

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 |
| | $\mathbb{Q}_0^{(a)}(A)$ | $\begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \end{bmatrix}$ |
| 2 | symmetry | y |
| | $\mathbb{M}_1^{(1,-1;a)}(A)$ | $\begin{bmatrix} 0 & -\frac{\sqrt{2}i}{2} \\ \frac{\sqrt{2}i}{2} & 0 \end{bmatrix}$ |
| 3 | symmetry | x |
| | $\mathbb{M}_1^{(1,-1;a)}(B,1)$ | $\begin{bmatrix} 0 & \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} & 0 \end{bmatrix}$ |
| 4 | symmetry | z |
| | $\mathbb{M}_1^{(1,-1;a)}(B,2)$ | $\begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & -\frac{\sqrt{2}}{2} \end{bmatrix}$ |

bra: = $\langle s, \uparrow |, \langle s, \downarrow |$
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 | y |
| | $\mathbb{Q}_1^{(a)}(A)$ | $\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$ |
| 6 | symmetry | x |
| | $\mathbb{Q}_1^{(a)}(B,1)$ | $\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$ |

continued ...

Table 2

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

continued ...

Table 2

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

continued ...

Table 2

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

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

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

Table 3: (s,d) block.

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

continued ...

Table 3

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

continued ...

Table 3

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

continued ...

Table 3

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

continued ...

Table 3

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

continued ...

Table 3

| No. | multipole | matrix | | | | | | | | | |
|-----|-------------------------------|------------------------|-------------------------|---|---|-------------------------|--------------------------|------------------------|------------------------|---|---|
| | $\mathbb{M}_1^{(1,1;a)}(B,2)$ | $\frac{\sqrt{10}}{10}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{20}$ | 0 | $\frac{\sqrt{30}}{20}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{10}}{10}$ | 0 | 0 | $\frac{\sqrt{30}i}{20}$ | 0 | $\frac{\sqrt{30}}{20}$ | 0 | 0 | 0 |

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

ket: $= |f_3, \uparrow\rangle, |f_3, \downarrow\rangle, |f_{ax}, \uparrow\rangle, |f_{ax}, \downarrow\rangle, |f_{ay}, \uparrow\rangle, |f_{ay}, \downarrow\rangle, |f_{az}, \uparrow\rangle, |f_{az}, \downarrow\rangle, |f_{bx}, \uparrow\rangle, |f_{bx}, \downarrow\rangle, |f_{by}, \uparrow\rangle, |f_{by}, \downarrow\rangle, |f_{bz}, \uparrow\rangle, |f_{bz}, \downarrow\rangle$

Table 4: (s,f) block.

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 69 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(a)}(A,1)$ | $\begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | | | | | |
| 70 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(a)}(A,2)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | | | | | |
| 71 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(a)}(A,3)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | | | | | |
| 72 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(a)}(B,1)$ | $\begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | | | | | |
| 73 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(a)}(B,2)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | | | | | |
| 74 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(a)}(B,3)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | | | | | |
| 75 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 4

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

continued ...

