PG No. 2 $C_{\rm i}$ $\bar{1}$ [triclinic] (axial, internal polar quadrupole)

* Harmonics for rank 0

* Harmonics for rank 1

$\vec{\mathbb{G}}_1^{(2,1)}[q](A_g,1)$

** symmetry

$$x$$

** expression

$$-\frac{3\sqrt{10}Q_u yz}{10}-\frac{\sqrt{30}Q_v yz}{10}+\frac{\sqrt{30}Q_{xy}xz}{10}-\frac{\sqrt{30}Q_{xz}xy}{10}-\frac{\sqrt{30}Q_{yz}\left(y-z\right)\left(y+z\right)}{10}$$

$\vec{\mathbb{G}}_1^{(2,1)}[q](A_g,2)$

** symmetry

$$y$$

** expression

$$\frac{3\sqrt{10}Q_u xz}{10}-\frac{\sqrt{30}Q_v xz}{10}-\frac{\sqrt{30}Q_{xy}yz}{10}+\frac{\sqrt{30}Q_{xz}\left(x-z\right)\left(x+z\right)}{10}+\frac{\sqrt{30}Q_{yz}xy}{10}$$

$\vec{\mathbb{G}}_1^{(2,1)}[q](A_g,3)$

** symmetry

$$z$$

** expression

$$\frac{\sqrt{30}Q_v xy}{5}-\frac{\sqrt{30}Q_{xy}\left(x-y\right)\left(x+y\right)}{10}+\frac{\sqrt{30}Q_{xz}yz}{10}-\frac{\sqrt{30}Q_{yz}xz}{10}$$

* Harmonics for rank 2

$\vec{\mathbb{G}}_2^{(2,-1)}[q](A_u,1)$

** symmetry

$$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$$

** expression

$$\frac{\sqrt{2}Q_{xz}y}{2}-\frac{\sqrt{2}Q_{yz}x}{2}$$

$\vec{\mathbb{G}}_2^{(2,-1)}[q](A_u,2)$

** symmetry

$$\frac{\sqrt{3}\left(x-y\right)\left(x+y\right)}{2}$$

** expression

$$\frac{\sqrt{6}Q_{xy}z}{3}-\frac{\sqrt{6}Q_{xz}y}{6}-\frac{\sqrt{6}Q_{yz}x}{6}$$

$\vec{\mathbb{G}}_2^{(2,-1)}[q](A_u,3)$

** symmetry

$$\sqrt{3}yz$$

** expression

$$\frac{\sqrt{2}Q_u x}{2}+\frac{\sqrt{6}Q_v x}{6}+\frac{\sqrt{6}Q_{xy}y}{6}-\frac{\sqrt{6}Q_{xz}z}{6}$$

$\vec{\mathbb{G}}_2^{(2,-1)}[q](A_u,4)$

** symmetry

$$\sqrt{3}xz$$

** expression

$$-\frac{\sqrt{2}Q_u y}{2}+\frac{\sqrt{6}Q_v y}{6}-\frac{\sqrt{6}Q_{xy}x}{6}+\frac{\sqrt{6}Q_{yz}z}{6}$$

$\vec{\mathbb{G}}_2^{(2,-1)}[q](A_u,5)$

** symmetry

$$\sqrt{3}xy$$

** expression

$$-\frac{\sqrt{6}Q_{v}z}{3}+\frac{\sqrt{6}Q_{xz}x}{6}-\frac{\sqrt{6}Q_{yz}y}{6}$$

$\vec{\mathbb{G}}_{2}^{(2,1)}[q](A_u,1)$
** symmetry

$$-\frac{x^{2}}{2}-\frac{y^{2}}{2}+z^{2}$$

** expression

$$\frac{5\sqrt{42}Q_{v}xyz}{14}-\frac{5\sqrt{42}Q_{xy}z\left(x-y\right)\left(x+y\right)}{28}-\frac{\sqrt{42}Q_{xz}y\left(x^{2}+y^{2}-4z^{2}\right)}{28}+\frac{\sqrt{42}Q_{yz}x\left(x^{2}+y^{2}-4z^{2}\right)}{28}$$

