0 & -\frac{5\sqrt{429}}{858} & 0 & 0 & -\frac{\sqrt{286}}{572} & 0 \\ 0 & \frac{\sqrt{4290}i}{312} & 0 & \frac{\sqrt{4290}}{312} & 0 & 0 & \frac{\sqrt{715}}{143} & 0 & 0 & \frac{3\sqrt{286}i}{1144} & 0 & -\frac{3\sqrt{286}}{1144} & 0 & 0 \\ -\frac{\sqrt{4290}i}{312} & 0 & \frac{\sqrt{4290}}{312} & 0 & 0 & 0 & 0 & -\frac{\sqrt{715}}{143} & -\frac{3\sqrt{286}i}{1144} & 0 & -\frac{3\sqrt{286}}{1144} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{4290}}{312} & 0 & -\frac{\sqrt{4290}i}{312} & \frac{\sqrt{715}}{143} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{286}}{1144} & 0 & -\frac{3\sqrt{286}i}{1144} & 0 & 0 \\ \frac{\sqrt{4290}}{312} & 0 & \frac{\sqrt{4290}i}{312} & 0 & 0 & -\frac{\sqrt{715}}{143} & 0 & 0 & -\frac{3\sqrt{286}}{1144} & 0 & \frac{3\sqrt{286}i}{1144} & 0 & 0 & 0 \\ 0 & 0 & \frac{5\sqrt{429}}{858} & 0 & 0 & \frac{3\sqrt{286}i}{1144} & 0 & -\frac{3\sqrt{286}}{1144} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{5\sqrt{429}}{858} & -\frac{3\sqrt{286}i}{1144} & 0 & -\frac{3\sqrt{286}}{1144} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{5\sqrt{429}}{858} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{286}}{1144} & 0 & -\frac{3\sqrt{286}i}{1144} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{429}}{858} & 0 & 0 & -\frac{3\sqrt{286}}{1144} & 0 & \frac{3\sqrt{286}i}{1144} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{286}i}{572} & 0 & -\frac{\sqrt{286}}{572} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{286}i}{572} & 0 & -\frac{\sqrt{286}}{572} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
1015	symmetry	$\frac{\sqrt{105}xyz\left(x^2+y^2-2z^2\right)}{2}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_g,2)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}i}{3432} & 0 & -\frac{\sqrt{1430}}{3432} & 0 & 0 & -\frac{2\sqrt{143}}{429} & 0 & 0 & -\frac{\sqrt{858}i}{286} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{1430}i}{3432} & 0 & -\frac{\sqrt{1430}}{3432} & 0 & 0 & 0 & 0 & \frac{2\sqrt{143}}{429} & \frac{\sqrt{858}i}{286} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{1430}}{3432} & 0 & -\frac{\sqrt{1430}i}{3432} & \frac{2\sqrt{143}}{429} & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}}{286} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{1430}}{3432} & 0 & \frac{\sqrt{1430}i}{3432} & 0 & 0 & -\frac{2\sqrt{143}}{429} & 0 & 0 & -\frac{\sqrt{858}}{286} & 0 \\ 0 & -\frac{\sqrt{1430}i}{3432} & 0 & \frac{\sqrt{1430}}{3432} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}i}{264} & 0 & -\frac{\sqrt{858}}{264} & 0 & 0 \\ \frac{\sqrt{1430}i}{3432} & 0 & \frac{\sqrt{1430}}{3432} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{858}i}{264} & 0 & -\frac{\sqrt{858}}{264} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{1430}}{3432} & 0 & -\frac{\sqrt{1430}i}{3432} & 0 & 0 & 0 & 0 & 0 & -\frac{23\sqrt{858}}{3432} & 0 & \frac{23\sqrt{858}i}{3432} & -\frac{8\sqrt{143}}{429} & 0 \\ -\frac{\sqrt{1430}}{3432} & 0 & \frac{\sqrt{1430}i}{3432} & 0 & 0 & 0 & 0 & 0 & -\frac{23\sqrt{858}}{3432} & 0 & -\frac{23\sqrt{858}i}{3432} & 0 & 0 & \frac{8\sqrt{143}}{429} \\ 0 & 0 & \frac{2\sqrt{143}}{429} & 0 & 0 & -\frac{\sqrt{858}i}{264} & 0 & -\frac{23\sqrt{858}}{3432} & 0 & 0 & -\frac{2\sqrt{2145}}{429} & 0 & 0 & -\frac{5\sqrt{1430}i}{1716} \\ 0 & 0 & 0 & -\frac{2\sqrt{143}}{429} & \frac{\sqrt{858}i}{264} & 0 & -\frac{23\sqrt{858}}{3432} & 0 & 0 & 0 & 0 & \frac{2\sqrt{2145}}{429} & \frac{5\sqrt{1430}i}{1716} & 0 \\ -\frac{2\sqrt{143}}{429} & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}}{264} & 0 & \frac{23\sqrt{858}i}{3432} & -\frac{2\sqrt{2145}}{429} & 0 & 0 & 0 & 0 & \frac{5\sqrt{1430}}{1716} \\ 0 & \frac{2\sqrt{143}}{429} & 0 & 0 & -\frac{\sqrt{858}}{264} & 0 & -\frac{23\sqrt{858}i}{3432} & 0 & 0 & \frac{2\sqrt{2145}}{429} & 0 & 0 & \frac{5\sqrt{1430}}{1716} & 0 \\ 0 & -\frac{\sqrt{858}i}{286} & 0 & -\frac{\sqrt{858}}{286} & 0 & 0 & -\frac{8\sqrt{143}}{429} & 0 & 0 & -\frac{5\sqrt{1430}i}{1716} & 0 & \frac{5\sqrt{1430}}{1716} & 0 & 0 \\ \frac{\sqrt{858}i}{286} & 0 & -\frac{\sqrt{858}}{286} & 0 & 0 & 0 & 0 & \frac{8\sqrt{143}}{429} & \frac{5\sqrt{1430}i}{1716} & 0 & \frac{5\sqrt{1430}}{1716} & 0 & 0 & 0 \end{bmatrix}$