Table 4

| No. | multipole | matrix |
|-----|---------------------------------|---|
| | $\mathbb{G}_4^{(1,-1;a)}(A, 2)$ | $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & -\frac{\sqrt{105}}{84} & \frac{\sqrt{105}i}{42} & 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}i}{84} & 0 & \frac{\sqrt{105}}{84} & 0 & 0 & -\frac{\sqrt{105}i}{42} & \frac{3\sqrt{7}i}{28} & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 \end{bmatrix}$ |
| 85 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ |
| | $\mathbb{G}_4^{(1,-1;a)}(A, 3)$ | $\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & -\frac{\sqrt{21}i}{14} & 0 \\ 0 & 0 & \frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{21}i}{14} \end{bmatrix}$ |
| 86 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ |
| | $\mathbb{G}_4^{(1,-1;a)}(A, 4)$ | $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$ |
| 87 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ |
| | $\mathbb{G}_4^{(1,-1;a)}(A, 5)$ | $\begin{bmatrix} 0 & \frac{\sqrt{21}}{14} & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & \frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} \\ -\frac{\sqrt{21}}{14} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 \end{bmatrix}$ |
| 88 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ |
| | $\mathbb{G}_4^{(1,-1;a)}(B, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{8} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & \frac{\sqrt{3}}{8} & 0 \end{bmatrix}$ |
| 89 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ |
| | $\mathbb{G}_4^{(1,-1;a)}(B, 2)$ | $\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 \end{bmatrix}$ |
| 90 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ |
| | $\mathbb{G}_4^{(1,-1;a)}(B, 3)$ | $\begin{bmatrix} 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & \frac{3\sqrt{21}}{56} \\ \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{56} & \frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & -\frac{3\sqrt{21}}{56} & 0 \end{bmatrix}$ |
| 91 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ |
| | $\mathbb{G}_4^{(1,-1;a)}(B, 4)$ | $\begin{bmatrix} \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{14} & \frac{\sqrt{35}}{56} & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 & 0 \end{bmatrix}$ |
| 92 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ |
| | $\mathbb{G}_2^{(1,1;a)}(A, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{28} & \frac{\sqrt{21}i}{14} & 0 & 0 & -\frac{\sqrt{35}i}{28} & 0 & \frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{21}i}{14} & -\frac{\sqrt{35}i}{28} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 \end{bmatrix}$ |
| 93 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ |

continued ...

Table 4

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

continued ...

Table 4

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

continued ...

Table 4

| No. | multipole | matrix |
|-----|---------------------------------|---|
| | $\mathbb{M}_4^{(1,-1;a)}(A, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 112 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ |
| | $\mathbb{M}_4^{(1,-1;a)}(A, 2)$ | $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{105}}{42} & \frac{3\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 \end{bmatrix}$ |
| 113 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ |
| | $\mathbb{M}_4^{(1,-1;a)}(A, 3)$ | $\begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & -\frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & \frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & 0 & 0 & \frac{\sqrt{21}}{14} \end{bmatrix}$ |
| 114 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ |
| | $\mathbb{M}_4^{(1,-1;a)}(A, 4)$ | $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 \end{bmatrix}$ |
| 115 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ |
| | $\mathbb{M}_4^{(1,-1;a)}(A, 5)$ | $\begin{bmatrix} 0 & -\frac{\sqrt{21}i}{14} & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} \\ \frac{\sqrt{21}i}{14} & 0 & 0 & \frac{\sqrt{35}}{56} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 \end{bmatrix}$ |
| 116 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ |
| | $\mathbb{M}_4^{(1,-1;a)}(B, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & \frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & -\frac{\sqrt{3}i}{8} & 0 \end{bmatrix}$ |
| 117 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ |
| | $\mathbb{M}_4^{(1,-1;a)}(B, 2)$ | $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 \end{bmatrix}$ |
| 118 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ |
| | $\mathbb{M}_4^{(1,-1;a)}(B, 3)$ | $\begin{bmatrix} 0 & \frac{\sqrt{21}}{14} & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & -\frac{3\sqrt{21}i}{56} \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{56} & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & \frac{3\sqrt{21}i}{56} & 0 \end{bmatrix}$ |
| 119 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ |
| | $\mathbb{M}_4^{(1,-1;a)}(B, 4)$ | $\begin{bmatrix} \frac{\sqrt{21}}{14} & 0 & 0 & \frac{\sqrt{35}i}{56} & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{14} & -\frac{\sqrt{35}i}{56} & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 \end{bmatrix}$ |
| 120 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ |

continued ...