$\vec{\mathbb{G}}_{2}^{(2,1)}[q](A_u,2)$
** symmetry

$$\frac{\sqrt{3}\left(x-y\right)\left(x+y\right)}{2}$$

** expression

$$-\frac{5\sqrt{42}Q_{u}xyz}{14}+\frac{\sqrt{14}Q_{xy}z\left(3x^{2}+3y^{2}-2z^{2}\right)}{28}-\frac{\sqrt{14}Q_{xz}y\left(9x^{2}-y^{2}-6z^{2}\right)}{28}+\frac{\sqrt{14}Q_{yz}x\left(x^{2}-9y^{2}+6z^{2}\right)}{28}$$

$\vec{\mathbb{G}}_{2}^{(2,1)}[q](A_u,3)$
** symmetry

$$\sqrt{3}yz$$

** expression

$$-\frac{\sqrt{42}Q_{u}x\left(x^{2}+y^{2}-4z^{2}\right)}{28}-\frac{\sqrt{14}Q_{v}x\left(x^{2}-9y^{2}+6z^{2}\right)}{28}-\frac{\sqrt{14}Q_{xy}y\left(3x^{2}-2y^{2}+3z^{2}\right)}{14}+\frac{\sqrt{14}Q_{xz}z\left(3x^{2}+3y^{2}-2z^{2}\right)}{14}$$

$\vec{\mathbb{G}}_{2}^{(2,1)}[q](A_u,4)$
** symmetry

$$\sqrt{3}xz$$

** expression

$$\frac{\sqrt{42}Q_{u}y\left(x^{2}+y^{2}-4z^{2}\right)}{28}+\frac{\sqrt{14}Q_{v}y\left(9x^{2}-y^{2}-6z^{2}\right)}{28}-\frac{\sqrt{14}Q_{xy}x\left(2x^{2}-3y^{2}-3z^{2}\right)}{14}-\frac{\sqrt{14}Q_{yz}z\left(3x^{2}+3y^{2}-2z^{2}\right)}{14}$$

$\vec{\mathbb{G}}_{2}^{(2,1)}[q](A_u,5)$
** symmetry

$$\sqrt{3}xy$$

** expression

$$\frac{5\sqrt{42}Q_{u}z\left(x-y\right)\left(x+y\right)}{28}-\frac{\sqrt{14}Q_{v}z\left(3x^{2}+3y^{2}-2z^{2}\right)}{28}+\frac{\sqrt{14}Q_{xz}x\left(2x^{2}-3y^{2}-3z^{2}\right)}{14}+\frac{\sqrt{14}Q_{yz}y\left(3x^{2}-2y^{2}+3z^{2}\right)}{14}$$

* Harmonics for rank 3
$\vec{\mathbb{G}}_{3}^{(2,-1)}[q](A_g,1)$
** symmetry

$$\sqrt{15}xyz$$

** expression

$$\frac{\sqrt{6}Q_{u}\left(x-y\right)\left(x+y\right)}{4}+\frac{\sqrt{2}Q_{v}\left(x^{2}+y^{2}-2z^{2}\right)}{4}$$

$\vec{\mathbb{G}}_{3}^{(2,-1)}[q](A_g,2)$
** symmetry

$$\frac{x\left(2x^{2}-3y^{2}-3z^{2}\right)}{2}$$

** expression

$$\frac{3\sqrt{10}Q_{u}yz}{20}+\frac{\sqrt{30}Q_{v}yz}{20}+\frac{\sqrt{30}Q_{xy}xz}{5}-\frac{\sqrt{30}Q_{xz}xy}{5}+\frac{\sqrt{30}Q_{yz}\left(y-z\right)\left(y+z\right)}{20}$$

$\vec{\mathbb{G}}_{3}^{(2,-1)}[q](A_g,3)$

** symmetry

$$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$$

** expression

$$-\frac{3\sqrt{10}Q_u xz}{20}+\frac{\sqrt{30}Q_v xz}{20}-\frac{\sqrt{30}Q_{xy}yz}{5}-\frac{\sqrt{30}Q_{xz}\left(x-z\right)\left(x+z\right)}{20}+\frac{\sqrt{30}Q_{yz}xy}{5}$$