1016	symmetry	$\frac{x\left(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_g,3)$	$\begin{bmatrix} 0 & \frac{59\sqrt{1001}}{8008} & 0 & -\frac{3\sqrt{1001}i}{416} & \frac{19\sqrt{6006}}{13728} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15015}}{1144} & 0 & \frac{5\sqrt{15015}i}{13728} & -\frac{3\sqrt{10010}}{4576} & 0 \\ \frac{59\sqrt{1001}}{8008} & 0 & \frac{3\sqrt{1001}i}{416} & 0 & 0 & -\frac{19\sqrt{6006}}{13728} & 0 & 0 & -\frac{\sqrt{15015}}{1144} & 0 & -\frac{5\sqrt{15015}i}{13728} & 0 & 0 & \frac{3\sqrt{10010}}{4576} \\ 0 & -\frac{3\sqrt{1001}i}{416} & 0 & -\frac{113\sqrt{1001}}{16016} & 0 & 0 & -\frac{7\sqrt{6006}}{6864} & 0 & 0 & \frac{7\sqrt{15015}i}{13728} & 0 & \frac{\sqrt{15015}}{2288} & 0 & 0 \\ \frac{3\sqrt{1001}i}{416} & 0 & -\frac{113\sqrt{1001}}{16016} & 0 & 0 & 0 & 0 & \frac{7\sqrt{6006}}{6864} & -\frac{7\sqrt{15015}i}{13728} & 0 & \frac{\sqrt{15015}}{2288} & 0 & 0 & 0 \\ \frac{19\sqrt{6006}}{13728} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{1001}}{616} & 0 & \frac{3\sqrt{1001}i}{1144} & -\frac{7\sqrt{10010}}{4576} & 0 & 0 & 0 & 0 & \frac{\sqrt{15015}}{1144} \\ 0 & -\frac{19\sqrt{6006}}{13728} & 0 & 0 & -\frac{3\sqrt{1001}}{616} & 0 & -\frac{3\sqrt{1001}i}{1144} & 0 & 0 & \frac{7\sqrt{10010}}{4576} & 0 & 0 & \frac{\sqrt{15015}}{1144} & 0 \\ 0 & 0 & -\frac{7\sqrt{6006}}{6864} & 0 & 0 & \frac{3\sqrt{1001}i}{1144} & 0 & \frac{3\sqrt{1001}}{1001} & 0 & 0 & \frac{\sqrt{10010}}{2288} & 0 & 0 & -\frac{\sqrt{15015}i}{3432} \\ 0 & 0 & 0 & \frac{7\sqrt{6006}}{6864} & -\frac{3\sqrt{1001}i}{1144} & 0 & \frac{3\sqrt{1001}}{1001} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}}{2288} & \frac{\sqrt{15015}i}{3432} & 0 \\ 0 & -\frac{\sqrt{15015}}{1144} & 0 & \frac{7\sqrt{15015}i}{13728} & -\frac{7\sqrt{10010}}{4576} & 0 & 0 & 0 & 0 & \frac{45\sqrt{1001}}{8008} & 0 & -\frac{5\sqrt{1001}i}{4576} & \frac{25\sqrt{6006}}{13728} & 0 \\ -\frac{\sqrt{15015}}{1144} & 0 & -\frac{7\sqrt{15015}i}{13728} & 0 & 0 & \frac{7\sqrt{10010}}{4576} & 0 & 0 & \frac{45\sqrt{1001}}{8008} & 0 & \frac{5\sqrt{1001}i}{4576} & 0 & 0 & -\frac{25\sqrt{6006}}{13728} \\ 0 & \frac{5\sqrt{15015}i}{13728} & 0 & \frac{\sqrt{15015}}{2288} & 0 & 0 & \frac{\sqrt{10010}}{2288} & 0 & 0 & -\frac{5\sqrt{1001}i}{4576} & 0 & -\frac{15\sqrt{1001}}{16016} & 0 & 0 \\ -\frac{5\sqrt{15015}i}{13728} & 0 & \frac{\sqrt{15015}}{2288} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}}{2288} & \frac{5\sqrt{1001}i}{4576} & 0 & -\frac{15\sqrt{1001}}{16016} & 0 & 0 & 0 \\ -\frac{3\sqrt{10010}}{4576} & 0 & 0 & 0 & 0 & \frac{\sqrt{15015}}{1144} & 0 & -\frac{\sqrt{15015}i}{3432} & \frac{25\sqrt{6006}}{13728} & 0 & 0 & 0 & 0 & -\frac{25\sqrt{1001}}{8008} \\ 0 & \frac{3\sqrt{10010}}{4576} & 0 & 0 & \frac{\sqrt{15015}}{1144} & 0 & \frac{\sqrt{15015}i}{3432} & 0 & 0 & -\frac{25\sqrt{6006}}{13728} & 0 & 0 & -\frac{25\sqrt{1001}}{8008} & 0 \end{bmatrix}$