Table 4

| No. | multipole | matrix |
|-----|--------------------------------|---|
| | $\mathbb{M}_2^{(1,1;a)}(A, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{\sqrt{21}i}{28} & \frac{\sqrt{21}}{14} & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & -\frac{\sqrt{35}i}{28} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{14} & -\frac{\sqrt{35}}{28} & 0 & \frac{\sqrt{35}i}{28} & 0 & 0 & 0 \end{bmatrix}$ |
| 121 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ |
| | $\mathbb{M}_2^{(1,1;a)}(A, 2)$ | $\begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & \frac{\sqrt{105}i}{84} & \frac{\sqrt{105}}{42} & 0 \\ 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & -\frac{\sqrt{105}i}{84} & 0 & 0 & -\frac{\sqrt{105}}{42} \end{bmatrix}$ |
| 122 | symmetry | $\sqrt{3}xz$ |
| | $\mathbb{M}_2^{(1,1;a)}(A, 3)$ | $\begin{bmatrix} 0 & -\frac{\sqrt{105}i}{42} & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \\ \frac{\sqrt{105}i}{42} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{105}}{42} & 0 \end{bmatrix}$ |
| 123 | symmetry | $\sqrt{3}yz$ |
| | $\mathbb{M}_2^{(1,1;a)}(B, 1)$ | $\begin{bmatrix} 0 & \frac{\sqrt{105}}{42} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{105}i}{42} \\ \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & -\frac{\sqrt{105}i}{42} & 0 \end{bmatrix}$ |
| 124 | symmetry | $\sqrt{3}xy$ |
| | $\mathbb{M}_2^{(1,1;a)}(B, 2)$ | $\begin{bmatrix} \frac{\sqrt{105}}{42} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{42} & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 \end{bmatrix}$ |

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 |
| | $\mathbb{Q}_0^{(a)}(A)$ | $\begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{bmatrix}$ |

continued ...

Table 5

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

continued ...

Table 5

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

continued ...

Table 5

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

continued ...

Table 5

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

continued ...

Table 5

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

continued ...

Table 5

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

continued ...

Table 5

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

continued ...

Table 5

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

continued ...

Table 5

| No. | multipole | matrix | | | | | |
|-----|-----------|-------------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|
| | | $\mathbb{M}_1^{(1,1;a)}(A)$ | | | | | |
| | | 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 |
| 159 | symmetry | $\mathbb{M}_1^{(1,1;a)}(B,1)$ | | | | | |
| | | x | | | | | |
| | | 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 |
| 160 | symmetry | $\mathbb{M}_1^{(1,1;a)}(B,2)$ | | | | | |
| | | z | | | | | |
| | | $-\frac{\sqrt{30}}{30}$ | 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 | $-\frac{\sqrt{30}}{15}$ |

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

Table 6: (p,d) block.

| No. | multipole | matrix |
|-----|-----------|--------|
| 161 | symmetry | y |

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

| No. | multipole | matrix |
|-----|---------------------------------|---|
| | $\mathbb{Q}_3^{(1,-1;a)}(B, 4)$ | $ \begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{2}}{12} & -\frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{12} \\ \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & \frac{\sqrt{2}}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & \frac{\sqrt{2}}{12} & \frac{\sqrt{2}i}{6} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{6} \end{bmatrix} $ |
| 178 | symmetry | $ \begin{array}{c} y \\ \mathbb{Q}_1^{(1,0;a)}(A) \end{array} \left[\begin{array}{cccccccccc} -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 \end{array} \right] $ |
| 179 | symmetry | $ \begin{array}{c} x \\ \mathbb{Q}_1^{(1,0;a)}(B, 1) \end{array} \left[\begin{array}{cccccccccc} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \end{array} \right] $ |
| 180 | symmetry | $ \begin{array}{c} z \\ \mathbb{Q}_1^{(1,0;a)}(B, 2) \end{array} \left[\begin{array}{cccccccccc} 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ -\frac{\sqrt{5}i}{20} & 0 & -\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} & 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{array} \right] $ |
| 181 | symmetry | $\sqrt{15}xyz$ |

continued ...