$\vec{\mathbb{G}}_3^{(2,-1)}[q](A_g,4)$
** symmetry

$$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$$

** expression

$$-\frac{\sqrt{30}Q_v xy}{10}+\frac{\sqrt{30}Q_{xy}\left(x-y\right)\left(x+y\right)}{20}+\frac{\sqrt{30}Q_{xz}yz}{5}-\frac{\sqrt{30}Q_{yz}xz}{5}$$

$\vec{\mathbb{G}}_3^{(2,-1)}[q](A_g,5)$
** symmetry

$$\frac{\sqrt{15}x\left(y-z\right)\left(y+z\right)}{2}$$

** expression

$$\frac{\sqrt{6}Q_u yz}{4}-\frac{3\sqrt{2}Q_v yz}{4}+\frac{\sqrt{2}Q_{yz}\left(2x^2-y^2-z^2\right)}{4}$$

$\vec{\mathbb{G}}_3^{(2,-1)}[q](A_g,6)$
** symmetry

$$-\frac{\sqrt{15}y\left(x-z\right)\left(x+z\right)}{2}$$

** expression

$$\frac{\sqrt{6}Q_u xz}{4}+\frac{3\sqrt{2}Q_v xz}{4}-\frac{\sqrt{2}Q_{xz}\left(x^2-2y^2+z^2\right)}{4}$$

$\vec{\mathbb{G}}_3^{(2,-1)}[q](A_g,7)$
** symmetry

$$\frac{\sqrt{15}z\left(x-y\right)\left(x+y\right)}{2}$$

** expression

$$-\frac{\sqrt{6}Q_u xy}{2}-\frac{\sqrt{2}Q_{xy}\left(x^2+y^2-2z^2\right)}{4}$$

$\vec{\mathbb{G}}_3^{(2,1)}[q](A_g,1)$
** symmetry

$$\sqrt{15}xyz$$

** expression

$$-\frac{\sqrt{3}Q_u\left(x-y\right)\left(x+y\right)\left(x^2+y^2-6z^2\right)}{6}-\frac{Q_v\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{6}$$
$$-\frac{7Q_{xy}xy\left(x-y\right)\left(x+y\right)}{6}+\frac{7Q_{xz}xz\left(x-z\right)\left(x+z\right)}{6}-\frac{7Q_{yz}yz\left(y-z\right)\left(y+z\right)}{6}$$

$\vec{\mathbb{G}}_3^{(2,1)}[q](A_g,2)$
** symmetry

$$\frac{x\left(2x^2-3y^2-3z^2\right)}{2}$$

** expression

$$-\frac{\sqrt{5}Q_u yz\left(6x^2-y^2-z^2\right)}{4}-\frac{\sqrt{15}Q_v yz\left(6x^2-y^2-z^2\right)}{12}+\frac{\sqrt{15}Q_{xy}xz\left(4x^2-3y^2-3z^2\right)}{12}$$
$$-\frac{\sqrt{15}Q_{xz}xy\left(4x^2-3y^2-3z^2\right)}{12}-\frac{\sqrt{15}Q_{yz}\left(y-z\right)\left(y+z\right)\left(6x^2-y^2-z^2\right)}{12}$$

$\vec{\mathbb{G}}_3^{(2,1)}[q](A_g,3)$

** symmetry

$$-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$$

** expression

$$-\frac{\sqrt{5}Q_u xz\left(x^2-6y^2+z^2\right)}{4}+\frac{\sqrt{15}Q_v xz\left(x^2-6y^2+z^2\right)}{12}+\frac{\sqrt{15}Q_{xy} yz\left(3x^2-4y^2+3z^2\right)}{12}-\frac{\sqrt{15}Q_{xz}\left(x-z\right)\left(x+z\right)\left(x^2-6y^2+z^2\right)}{12}-\frac{\sqrt{15}Q_{yz} xy\left(3x^2-4y^2+3z^2\right)}{12}$$

$\vec{\mathbb{G}}_3^{(2,1)}[q](A_g,4)$

** symmetry

$$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$$

** expression

$$-\frac{\sqrt{15}Q_v xy\left(x^2+y^2-6z^2\right)}{6}+\frac{\sqrt{15}Q_{xy}\left(x-y\right)\left(x+y\right)\left(x^2+y^2-6z^2\right)}{12}-\frac{\sqrt{15}Q_{xz} yz\left(3x^2+3y^2-4z^2\right)}{12}+\frac{\sqrt{15}Q_{yz} xz\left(3x^2+3y^2-4z^2\right)}{12}$$