1017	symmetry	$\frac{y\left(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_g,4)$	$\begin{pmatrix} 0 & \frac{113\sqrt{1001}i}{16016} & 0 & \frac{3\sqrt{1001}}{416} & 0 & 0 & \frac{7\sqrt{6006}}{6864} & 0 & 0 & \frac{\sqrt{15015}i}{2288} & 0 & \frac{7\sqrt{15015}}{13728} & 0 & 0 \\ -\frac{113\sqrt{1001}i}{16016} & 0 & \frac{3\sqrt{1001}}{416} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{6006}}{6864} & -\frac{\sqrt{15015}i}{2288} & 0 & \frac{7\sqrt{15015}}{13728} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{1001}}{416} & 0 & -\frac{59\sqrt{1001}i}{8008} & \frac{19\sqrt{6006}}{13728} & 0 & 0 & 0 & 0 & \frac{5\sqrt{15015}}{13728} & 0 & -\frac{\sqrt{15015}i}{1144} & \frac{3\sqrt{10010}}{4576} & 0 \\ \frac{3\sqrt{1001}}{416} & 0 & \frac{59\sqrt{1001}i}{8008} & 0 & 0 & -\frac{19\sqrt{6006}}{13728} & 0 & 0 & \frac{5\sqrt{15015}}{13728} & 0 & \frac{\sqrt{15015}i}{1144} & 0 & 0 & -\frac{3\sqrt{10010}}{4576} \\ 0 & 0 & \frac{19\sqrt{6006}}{13728} & 0 & 0 & \frac{3\sqrt{1001}i}{616} & 0 & \frac{3\sqrt{1001}}{1144} & 0 & 0 & \frac{7\sqrt{10010}}{4576} & 0 & 0 & \frac{\sqrt{15015}i}{1144} \\ 0 & 0 & 0 & -\frac{19\sqrt{6006}}{13728} & -\frac{3\sqrt{1001}i}{616} & 0 & \frac{3\sqrt{1001}}{1144} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{10010}}{4576} & -\frac{\sqrt{15015}i}{1144} & 0 \\ \frac{7\sqrt{6006}}{6864} & 0 & 0 & 0 & 0 & \frac{3\sqrt{1001}}{1144} & 0 & -\frac{3\sqrt{1001}i}{1001} & \frac{\sqrt{10010}}{2288} & 0 & 0 & 0 & 0 & \frac{\sqrt{15015}}{3432} \\ 0 & -\frac{7\sqrt{6006}}{6864} & 0 & 0 & \frac{3\sqrt{1001}}{1144} & 0 & \frac{3\sqrt{1001}i}{1001} & 0 & 0 & -\frac{\sqrt{10010}}{2288} & 0 & 0 & \frac{\sqrt{15015}}{3432} & 0 \\ 0 & \frac{\sqrt{15015}i}{2288} & 0 & \frac{5\sqrt{15015}}{13728} & 0 & 0 & \frac{\sqrt{10010}}{2288} & 0 & 0 & \frac{15\sqrt{1001}i}{16016} & 0 & \frac{5\sqrt{1001}}{4576} & 0 & 0 \\ -\frac{\sqrt{15015}i}{2288} & 0 & \frac{5\sqrt{15015}}{13728} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}}{2288} & -\frac{15\sqrt{1001}i}{16016} & 0 & \frac{5\sqrt{1001}}{4576} & 0 & 0 & 0 \\ 0 & \frac{7\sqrt{15015}}{13728} & 0 & -\frac{\sqrt{15015}i}{1144} & \frac{7\sqrt{10010}}{4576} & 0 & 0 & 0 & 0 & \frac{5\sqrt{1001}}{4576} & 0 & -\frac{45\sqrt{1001}i}{8008} & \frac{25\sqrt{6006}}{13728} & 0 \\ \frac{7\sqrt{15015}}{13728} & 0 & \frac{\sqrt{15015}i}{1144} & 0 & 0 & -\frac{7\sqrt{10010}}{4576} & 0 & 0 & \frac{5\sqrt{1001}}{4576} & 0 & \frac{45\sqrt{1001}i}{8008} & 0 & 0 & -\frac{25\sqrt{6006}}{13728} \\ 0 & 0 & \frac{3\sqrt{10010}}{4576} & 0 & 0 & \frac{\sqrt{15015}i}{1144} & 0 & \frac{\sqrt{15015}}{3432} & 0 & 0 & \frac{25\sqrt{6006}}{13728} & 0 & 0 & \frac{25\sqrt{1001}i}{8008} \\ 0 & 0 & 0 & -\frac{3\sqrt{10010}}{4576} & -\frac{\sqrt{15015}i}{1144} & 0 & \frac{\sqrt{15015}}{3432} & 0 & 0 & 0 & 0 & -\frac{25\sqrt{6006}}{13728} & -\frac{25\sqrt{1001}i}{8008} & 0 \end{pmatrix}$
1018	symmetry	$\frac{z\left(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_g,5)$	$\begin{pmatrix} -\frac{\sqrt{1001}}{2002} & 0 & 0 & 0 & 0 & \frac{\sqrt{6006}}{3432} & 0 & \frac{\sqrt{6006}i}{3432} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{1001}}{2002} & 0 & 0 & \frac{\sqrt{6006}}{3432} & 0 & -\frac{\sqrt{6006}i}{3432} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{1001}}{2002} & 0 & 0 & -\frac{\sqrt{6006}i}{3432} & 0 & \frac{\sqrt{6006}}{3432} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{1001}}{2002} & \frac{\sqrt{6006}i}{3432} & 0 & \frac{\sqrt{6006}}{3432} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6006}}{3432} & 0 & -\frac{\sqrt{6006}i}{3432} & \frac{3\sqrt{1001}}{1001} & 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}}{1144} & 0 & -\frac{\sqrt{10010}i}{1144} & 0 & 0 \\ \frac{\sqrt{6006}}{3432} & 0 & \frac{\sqrt{6006}i}{3432} & 0 & 0 & -\frac{3\sqrt{1001}}{1001} & 0 & 0 & -\frac{\sqrt{10010}}{1144} & 0 & \frac{\sqrt{10010}i}{1144} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6006}i}{3432} & 0 & \frac{\sqrt{6006}}{3432} & 0 & 0 & \frac{3\sqrt{1001}}{1001} & 