Table 6

| No. | multipole | matrix |
|-----|--------------------------------|--|
| | $\mathbb{Q}_3^{(1,0;a)}(A, 1)$ | $\begin{bmatrix} 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{i}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & -\frac{1}{6} \\ -\frac{\sqrt{3}i}{12} & 0 & -\frac{i}{12} & 0 & 0 & 0 & 0 & -\frac{i}{6} & \frac{1}{6} & 0 \\ 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{1}{12} & -\frac{i}{6} & 0 & 0 & 0 & 0 & \frac{i}{6} \\ -\frac{\sqrt{3}}{12} & 0 & \frac{1}{12} & 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{i}{6} & 0 \\ 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{6} & -\frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & 0 \end{bmatrix}$ |
| 182 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ |
| | $\mathbb{Q}_3^{(1,0;a)}(A, 2)$ | $\begin{bmatrix} -\frac{\sqrt{5}i}{40} & 0 & -\frac{7\sqrt{15}i}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{40} & 0 & \frac{7\sqrt{15}i}{120} & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} \\ 0 & \frac{3\sqrt{5}i}{40} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 \\ \frac{3\sqrt{5}i}{40} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 \end{bmatrix}$ |
| 183 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ |
| | $\mathbb{Q}_3^{(1,0;a)}(A, 3)$ | $\begin{bmatrix} \frac{\sqrt{3}i}{24} & 0 & -\frac{5i}{24} & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{24} & 0 & \frac{5i}{24} & \frac{1}{6} & 0 & \frac{i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & -\frac{1}{6} & \frac{i}{6} & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{6} & 0 & 0 & -\frac{i}{6} \\ 0 & -\frac{\sqrt{3}i}{8} & 0 & -\frac{i}{24} & 0 & 0 & \frac{i}{12} & 0 & 0 & -\frac{1}{6} \\ -\frac{\sqrt{3}i}{8} & 0 & -\frac{i}{24} & 0 & 0 & 0 & 0 & -\frac{i}{12} & \frac{1}{6} & 0 \end{bmatrix}$ |
| 184 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ |
| | $\mathbb{Q}_3^{(1,0;a)}(B, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & -\frac{\sqrt{15}i}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{15}i}{15} \\ \frac{\sqrt{5}i}{40} & 0 & -\frac{7\sqrt{15}i}{120} & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{40} & 0 & \frac{7\sqrt{15}i}{120} & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{3\sqrt{5}}{40} & 0 & \frac{\sqrt{15}}{24} & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 \\ \frac{3\sqrt{5}}{40} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 185 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ |

continued ...

Table 6

| No. | multipole | matrix |
|-----|--------------------------------|--|
| | $\mathbb{Q}_3^{(1,0;a)}(B, 2)$ | $\begin{bmatrix} 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} \\ \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} & 0 \\ 0 & \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} \\ \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 \end{bmatrix}$ |
| 186 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & \frac{1}{6} & \frac{i}{6} & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 & -\frac{i}{6} \\ \frac{\sqrt{3}i}{24} & 0 & \frac{5i}{24} & 0 & 0 & \frac{1}{12} & 0 & -\frac{i}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{24} & 0 & -\frac{5i}{24} & -\frac{1}{12} & 0 & -\frac{i}{6} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{8} & 0 & \frac{1}{24} & \frac{i}{12} & 0 & 0 & 0 & 0 & -\frac{i}{6} \\ \frac{\sqrt{3}}{8} & 0 & -\frac{1}{24} & 0 & 0 & -\frac{i}{12} & 0 & 0 & -\frac{i}{6} & 0 \end{bmatrix}$ |
| 187 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{1}{6} & -\frac{i}{6} & 0 & 0 & 0 & 0 & \frac{i}{12} \\ -\frac{\sqrt{3}}{12} & 0 & \frac{1}{6} & 0 & 0 & \frac{i}{6} & 0 & 0 & \frac{i}{12} & 0 \\ 0 & \frac{\sqrt{3}i}{12} & 0 & \frac{i}{6} & 0 & 0 & -\frac{i}{6} & 0 & 0 & \frac{1}{12} \\ \frac{\sqrt{3}i}{12} & 0 & \frac{i}{6} & 0 & 0 & 0 & 0 & \frac{i}{6} & -\frac{1}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{6} & -\frac{i}{6} & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 & \frac{i}{6} \end{bmatrix}$ |
| 188 | symmetry | y $\begin{bmatrix} \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{10} & 0 \end{bmatrix}$ |
| 189 | symmetry | x |