$\vec{\mathbb{G}}_3^{(2,1)}[q](A_g,5)$

** symmetry

$$\frac{\sqrt{15}x\left(y-z\right)\left(y+z\right)}{2}$$

** expression

$$\frac{\sqrt{3}Q_u yz\left(12x^2-9y^2+5z^2\right)}{12}-\frac{Q_v yz\left(36x^2+y^2-13z^2\right)}{12}+\frac{7Q_{xy} xz\left(2x^2-3y^2-z^2\right)}{12}+\frac{7Q_{xz} xy\left(2x^2-y^2-3z^2\right)}{12}-\frac{Q_{yz}\left(4x^4-12x^2y^2-12x^2z^2+5y^4-18y^2z^2+5z^4\right)}{12}$$

$\vec{\mathbb{G}}_3^{(2,1)}[q](A_g,6)$

** symmetry

$$-\frac{\sqrt{15}y\left(x-z\right)\left(x+z\right)}{2}$$

** expression

$$-\frac{\sqrt{3}Q_u xz\left(9x^2-12y^2-5z^2\right)}{12}+\frac{Q_v xz\left(x^2+36y^2-13z^2\right)}{12}-\frac{7Q_{xy} yz\left(3x^2-2y^2+z^2\right)}{12}-\frac{Q_{xz}\left(5x^4-12x^2y^2-18x^2z^2+4y^4-12y^2z^2+5z^4\right)}{12}-\frac{7Q_{yz} xy\left(x^2-2y^2+3z^2\right)}{12}$$

$\vec{\mathbb{G}}_3^{(2,1)}[q](A_g,7)$

** symmetry

$$\frac{\sqrt{15}z\left(x-y\right)\left(x+y\right)}{2}$$

** expression

$$\frac{\sqrt{3}Q_u xy\left(x^2+y^2-6z^2\right)}{3}+\frac{7Q_v xy\left(x-y\right)\left(x+y\right)}{6}-\frac{Q_{xy}\left(5x^4-18x^2y^2-12x^2z^2+5y^4-12y^2z^2+4z^4\right)}{12}-\frac{7Q_{xz} yz\left(3x^2+y^2-2z^2\right)}{12}-\frac{7Q_{yz} xz\left(x^2+3y^2-2z^2\right)}{12}$$

* Harmonics for rank 4

$\vec{\mathbb{G}}_4^{(2,-1)}[q](A_u,1)$

** symmetry

$$\frac{\sqrt{21}\left(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4\right)}{6}$$

** expression

$$\frac{\sqrt{5}Q_{xy} z\left(x-y\right)\left(x+y\right)}{2}-\frac{\sqrt{5}Q_{xz} y\left(x-z\right)\left(x+z\right)}{2}+\frac{\sqrt{5}Q_{yz} x\left(y-z\right)\left(y+z\right)}{2}$$

$\vec{\mathbb{G}}_4^{(2,-1)}[q](A_u,2)$

** symmetry

$$-\frac{\sqrt{15}\left(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4\right)}{12}$$

** expression

$$-\frac{6\sqrt{7}Q_v xyz}{7} - \frac{\sqrt{7}Q_{xy} z\left(x-y\right)\left(x+y\right)}{14} + \frac{\sqrt{7}Q_{xz} y\left(4x^2-3y^2+5z^2\right)}{14} + \frac{\sqrt{7}Q_{yz} x\left(3x^2-4y^2-5z^2\right)}{14}$$

$\vec{\mathbb{G}}_4^{(2,-1)}[q](A_u, 3)$
** symmetry

$$\frac{\sqrt{5}\left(x-y\right)\left(x+y\right)\left(x^2+y^2-6z^2\right)}{4}$$

** expression

$$\frac{6\sqrt{7}Q_u xyz}{7} + \frac{\sqrt{21}Q_{xy} z\left(3x^2+3y^2-2z^2\right)}{14} - \frac{\sqrt{21}Q_{xz} y\left(2x^2-y^2+z^2\right)}{14} + \frac{\sqrt{21}Q_{yz} x\left(x^2-2y^2-z^2\right)}{14}$$