0 & 0 & \frac{\sqrt{10010}i}{1144} & 0 & -\frac{\sqrt{10010}}{1144} & 0 & 0 \\ -\frac{\sqrt{6006}i}{3432} & 0 & \frac{\sqrt{6006}}{3432} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{1001}}{1001} & -\frac{\sqrt{10010}i}{1144} & 0 & -\frac{\sqrt{10010}}{1144} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}}{1144} & 0 & \frac{\sqrt{10010}i}{1144} & -\frac{15\sqrt{1001}}{2002} & 0 & 0 & 0 & 0 & \frac{5\sqrt{6006}}{1716} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}}{1144} & 0 & -\frac{\sqrt{10010}i}{1144} & 0 & 0 & \frac{15\sqrt{1001}}{2002} & 0 & 0 & \frac{5\sqrt{6006}}{1716} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10010}i}{1144} & 0 & -\frac{\sqrt{10010}}{1144} & 0 & 0 & -\frac{15\sqrt{1001}}{2002} & 0 & 0 & -\frac{5\sqrt{6006}i}{1716} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10010}i}{1144} & 0 & -\frac{\sqrt{10010}}{1144} & 0 & 0 & 0 & 0 & \frac{15\sqrt{1001}}{2002} & \frac{5\sqrt{6006}i}{1716} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6006}}{1716} & 0 & -\frac{5\sqrt{6006}i}{1716} & \frac{10\sqrt{1001}}{1001} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{6006}}{1716} & 0 & \frac{5\sqrt{6006}i}{1716} & 0 & 0 & -\frac{10\sqrt{1001}}{1001} \end{pmatrix}$
1019	symmetry	$\frac{3\sqrt{35}x\left(y^2-2yz-z^2\right)\left(y^2+2yz-z^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_g,6)$	$\begin{pmatrix} 0 & \frac{3\sqrt{715}}{1144} & 0 & -\frac{\sqrt{715}i}{416} & \frac{3\sqrt{4290}}{4576} & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}}{1144} & 0 & -\frac{31\sqrt{429}i}{4576} & \frac{27\sqrt{286}}{4576} & 0 \\ \frac{3\sqrt{715}}{1144} & 0 & \frac{\sqrt{715}i}{416} & 0 & 0 & -\frac{3\sqrt{4290}}{4576} & 0 & 0 & \frac{5\sqrt{429}}{1144} & 0 & \frac{31\sqrt{429}i}{4576} & 0 & 0 & -\frac{27\sqrt{286}}{4576} \\ 0 & -\frac{\sqrt{715}i}{416} & 0 & -\frac{5\sqrt{715}}{2288} & 0 & 0 & -\frac{\sqrt{4290}}{6864} & 0 & 0 & -\frac{47\sqrt{429}i}{13728} & 0 & -\frac{35\sqrt{429}}{6864} & 0 & 0 \\ \frac{\sqrt{715}i}{416} & 0 & -\frac{5\sqrt{715}}{2288} & 0 & 0 & 0 & 0 & \frac{\sqrt{4290}}{6864} & \frac{47\sqrt{429}i}{13728} & 0 & -\frac{35\sqrt{429}}{6864} & 0 & 0 & 0 \\ \frac{3\sqrt{4290}}{4576} & 0 & 0 & 0 & 0 & \frac{5\sqrt{715}}{1144} & 0 & -\frac{7\sqrt{715}i}{1144} & \frac{23\sqrt{286}}{4576} & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}}{3432} \\ 0 & -\frac{3\sqrt{4290}}{4576} & 0 & 0 & \frac{5\sqrt{715}}{1144} & 0 & \frac{7\sqrt{715}i}{1144} & 0 & 0 & -\frac{23\sqrt{286}}{4576} & 0 & 0 & \frac{5\sqrt{429}}{3432} & 0 \\ 0 & 0 & -\frac{\sqrt{4290}}{6864} & 0 & 0 & -\frac{7\sqrt{715}i}{1144} & 0 & -\frac{\sqrt{715}}{143} & 0 & 0 & -\frac{29\sqrt{286}}{2288} & 0 & 0 & -\frac{23\sqrt{429}i}{3432} \\ 0 & 0 & 0 & \frac{\sqrt{4290}}{6864} & \frac{7\sqrt{715}i}{1144} & 0 & -\frac{\sqrt{715}}{143} & 0 & 0 & 0 & 0 & \frac{29\sqrt{286}}{2288} & \frac{23\sqrt{429}i}{3432} & 0 \\ 0 & \frac{5\sqrt{429}}{1144} & 0 & -\frac{47\sqrt{429}i}{13728} & \frac{23\sqrt{286}}{4576} & 0 & 0 & 0 & 0 & \frac{5\sqrt{715}}{1144} & 0 & -\frac{23\sqrt{715}i}{4576} & \frac{35\sqrt{4290}}{13728} & 0 \\ \frac{5\sqrt{429}}{1144} & 0 & \frac{47\sqrt{429}i}{13728} & 0 & 0 & -\frac{23\sqrt{286}}{4576} & 0 & 0 & \frac{5\sqrt{715}}{1144} & 0 & \frac{23\sqrt{715}i}{4576} & 0 & 0 & -\frac{35\sqrt{4290}}{13728} \\ 0 & -\frac{31\sqrt{429}i}{4576} & 0 & -\frac{35\sqrt{429}}{6864} & 0 & 0 & -\frac{29\sqrt{286}}{2288} & 0 & 0 & -\frac{23\sqrt{715}i}{4576} & 0 & \frac{5\sqrt{715}}{2288} & 0 & 0 \\ \frac{31\sqrt{429}i}{4576} & 0 & -\frac{35\sqrt{429}}{6864} & 0 & 0 & 0 & 0 & \frac{29\sqrt{286}}{2288} & \frac{23\sqrt{715}i}{4576} & 0 & \frac{5\sqrt{715}}{2288} & 0 & 0 & 0 \\ \frac{27\sqrt{286}}{4576} & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}}{3432} & 0 & -\frac{23\sqrt{429}i}{3432} & \frac{35\sqrt{4290}}{13728} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{715}}{1144} \\ 0 & -\frac{27\sqrt{286}}{4576} & 0 & 0 & \frac{5\sqrt{429}}{3432} & 0 & \frac{23\sqrt{429}i}{3432} & 0 & 0 & -\frac{35\sqrt{4290}}{13728} & 0 & 0 & -\frac{5\sqrt{715}}{1144} & 0 \end{pmatrix}$