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|----------------------------|-----------------------------|---------------------------|---------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|---------------------------|
| | $\mathbb{G}_2^{(1,1;a)}(A, 2)$ | 0 | $-\frac{\sqrt{105}i}{210}$ | 0 | $\frac{4\sqrt{35}i}{105}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{30}$ |
| | | $-\frac{\sqrt{105}i}{210}$ | 0 | $\frac{4\sqrt{35}i}{105}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{30}$ | 0 |
| | | 0 | $\frac{\sqrt{105}}{210}$ | 0 | $\frac{4\sqrt{35}}{105}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{30}$ |
| | | $-\frac{\sqrt{105}}{210}$ | 0 | $-\frac{4\sqrt{35}}{105}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{30}$ | 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 |
| 218 | symmetry | $\sqrt{3}xz$ | | | | | | | | | |
| | $\mathbb{G}_2^{(1,1;a)}(A, 3)$ | $\frac{2\sqrt{105}i}{105}$ | 0 | $-\frac{\sqrt{35}i}{105}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $\frac{4\sqrt{35}i}{105}$ | 0 | 0 |
| | | 0 | $-\frac{2\sqrt{105}i}{105}$ | 0 | $\frac{\sqrt{35}i}{105}$ | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{4\sqrt{35}i}{105}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{105}$ | 0 | $\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{105}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{105}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{105}$ |
| | | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{4\sqrt{35}i}{105}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ |
| | | $-\frac{\sqrt{105}i}{70}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{4\sqrt{35}i}{105}$ | $-\frac{\sqrt{35}}{42}$ | 0 |
| 219 | symmetry | $\sqrt{3}yz$ | | | | | | | | | |
| | $\mathbb{G}_2^{(1,1;a)}(B, 1)$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{105}$ | $-\frac{\sqrt{35}i}{105}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{105}$ | 0 | 0 | $\frac{\sqrt{35}i}{105}$ |
| | | $\frac{2\sqrt{105}i}{105}$ | 0 | $\frac{\sqrt{35}i}{105}$ | 0 | 0 | $\frac{4\sqrt{35}}{105}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 |
| | | 0 | $-\frac{2\sqrt{105}i}{105}$ | 0 | $-\frac{\sqrt{35}i}{105}$ | $-\frac{4\sqrt{35}}{105}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | $-\frac{\sqrt{35}}{42}$ | $\frac{4\sqrt{35}i}{105}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ |
| | | $\frac{\sqrt{105}}{70}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{4\sqrt{35}i}{105}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 |
| 220 | symmetry | $\sqrt{3}xy$ | | | | | | | | | |
| | $\mathbb{G}_2^{(1,1;a)}(B, 2)$ | 0 | $-\frac{\sqrt{105}}{210}$ | 0 | $-\frac{\sqrt{35}}{30}$ | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{4\sqrt{35}i}{105}$ |
| | | $\frac{\sqrt{105}}{210}$ | 0 | $\frac{\sqrt{35}}{30}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{4\sqrt{35}i}{105}$ | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{210}$ | 0 | $\frac{\sqrt{35}i}{30}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{4\sqrt{35}}{105}$ |
| | | $-\frac{\sqrt{105}i}{210}$ | 0 | $\frac{\sqrt{35}i}{30}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{4\sqrt{35}}{105}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{105}$ | 0 | $-\frac{\sqrt{35}}{105}$ | $\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{105}$ | 0 | $\frac{\sqrt{35}}{105}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ |
| 221 | symmetry | y | | | | | | | | | |

continued ...

Table 6

| No. | multipole | matrix |
|-----|-------------------------|---|
| | $\mathbb{T}_1^{(a)}(A)$ | $ \begin{bmatrix} 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} \\ -\frac{\sqrt{10}i}{20} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 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 | $ \begin{array}{c} x \\ \mathbb{T}_1^{(a)}(B, 1) \end{array} \begin{bmatrix} -\frac{\sqrt{10}i}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{10}i}{20} & 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 & \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 | $ \begin{array}{c} z \\ \mathbb{T}_1^{(a)}(B, 2) \end{array} \begin{bmatrix} 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 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{10}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} $ |
| 224 | symmetry | $ \begin{array}{c} \sqrt{15}xyz \\ \mathbb{T}_3^{(a)}(A, 1) \end{array} \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 \\ 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} \end{bmatrix} $ |
| 225 | symmetry | $ -\frac{y(3x^2-2y^2+3z^2)}{2} $ |

continued ...