$\vec{\mathbb{G}}_4^{(2,-1)}[q](A_u, 4)$
** symmetry

$$\frac{\sqrt{35}yz\left(y-z\right)\left(y+z\right)}{2}$$

** expression

$$\frac{3Q_u x\left(y-z\right)\left(y+z\right)}{4} + \frac{\sqrt{3}Q_v x\left(y-z\right)\left(y+z\right)}{4} + \frac{\sqrt{3}Q_{xy} y\left(y^2-3z^2\right)}{4} - \frac{\sqrt{3}Q_{xz} z\left(3y^2-z^2\right)}{4} + \sqrt{3}Q_{yz} xyz$$

$\vec{\mathbb{G}}_4^{(2,-1)}[q](A_u, 5)$
** symmetry

$$-\frac{\sqrt{35}xz\left(x-z\right)\left(x+z\right)}{2}$$

** expression

$$\frac{3Q_u y\left(x-z\right)\left(x+z\right)}{4} - \frac{\sqrt{3}Q_v y\left(x-z\right)\left(x+z\right)}{4} + \frac{\sqrt{3}Q_{xy} x\left(x^2-3z^2\right)}{4} + \sqrt{3}Q_{xz} xyz - \frac{\sqrt{3}Q_{yz} z\left(3x^2-z^2\right)}{4}$$

$\vec{\mathbb{G}}_4^{(2,-1)}[q](A_u, 6)$
** symmetry

$$\frac{\sqrt{35}xy\left(x-y\right)\left(x+y\right)}{2}$$

** expression

$$-\frac{\sqrt{3}Q_v z\left(x-y\right)\left(x+y\right)}{2} + \sqrt{3}Q_{xy} xyz + \frac{\sqrt{3}Q_{xz} x\left(x^2-3y^2\right)}{4} - \frac{\sqrt{3}Q_{yz} y\left(3x^2-y^2\right)}{4}$$

$\vec{\mathbb{G}}_4^{(2,-1)}[q](A_u, 7)$
** symmetry

$$\frac{\sqrt{5}yz\left(6x^2-y^2-z^2\right)}{2}$$

** expression

$$\frac{3\sqrt{7}Q_u x\left(2x^2-5y^2-z^2\right)}{28} + \frac{\sqrt{21}Q_v x\left(2x^2+3y^2-9z^2\right)}{28} - \frac{\sqrt{21}Q_{xy} y\left(2x^2+y^2-5z^2\right)}{28} + \frac{\sqrt{21}Q_{xz} z\left(2x^2-5y^2+z^2\right)}{28}$$

$\vec{\mathbb{G}}_4^{(2,-1)}[q](A_u, 8)$
** symmetry

$$-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$$

** expression

$$\frac{3\sqrt{7}Q_u y\left(5x^2-2y^2+z^2\right)}{28} + \frac{\sqrt{21}Q_v y\left(3x^2+2y^2-9z^2\right)}{28} + \frac{\sqrt{21}Q_{xy} x\left(x^2+2y^2-5z^2\right)}{28} + \frac{\sqrt{21}Q_{yz} z\left(5x^2-2y^2-z^2\right)}{28}$$

$\vec{\mathbb{G}}_4^{(2,-1)}[q](A_u, 9)$
** symmetry

$$-\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$$

** expression

$$\frac{3\sqrt{7}Q_u z\left(x-y\right)\left(x+y\right)}{7} + \frac{\sqrt{21}Q_v z\left(3x^2+3y^2-2z^2\right)}{14} - \frac{\sqrt{21}Q_{xz} x\left(x^2-5y^2+2z^2\right)}{28} - \frac{\sqrt{21}Q_{yz} y\left(5x^2-y^2-2z^2\right)}{28}$$

$\vec{\mathbb{G}}_4^{(2,1)}[q](A_u, 1)$
** symmetry

$$\frac{\sqrt{21}\left(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4\right)}{6}$$

** expression

$$-\frac{3\sqrt{2310}Q_u xyz\left(x-y\right)\left(x+y\right)}{44} - \frac{3\sqrt{770}Q_v xyz\left(x^2+y^2-2z^2\right)}{44} + \frac{\sqrt{770}Q_{xy}z\left(x-y\right)\left(x+y\right)\left(x^2+y^2-2z^2\right)}{22} - \frac{\sqrt{770}Q_{xz}y\left(x-z\right)\left(x+z\right)\left(x^2-2y^2+z^2\right)}{22} - \frac{\sqrt{770}Q_{yz}x\left(y-z\right)\left(y+z\right)\left(2x^2-y^2-z^2\right)}{22}$$