1020	symmetry	$\frac{3\sqrt{35}y\left(x^2-2xz-z^2\right)\left(x^2+2xz-z^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_g,7)$	$\begin{pmatrix} 0 & \frac{5\sqrt{715}i}{2288} & 0 & \frac{\sqrt{715}}{416} & 0 & 0 & \frac{\sqrt{4290}}{6864} & 0 & 0 & -\frac{35\sqrt{429}i}{6864} & 0 & -\frac{47\sqrt{429}}{13728} & 0 & 0 \\ -\frac{5\sqrt{715}i}{2288} & 0 & \frac{\sqrt{715}}{416} & 0 & 0 & 0 & 0 & -\frac{\sqrt{4290}}{6864} & \frac{35\sqrt{429}i}{6864} & 0 & -\frac{47\sqrt{429}}{13728} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{715}}{416} & 0 & -\frac{3\sqrt{715}i}{1144} & \frac{3\sqrt{4290}}{4576} & 0 & 0 & 0 & 0 & -\frac{31\sqrt{429}}{4576} & 0 & \frac{5\sqrt{429}i}{1144} & -\frac{27\sqrt{286}}{4576} & 0 \\ \frac{\sqrt{715}}{416} & 0 & \frac{3\sqrt{715}i}{1144} & 0 & 0 & -\frac{3\sqrt{4290}}{4576} & 0 & 0 & -\frac{31\sqrt{429}}{4576} & 0 & -\frac{5\sqrt{429}i}{1144} & 0 & 0 & \frac{27\sqrt{286}}{4576} \\ 0 & 0 & \frac{3\sqrt{4290}}{4576} & 0 & 0 & -\frac{5\sqrt{715}i}{1144} & 0 & -\frac{7\sqrt{715}}{1144} & 0 & 0 & -\frac{23\sqrt{286}}{4576} & 0 & 0 & \frac{5\sqrt{429}i}{3432} \\ 0 & 0 & 0 & -\frac{3\sqrt{4290}}{4576} & \frac{5\sqrt{715}i}{1144} & 0 & -\frac{7\sqrt{715}}{1144} & 0 & 0 & 0 & 0 & \frac{23\sqrt{286}}{4576} & -\frac{5\sqrt{429}i}{3432} & 0 \\ \frac{\sqrt{4290}}{6864} & 0 & 0 & 0 & 0 & -\frac{7\sqrt{715}}{1144} & 0 & \frac{\sqrt{715}i}{143} & -\frac{29\sqrt{286}}{2288} & 0 & 0 & 0 & 0 & \frac{23\sqrt{429}}{3432} \\ 0 & -\frac{\sqrt{4290}}{6864} & 0 & 0 & -\frac{7\sqrt{715}}{1144} & 0 & -\frac{\sqrt{715}i}{143} & 0 & 0 & \frac{29\sqrt{286}}{2288} & 0 & 0 & \frac{23\sqrt{429}}{3432} & 0 \\ 0 & -\frac{35\sqrt{429}i}{6864} & 0 & -\frac{31\sqrt{429}}{4576} & 0 & 0 & -\frac{29\sqrt{286}}{2288} & 0 & 0 & -\frac{5\sqrt{715}i}{2288} & 0 & \frac{23\sqrt{715}}{4576} & 0 & 0 \\ \frac{35\sqrt{429}i}{6864} & 0 & -\frac{31\sqrt{429}}{4576} & 0 & 0 & 0 & 0 & \frac{29\sqrt{286}}{2288} & \frac{5\sqrt{715}i}{2288} & 0 & \frac{23\sqrt{715}}{4576} & 0 & 0 & 0 \\ 0 & -\frac{47\sqrt{429}}{13728} & 0 & \frac{5\sqrt{429}i}{1144} & -\frac{23\sqrt{286}}{4576} & 0 & 0 & 0 & 0 & \frac{23\sqrt{715}}{4576} & 0 & -\frac{5\sqrt{715}i}{1144} & \frac{35\sqrt{4290}}{13728} & 0 \\ -\frac{47\sqrt{429}}{13728} & 0 & -\frac{5\sqrt{429}i}{1144} & 0 & 0 & \frac{23\sqrt{286}}{4576} & 0 & 0 & \frac{23\sqrt{715}}{4576} & 0 & \frac{5\sqrt{715}i}{1144} & 0 & 0 & -\frac{35\sqrt{4290}}{13728} \\ 0 & 0 & -\frac{27\sqrt{286}}{4576} & 0 & 0 & \frac{5\sqrt{429}i}{3432} & 0 & \frac{23\sqrt{429}}{3432} & 0 & 0 & \frac{35\sqrt{4290}}{13728} & 0 & 0 & \frac{5\sqrt{715}i}{1144} \\ 0 & 0 & 0 & \frac{27\sqrt{286}}{4576} & -\frac{5\sqrt{429}i}{3432} & 0 & \frac{23\sqrt{429}}{3432} & 0 & 0 & 0 & 0 & -\frac{35\sqrt{4290}}{13728} & -\frac{5\sqrt{715}i}{1144} & 0 \end{pmatrix}$