Table 6

| No. | multipole | matrix |
|-----|----------------------------|---|
| | $\mathbb{T}_3^{(a)}(A, 2)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ -\frac{\sqrt{15}i}{20} & 0 & -\frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 226 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ $\mathbb{T}_3^{(a)}(A, 3) \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ \frac{i}{4} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 227 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ $\mathbb{T}_3^{(a)}(B, 1) \begin{bmatrix} -\frac{\sqrt{15}i}{20} & 0 & \frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & \frac{3\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \end{bmatrix}$ |
| 228 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\mathbb{T}_3^{(a)}(B, 2) \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 229 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ |

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

| No. | multipole | matrix |
|-----|---------------------------------|---|
| | $\mathbb{T}_3^{(1,-1;a)}(B, 4)$ | $\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{2}i}{12} & \frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{12} \\ \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{2}i}{12} & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & \frac{\sqrt{2}}{12} & 0 & 0 & -\frac{\sqrt{2}i}{12} \\ \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{2}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & \frac{\sqrt{2}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & \frac{\sqrt{2}i}{12} & -\frac{\sqrt{2}}{6} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{12} & 0 & -\frac{\sqrt{2}i}{12} & 0 & 0 & \frac{\sqrt{2}}{6} \end{bmatrix}$ |
| 238 | symmetry | $\begin{matrix} & & & & & & & & & y \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \end{matrix}$ $\begin{bmatrix} -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} \\ 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \end{bmatrix}$ |
| 239 | symmetry | $\begin{matrix} & & & & & & & & & x \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \end{matrix}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}}{20} \\ \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 240 | symmetry | $\begin{matrix} & & & & & & & & & z \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \\ & & & & & & & & & \end{matrix}$ $\begin{bmatrix} 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 \end{bmatrix}$ |
| 241 | symmetry | $\sqrt{15}xyz$ |

continued ...

Table 6

| No. | multipole | matrix |
|-----|--------------------------------|--|
| | $\mathbb{T}_3^{(1,0;a)}(A, 1)$ | $\begin{bmatrix} 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{1}{12} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{i}{6} \\ -\frac{\sqrt{3}}{12} & 0 & -\frac{1}{12} & 0 & 0 & 0 & 0 & -\frac{1}{6} & -\frac{i}{6} & 0 \\ 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{i}{12} & -\frac{1}{6} & 0 & 0 & 0 & 0 & \frac{1}{6} \\ \frac{\sqrt{3}i}{12} & 0 & -\frac{i}{12} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{1}{6} & 0 \\ 0 & 0 & \frac{1}{6} & 0 & 0 & -\frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{6} & \frac{i}{6} & 0 & -\frac{1}{6} & 0 & 0 & 0 \end{bmatrix}$ |
| 242 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ |
| | $\mathbb{T}_3^{(1,0;a)}(A, 2)$ | $\begin{bmatrix} -\frac{\sqrt{5}}{40} & 0 & -\frac{7\sqrt{15}}{120} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 \\ 0 & \frac{\sqrt{5}}{40} & 0 & \frac{7\sqrt{15}}{120} & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{15} \\ 0 & \frac{3\sqrt{5}}{40} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 \\ \frac{3\sqrt{5}}{40} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{60} & 0 & 0 \end{bmatrix}$ |
| 243 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ |
| | $\mathbb{T}_3^{(1,0;a)}(A, 3)$ | $\begin{bmatrix} \frac{\sqrt{3}}{24} & 0 & -\frac{5}{24} & 0 & 0 & \frac{i}{6} & 0 & \frac{1}{12} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{24} & 0 & \frac{5}{24} & -\frac{i}{6} & 0 & \frac{1}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{6} & 0 & \frac{i}{6} & \frac{1}{6} & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{6} & 0 & 0 & -\frac{1}{6} \\ 0 & -\frac{\sqrt{3}}{8} & 0 & -\frac{1}{24} & 0 & 0 & \frac{1}{12} & 0 & 0 & \frac{i}{6} \\ -\frac{\sqrt{3}}{8} & 0 & -\frac{1}{24} & 0 & 0 & 0 & 0 & -\frac{1}{12} & -\frac{i}{6} & 0 \end{bmatrix}$ |
| 244 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ |
| | $\mathbb{T}_3^{(1,0;a)}(B, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & -\frac{\sqrt{15}}{15} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 & \frac{\sqrt{15}}{15} \\ \frac{\sqrt{5}}{40} & 0 & -\frac{7\sqrt{15}}{120} & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{40} & 0 & \frac{7\sqrt{15}}{120} & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{5}i}{40} & 0 & -\frac{\sqrt{15}i}{24} & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 \\ -\frac{3\sqrt{5}i}{40} & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 245 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ |

continued ...