$\vec{\mathbb{G}}_4^{(2,1)}[q](A_u, 2)$
** symmetry

$$-\frac{\sqrt{15}\left(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4\right)}{12}$$

** expression

$$\frac{21\sqrt{66}Q_u xyz\left(x-y\right)\left(x+y\right)}{44} - \frac{21\sqrt{22}Q_v xyz\left(x^2+y^2-2z^2\right)}{44} + \frac{7\sqrt{22}Q_{xy}z\left(x-y\right)\left(x+y\right)\left(x^2+y^2-2z^2\right)}{44} + \frac{\sqrt{22}Q_{xz}y\left(17x^4-22x^2y^2-36x^2z^2+3y^4-8y^2z^2+10z^4\right)}{44} - \frac{\sqrt{22}Q_{yz}x\left(3x^4-22x^2y^2-8x^2z^2+17y^4-36y^2z^2+10z^4\right)}{44}$$

$\vec{\mathbb{G}}_4^{(2,1)}[q](A_u, 3)$
** symmetry

$$\frac{\sqrt{5}\left(x-y\right)\left(x+y\right)\left(x^2+y^2-6z^2\right)}{4}$$

** expression

$$-\frac{21\sqrt{22}Q_u xyz\left(x^2+y^2-2z^2\right)}{44} - \frac{21\sqrt{66}Q_v xyz\left(x-y\right)\left(x+y\right)}{44} + \frac{\sqrt{66}Q_{xy}z\left(9x^4-24x^2y^2-10x^2z^2+9y^4-10y^2z^2+2z^4\right)}{44} - \frac{\sqrt{66}Q_{xz}y\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{44} - \frac{\sqrt{66}Q_{yz}x\left(x^4+2x^2y^2-12x^2z^2+y^4-12y^2z^2+8z^4\right)}{44}$$

$\vec{\mathbb{G}}_4^{(2,1)}[q](A_u, 4)$
** symmetry

$$\frac{\sqrt{35}yz\left(y-z\right)\left(y+z\right)}{2}$$

** expression

$$-\frac{3\sqrt{154}Q_u x\left(x^2y^2-x^2z^2+y^4-9y^2z^2+2z^4\right)}{88} - \frac{\sqrt{462}Q_v x\left(x^2y^2-x^2z^2-5y^4+27y^2z^2-4z^4\right)}{88} - \frac{\sqrt{462}Q_{xy}y\left(2x^2y^2-6x^2z^2-y^4+8y^2z^2-3z^4\right)}{44} + \frac{\sqrt{462}Q_{xz}z\left(6x^2y^2-2x^2z^2+3y^4-8y^2z^2+z^4\right)}{44} - \frac{\sqrt{462}Q_{yz}xyz\left(2x^2-y^2-z^2\right)}{44}$$

$\vec{\mathbb{G}}_4^{(2,1)}[q](A_u, 5)$
** symmetry

$$-\frac{\sqrt{35}xz\left(x-z\right)\left(x+z\right)}{2}$$

** expression

$$-\frac{3\sqrt{154}Q_u y\left(x^4+x^2y^2-9x^2z^2-y^2z^2+2z^4\right)}{88} - \frac{\sqrt{462}Q_v y\left(5x^4-x^2y^2-27x^2z^2+y^2z^2+4z^4\right)}{88} + \frac{\sqrt{462}Q_{xy}x\left(x^4-2x^2y^2-8x^2z^2+6y^2z^2+3z^4\right)}{44} + \frac{\sqrt{462}Q_{xz}xyz\left(x^2-2y^2+z^2\right)}{44} + \frac{\sqrt{462}Q_{yz}z\left(3x^4+6x^2y^2-8x^2z^2-2y^2z^2+z^4\right)}{44}$$