1021	symmetry	$\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_g,8)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{4290}}{312} & 0 & -\frac{\sqrt{4290}i}{312} & \frac{5\sqrt{429}}{858} & 0 & 0 & 0 & 0 & -\frac{\sqrt{286}}{572} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{4290}}{312} & 0 & \frac{\sqrt{4290}i}{312} & 0 & 0 & -\frac{5\sqrt{429}}{858} & 0 & 0 & -\frac{\sqrt{286}}{572} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{4290}i}{312} & 0 & -\frac{\sqrt{4290}}{312} & 0 & 0 & -\frac{5\sqrt{429}}{858} & 0 & 0 & -\frac{\sqrt{286}i}{572} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{4290}i}{312} & 0 & -\frac{\sqrt{4290}}{312} & 0 & 0 & 0 & 0 & \frac{5\sqrt{429}}{858} & \frac{\sqrt{286}i}{572} & 0 \\ 0 & \frac{\sqrt{4290}}{312} & 0 & -\frac{\sqrt{4290}i}{312} & \frac{\sqrt{715}}{143} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{286}}{1144} & 0 & -\frac{3\sqrt{286}i}{1144} & 0 & 0 \\ \frac{\sqrt{4290}}{312} & 0 & \frac{\sqrt{4290}i}{312} & 0 & 0 & -\frac{\sqrt{715}}{143} & 0 & 0 & -\frac{3\sqrt{286}}{1144} & 0 & \frac{3\sqrt{286}i}{1144} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{4290}i}{312} & 0 & -\frac{\sqrt{4290}}{312} & 0 & 0 & -\frac{\sqrt{715}}{143} & 0 & 0 & -\frac{3\sqrt{286}i}{1144} & 0 & \frac{3\sqrt{286}}{1144} & 0 & 0 \\ \frac{\sqrt{4290}i}{312} & 0 & -\frac{\sqrt{4290}}{312} & 0 & 0 & 0 & 0 & \frac{\sqrt{715}}{143} & \frac{3\sqrt{286}i}{1144} & 0 & \frac{3\sqrt{286}}{1144} & 0 & 0 & 0 \\ \frac{5\sqrt{429}}{858} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{286}}{1144} & 0 & -\frac{3\sqrt{286}i}{1144} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{5\sqrt{429}}{858} & 0 & 0 & -\frac{3\sqrt{286}}{1144} & 0 & \frac{3\sqrt{286}i}{1144} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{5\sqrt{429}}{858} & 0 & 0 & -\frac{3\sqrt{286}i}{1144} & 0 & \frac{3\sqrt{286}}{1144} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{5\sqrt{429}}{858} & \frac{3\sqrt{286}i}{1144} & 0 & \frac{3\sqrt{286}}{1144} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{286}}{572} & 0 & -\frac{\sqrt{286}i}{572} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{286}}{572} & 0 & \frac{\sqrt{286}i}{572} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$
1022	symmetry	$\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_g,9)$	$\begin{pmatrix} 0 & -\frac{2\sqrt{2145}}{429} & 0 & \frac{\sqrt{2145}i}{208} & -\frac{\sqrt{1430}}{528} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{143}}{429} & 0 & \frac{19\sqrt{143}i}{6864} & -\frac{3\sqrt{858}}{2288} & 0 \\ -\frac{2\sqrt{2145}}{429} & 0 & -\frac{\sqrt{2145}i}{208} & 0 & 0 & \frac{\sqrt{1430}}{528} & 0 & 0 & -\frac{2\sqrt{143}}{429} & 0 & -\frac{19\sqrt{143}i}{6864} & 0 & 0 & \frac{3\sqrt{858}}{2288} \\ 0 & \frac{\sqrt{2145}i}{208} & 0 & \frac{17\sqrt{2145}}{3432} & 0 & 0 & \frac{5\sqrt{1430}}{1716} & 0 & 0 & \frac{41\sqrt{143}i}{6864} & 0 & -\frac{\sqrt{143}}{3432} & 0 & 0 \\ -\frac{\sqrt{2145}i}{208} & 0 & \frac{17\sqrt{2145}}{3432} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{1430}}{1716} & -\frac{41\sqrt{143}i}{6864} & 0 & -\frac{\sqrt{143}}{3432} & 0 & 0 & 0 \\ -\frac{\sqrt{1430}}{528} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}}{572} & 0 & \frac{\sqrt{2145}i}{572} & -\frac{31\sqrt{858}}{6864} & 0 & 0 & 0 & 0 & \frac{17\sqrt{143}}{1716} \\ 0 & \frac{\sqrt{1430}}{528} & 0 & 0 & -\frac{\sqrt{2145}}{572} & 0 & -\frac{\sqrt{2145}i}{572} & 0 & 0 & \frac{31\sqrt{858}}{6864} & 0 & 0 & \frac{17\sqrt{143}}{1716} & 0 \\ 0 & 0 & \frac{5\sqrt{1430}}{1716} & 0 & 0 & \frac{\sqrt{2145}i}{572} & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}}{1716} & 0 & 0 & -\frac{\sqrt{143}i}{156} \\ 0 & 0 & 0 & -\frac{5\sqrt{1430}}{1716} & -\frac{\sqrt{2145}i}{572} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{858}}{1716} & \frac{\sqrt{143}i}{156} & 0 \\ 0 & -\frac{2\sqrt{143}}{429} & 0 & \frac{41\sqrt{143}i}{6864} & -\frac{31\sqrt{858}}{6864} & 0 & 0 & 0 & 0 & \frac{2\sqrt{2145}}{429} & 0 & -\frac{\sqrt{2145}i}{624} & \frac{35\sqrt{1430}}{6864} & 0 \\ -\frac{2\sqrt{143}}{429} & 0 & -\frac{41\sqrt{143}i}{6864} & 0 & 0 & \frac{31\sqrt{858}}{6864} & 0 & 0 & \frac{2\sqrt{2145}}{429} & 0 & \frac{\sqrt{2145}i}{624} & 0 & 0 & -\frac{35\sqrt{1430}}{6864} \\ 0 & \frac{19\sqrt{143}i}{6864} & 0 & -\frac{\sqrt{143}}{3432} & 0 & 0 & -\frac{\sqrt{858}}{1716} & 0 & 0 & -\frac{\sqrt{2145}i}{624} & 0 & -\frac{\sqrt{2145}}{3432} & 0 & 0 \\ -\frac{19\sqrt{143}i}{6864} & 0 & -\frac{\sqrt{143}}{3432} & 0 & 0 & 0 & 0 & \frac{\sqrt{858}}{1716} & \frac{\sqrt{2145}i}{624} & 0 & -\frac{\sqrt{2145}}{3432} & 0 & 0 & 0 \\ -\frac{3\sqrt{858}}{2288} & 0 & 0 & 0 & 0 & \frac{17\sqrt{143}}{1716} & 0 & -\frac{\sqrt{143}i}{156} & \frac{35\sqrt{1430}}{6864} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{2145}}{1716} \\ 0 & \frac{3\sqrt{858}}{2288} & 0 & 0 & \frac{17\sqrt{143}}{1716} & 0 & \frac{\sqrt{143}i}{156} & 0 & 0 & -\frac{35\sqrt{1430}}{6864} & 0 & 0 & -\frac{5\sqrt{2145}}{1716} & 0 \end{pmatrix}$
1023	symmetry	$\frac{\sqrt{105}y(x-z)(x+z)\left(x^2-2y^2+z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_g,10)$	$\begin{pmatrix} 0 & \frac{17\sqrt{2145}i}{3432} & 0 & \frac{\sqrt{2145}}{208} & 0 & 0 & \frac{5\sqrt{1430}}{1716} & 0 & 0 & \frac{\sqrt{143}i}{3432} & 0 & -\frac{41\sqrt{143}}{6864} & 0 & 0 \\ -\frac{17\sqrt{2145}i}{3432} & 0 & \frac{\sqrt{2145}}{208} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{1430}}{1716} & -\frac{\sqrt{143}i}{3432} & 0 & -\frac{41\sqrt{143}}{6864} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2145}}{208} & 0 & -\frac{2\sqrt{2145}i}{429} & \frac{\sqrt{1430}}{528} & 0 & 0 & 0 & 0 & -\frac{19\sqrt{143}}{6864} & 0 & \frac{2\sqrt{143}i}{429} & -\frac{3\sqrt{858}}{2288} & 0 \\ \frac{\sqrt{2145}}{208} & 0 & \frac{2\sqrt{2145}i}{429} & 0 & 0 & -\frac{\sqrt{1430}}{528} & 0 & 0 & -\frac{19\sqrt{143}}{6864} & 0 & -\frac{2\sqrt{143}i}{429} & 0 & 0 & \frac{3\sqrt{858}}{2288} \\ 0 & 0 & \frac{\sqrt{1430}}{528} & 0 & 0 & -\frac{\sqrt{2145}i}{572} & 0 & -\frac{\sqrt{2145}}{572} & 0 & 0 & -\frac{31\sqrt{858}}{6864} & 0 & 0 & -\frac{17\sqrt{143}i}{1716} \\ 0 & 0 & 0 & -\frac{\sqrt{1430}}{528} & \frac{\sqrt{2145}i}{572} & 0 & -\frac{\sqrt{2145}}{572} & 0 & 0 & 0 & 0 & \frac{31\sqrt{858}}{6864} & \frac{17\sqrt{143}i}{1716} & 0 \\ \frac{5\sqrt{1430}}{1716} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}}{572} & 0 & 0 & \frac{\sqrt{858}}{1716} & 0 & 0 & 0 & 0 & -\frac{\sqrt{143}}{156} \\ 0 & -\frac{5\sqrt{1430}}{1716} & 0 & 0 & -\frac{\sqrt{2145}}{572} & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}}{1716} & 0 & 0 & -\frac{\sqrt{143}}{156} & 0 \\ 0 & \frac{\sqrt{143}i}{3432} & 0 & -\frac{19\sqrt{143}}{6864} & 0 & 0 & \frac{\sqrt{858}}{1716} & 0 & 0 & -\frac{\sqrt{2145}i}{3432} & 0 & -\frac{\sqrt{2145}}{624} & 0 & 0 \\ -\frac{\sqrt{143}i}{3432} & 0 & -\frac{19\sqrt{143}}{6864} & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}}{1716} & \frac{\sqrt{2145}i}{3432} & 0 & -\frac{\sqrt{2145}}{624} & 0 & 0 & 0 \\ 0 & -\frac{41\sqrt{143}}{6864} & 0 & \frac{2\sqrt{143}i}{429} & -\frac{31\sqrt{858}}{6864} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2145}}{624} & 0 & \frac{2\sqrt{2145}i}{429} & -\frac{35\sqrt{1430}}{6864} & 0 \\ -\frac{41\sqrt{143}}{6864} & 0 & -\frac{2\sqrt{143}i}{429} & 0 & 0 & \frac{31\sqrt{858}}{6864} & 0 & 0 & -\frac{\sqrt{2145}}{624} & 0 & -\frac{2\sqrt{2145}i}{429} & 0 & 0 & \frac{35\sqrt{1430}}{6864} \\ 0 & 0 & -\frac{3\sqrt{858}}{2288} & 0 & 0 & -\frac{17\sqrt{143}i}{1716} & 0 & -\frac{\sqrt{143}}{156} & 0 & 0 & -\frac{35\sqrt{1430}}{6864} & 0 & 0 & -\frac{5\sqrt{2145}i}{1716} \\ 0 & 0 & 0 & \frac{3\sqrt{858}}{2288} & \frac{17\sqrt{143}i}{1716} & 0 & -\frac{\sqrt{143}}{156} & 0 & 0 & 0 & 0 & \frac{35\sqrt{1430}}{6864} & \frac{5\sqrt{2145}i}{1716} & 0 \end{pmatrix}$
1024	symmetry	$-\frac{\sqrt{105}z(x-y)(x+y)\left(x^2+y^2-2z^2\right)}{4}$

continued ...