Table 6

| No. | multipole | matrix |
|-----|--------------------------------|--|
| | $\mathbb{T}_3^{(1,0;a)}(B, 2)$ | $\begin{bmatrix} 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} \\ -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{15}i}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{60} & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{60} \\ \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{15}}{60} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{60} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & \frac{\sqrt{15}i}{15} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 \end{bmatrix}$ |
| 246 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & -\frac{i}{6} & \frac{1}{6} & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{6} & 0 & \frac{i}{6} & 0 & 0 & -\frac{1}{6} \\ \frac{\sqrt{3}}{24} & 0 & \frac{5}{24} & 0 & 0 & -\frac{i}{12} & 0 & -\frac{1}{6} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{24} & 0 & -\frac{5}{24} & \frac{i}{12} & 0 & -\frac{1}{6} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{8} & 0 & -\frac{i}{24} & \frac{1}{12} & 0 & 0 & 0 & 0 & -\frac{1}{6} \\ -\frac{\sqrt{3}i}{8} & 0 & \frac{i}{24} & 0 & 0 & -\frac{1}{12} & 0 & 0 & -\frac{1}{6} & 0 \end{bmatrix}$ |
| 247 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ $\begin{bmatrix} 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{i}{6} & -\frac{1}{6} & 0 & 0 & 0 & 0 & \frac{1}{12} \\ \frac{\sqrt{3}i}{12} & 0 & -\frac{i}{6} & 0 & 0 & \frac{1}{6} & 0 & 0 & \frac{1}{12} & 0 \\ 0 & \frac{\sqrt{3}}{12} & 0 & \frac{1}{6} & 0 & 0 & -\frac{1}{6} & 0 & 0 & -\frac{i}{12} \\ \frac{\sqrt{3}}{12} & 0 & \frac{1}{6} & 0 & 0 & 0 & 0 & \frac{1}{6} & \frac{i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{6} & 0 & -\frac{i}{6} & -\frac{1}{6} & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{6} & 0 & \frac{i}{6} & 0 & 0 & \frac{1}{6} \end{bmatrix}$ |
| 248 | symmetry | y $\begin{bmatrix} -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & \frac{\sqrt{15}}{20} & 0 & \frac{\sqrt{5}}{20} & -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & \frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$ |
| 249 | symmetry | x |

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

continued ...

Table 6

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

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: = $|f_3, \uparrow\rangle, |f_3, \downarrow\rangle, |f_{ax}, \uparrow\rangle, |f_{ax}, \downarrow\rangle, |f_{ay}, \uparrow\rangle, |f_{ay}, \downarrow\rangle, |f_{az}, \uparrow\rangle, |f_{az}, \downarrow\rangle, |f_{bx}, \uparrow\rangle, |f_{bx}, \downarrow\rangle, |f_{by}, \uparrow\rangle, |f_{by}, \downarrow\rangle, |f_{bz}, \uparrow\rangle, |f_{bz}, \downarrow\rangle$

Table 7: (p,f) block.

| No. | multipole | matrix |
|-----|-----------|--|
| 281 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ $\mathbb{Q}_2^{(a)}(A, 1)$ $\begin{bmatrix} 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 282 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ $\mathbb{Q}_2^{(a)}(A, 2)$ $\begin{bmatrix} 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \end{bmatrix}$ |
| 283 | symmetry | $\sqrt{3}xz$ $\mathbb{Q}_2^{(a)}(A, 3)$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} \\ \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 284 | symmetry | $\sqrt{3}yz$ |

continued ...