$\vec{\mathbb{G}}_4^{(2,1)}[q](A_u, 6)$
** symmetry

$$\frac{\sqrt{35}xy\left(x-y\right)\left(x+y\right)}{2}$$

** expression

$$\frac{9\sqrt{154}Q_u z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{88} - \frac{\sqrt{462}Q_v z\left(x-y\right)\left(x+y\right)\left(x^2+y^2-2z^2\right)}{88} + \frac{\sqrt{462}Q_{xy}xyz\left(x^2+y^2-2z^2\right)}{44} + \frac{\sqrt{462}Q_{xz}x\left(x^4-8x^2y^2-2x^2z^2+3y^4+6y^2z^2\right)}{44} + \frac{\sqrt{462}Q_{yz}y\left(3x^4-8x^2y^2+6x^2z^2+y^4-2y^2z^2\right)}{44}$$

$\vec{\mathbb{G}}_4^{(2,1)}[q](A_u, 7)$

** symmetry

$$\frac{\sqrt{5}yz\left(6x^{2}-y^{2}-z^{2}\right)}{2}$$

** expression

$$-\frac{3\sqrt{22}Q_{u}x\left(2x^{4}-3x^{2}y^{2}-17x^{2}z^{2}-5y^{4}+39y^{2}z^{2}+2z^{4}\right)}{88}-\frac{\sqrt{66}Q_{v}x\left(2x^{4}-31x^{2}y^{2}+11x^{2}z^{2}+9y^{4}+39y^{2}z^{2}-12z^{4}\right)}{88}$$
$$-\frac{\sqrt{66}Q_{xy}y\left(8x^{4}-12x^{2}y^{2}-12x^{2}z^{2}+y^{4}+2y^{2}z^{2}+z^{4}\right)}{44}+\frac{\sqrt{66}Q_{xz}z\left(8x^{4}-12x^{2}y^{2}-12x^{2}z^{2}+y^{4}+2y^{2}z^{2}+z^{4}\right)}{44}-\frac{21\sqrt{66}Q_{yz}xyz\left(y-z\right)\left(y+z\right)}{44}$$

$\vec{\mathbb{G}}_{4}^{(2,1)}[q](A_u,8)$

** symmetry

$$-\frac{\sqrt{5}xz\left(x^{2}-6y^{2}+z^{2}\right)}{2}$$

** expression

$$-\frac{3\sqrt{22}Q_{u}y\left(5x^{4}+3x^{2}y^{2}-39x^{2}z^{2}-2y^{4}+17y^{2}z^{2}-2z^{4}\right)}{88}-\frac{\sqrt{66}Q_{v}y\left(9x^{4}-31x^{2}y^{2}+39x^{2}z^{2}+2y^{4}+11y^{2}z^{2}-12z^{4}\right)}{88}$$
$$+\frac{\sqrt{66}Q_{xy}x\left(x^{4}-12x^{2}y^{2}+2x^{2}z^{2}+8y^{4}-12y^{2}z^{2}+z^{4}\right)}{44}+\frac{21\sqrt{66}Q_{xz}xyz\left(x-z\right)\left(x+z\right)}{44}-\frac{\sqrt{66}Q_{yz}z\left(x^{4}-12x^{2}y^{2}+2x^{2}z^{2}+8y^{4}-12y^{2}z^{2}+z^{4}\right)}{44}$$

$\vec{\mathbb{G}}_{4}^{(2,1)}[q](A_u,9)$

** symmetry

$$-\frac{\sqrt{5}xy\left(x^{2}+y^{2}-6z^{2}\right)}{2}$$

** expression

$$-\frac{21\sqrt{22}Q_{u}z\left(x-y\right)\left(x+y\right)\left(x^{2}+y^{2}-2z^{2}\right)}{88}-\frac{\sqrt{66}Q_{v}z\left(3x^{4}-78x^{2}y^{2}+20x^{2}z^{2}+3y^{4}+20y^{2}z^{2}-4z^{4}\right)}{88}-\frac{21\sqrt{66}Q_{xy}xyz\left(x-y\right)\left(x+y\right)}{44}$$
$$-\frac{\sqrt{66}Q_{xz}x\left(x^{4}+2x^{2}y^{2}-12x^{2}z^{2}+y^{4}-12y^{2}z^{2}+8z^{4}\right)}{44}+\frac{\sqrt{66}Q_{yz}y\left(x^{4}+2x^{2}y^{2}-12x^{2}z^{2}+y^{4}-12y^{2}z^{2}+8z^{4}\right)}{44}$$