Table 10

No.	multipole	matrix
	$\mathbb{M}_5^{(1,1;a)}(A_g,11)$	$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}}{3432} & 0 & \frac{\sqrt{1430}i}{3432} & -\frac{2\sqrt{143}}{429} & 0 & 0 & 0 & 0 & \frac{\sqrt{858}}{286} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}}{3432} & 0 & -\frac{\sqrt{1430}i}{3432} & 0 & 0 & \frac{2\sqrt{143}}{429} & 0 & 0 & \frac{\sqrt{858}}{286} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{1430}i}{3432} & 0 & -\frac{\sqrt{1430}}{3432} & 0 & 0 & -\frac{2\sqrt{143}}{429} & 0 & 0 & -\frac{\sqrt{858}i}{286} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{1430}i}{3432} & 0 & -\frac{\sqrt{1430}}{3432} & 0 & 0 & 0 & 0 & \frac{2\sqrt{143}}{429} & \frac{\sqrt{858}i}{286} & 0 \\ 0 & -\frac{\sqrt{1430}}{3432} & 0 & -\frac{\sqrt{1430}i}{3432} & 0 & 0 & 0 & 0 & 0 & \frac{23\sqrt{858}}{3432} & 0 & -\frac{23\sqrt{858}i}{3432} & \frac{8\sqrt{143}}{429} & 0 \\ -\frac{\sqrt{1430}}{3432} & 0 & \frac{\sqrt{1430}i}{3432} & 0 & 0 & 0 & 0 & 0 & \frac{23\sqrt{858}}{3432} & 0 & \frac{23\sqrt{858}i}{3432} & 0 & 0 & -\frac{8\sqrt{143}}{429} \\ 0 & \frac{\sqrt{1430}i}{3432} & 0 & -\frac{\sqrt{1430}}{3432} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{858}i}{264} & 0 & -\frac{\sqrt{858}}{264} & 0 & 0 \\ -\frac{\sqrt{1430}i}{3432} & 0 & -\frac{\sqrt{1430}}{3432} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{858}i}{264} & 0 & -\frac{\sqrt{858}}{264} & 0 & 0 & 0 \\ -\frac{2\sqrt{143}}{429} & 0 & 0 & 0 & 0 & \frac{23\sqrt{858}}{3432} & 0 & -\frac{\sqrt{858}i}{264} & \frac{2\sqrt{2145}}{429} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{1430}}{1716} \\ 0 & \frac{2\sqrt{143}}{429} & 0 & 0 & \frac{23\sqrt{858}}{3432} & 0 & \frac{\sqrt{858}i}{264} & 0 & 0 & -\frac{2\sqrt{2145}}{429} & 0 & 0 & -\frac{5\sqrt{1430}}{1716} & 0 \\ 0 & 0 & -\frac{2\sqrt{143}}{429} & 0 & 0 & -\frac{23\sqrt{858}i}{3432} & 0 & -\frac{\sqrt{858}}{264} & 0 & 0 & -\frac{2\sqrt{2145}}{429} & 0 & 0 & -\frac{5\sqrt{1430}i}{1716} \\ 0 & 0 & 0 & \frac{2\sqrt{143}}{429} & \frac{23\sqrt{858}i}{3432} & 0 & -\frac{\sqrt{858}}{264} & 0 & 0 & 0 & 0 & \frac{2\sqrt{2145}}{429} & \frac{5\sqrt{1430}i}{1716} & 0 \\ 0 & \frac{\sqrt{858}}{286} & 0 & -\frac{\sqrt{858}i}{286} & \frac{8\sqrt{143}}{429} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{1430}}{1716} & 0 & -\frac{5\sqrt{1430}i}{1716} & 0 & 0 \\ \frac{\sqrt{858}}{286} & 0 & \frac{\sqrt{858}i}{286} & 0 & 0 & -\frac{8\sqrt{143}}{429} & 0 & 0 & -\frac{5\sqrt{1430}}{1716} & 0 & \frac{5\sqrt{1430}i}{1716} & 0 & 0 & 0 \end{bmatrix}$