Table 7

| No. | multipole | matrix |
|-----|----------------------------|---|
| | $\mathbb{Q}_2^{(a)}(B, 1)$ | $ \begin{bmatrix} \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 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 \end{bmatrix} $ |
| 285 | symmetry | $ \begin{matrix} \sqrt{3}xy \\ \left[\begin{array}{cccccccccccccccc} 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{42} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{42} & 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 \end{array} \right] \end{matrix} $ |
| 286 | symmetry | $ \begin{matrix} \frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6} \\ \left[\begin{array}{cccccccccccccccc} 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{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{array} \right] \end{matrix} $ |
| 287 | symmetry | $ \begin{matrix} -\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12} \\ \left[\begin{array}{cccccccccccccccc} 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{84} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 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{array} \right] \end{matrix} $ |
| 288 | symmetry | $ \frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4} $ |

continued ...

Table 7

| No. | multipole | matrix |
|-----|----------------------------|--|
| | $\mathbb{Q}_4^{(a)}(A, 3)$ | $\begin{bmatrix} 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{14} \end{bmatrix}$ |
| 289 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 290 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 291 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 \end{bmatrix}$ |
| 292 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ |

continued ...

Table 7

| No. | multipole | matrix |
|-----|----------------------------|---|
| | $\mathbb{Q}_4^{(a)}(B, 2)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 293 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ $\begin{bmatrix} \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 \end{bmatrix}$ |
| 294 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}}{56} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}}{56} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 295 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & -\frac{1}{8} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & \frac{\sqrt{15}}{24} & 0 \\ 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & \frac{i}{8} & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & 0 & \frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 \\ 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 \end{bmatrix}$ |
| 296 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|--------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|----------------------------|----------------------------|---------------------------|----------------------------|---------------------------|--------------------------|--------------------------|
| | $\mathbb{Q}_4^{(1,-1;a)}(A, 2)$ | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{168}$ |
| | | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | $-\frac{\sqrt{21}}{168}$ | 0 |
| | | 0 | $-\frac{\sqrt{21}}{28}$ | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{168}$ |
| | | $\frac{\sqrt{21}}{28}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 |
| 297 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,-1;a)}(A, 3)$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{3\sqrt{7}}{56}$ |
| | | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | $-\frac{3\sqrt{7}}{56}$ | 0 |
| | | 0 | $\frac{\sqrt{7}}{28}$ | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ |
| | | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 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 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 |
| 298 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,-1;a)}(A, 4)$ | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 |
| | | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{16}$ | 0 | 0 | $-\frac{\sqrt{15}i}{16}$ | 0 | 0 | $-\frac{3i}{16}$ | 0 | 0 | $\frac{3i}{16}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{16}$ | $-\frac{3i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{3i}{16}$ |
| | | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 |
| | | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 |
| 299 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,-1;a)}(A, 5)$ | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | 0 | 0 | $\frac{\sqrt{105}i}{112}$ | 0 | 0 | $\frac{\sqrt{7}i}{112}$ | 0 | $-\frac{\sqrt{7}}{14}$ | $\frac{\sqrt{7}i}{112}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | $\frac{\sqrt{7}i}{112}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ |
| | | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ |
| | | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | $\frac{\sqrt{7}}{14}$ | 0 |
| 300 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix |
|-----|---------------------------------|---|
| | $\mathbb{Q}_4^{(1,-1;a)}(B, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{16} & -\frac{\sqrt{15}i}{16} & 0 & 0 & 0 & 0 & \frac{3}{16} & -\frac{3i}{16} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{16} & 0 & 0 & \frac{\sqrt{15}i}{16} & 0 & 0 & -\frac{3}{16} & 0 & 0 & \frac{3i}{16} \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 301 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ $\mathbb{Q}_4^{(1,-1;a)}(B, 2)$ $\begin{bmatrix} 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} \\ \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 \\ 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} \\ -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{16} & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & 0 & \frac{3i}{16} & 0 & -\frac{3}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{15}i}{16} & 0 & \frac{\sqrt{15}}{16} & 0 & 0 & 0 & \frac{3i}{16} & 0 & \frac{3}{16} & 0 & 0 & 0 \end{bmatrix}$ |
| 302 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ $\mathbb{Q}_4^{(1,-1;a)}(B, 3)$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{112} & -\frac{\sqrt{105}i}{112} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{112} & \frac{\sqrt{7}i}{112} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & 0 & \frac{\sqrt{105}i}{112} & -\frac{\sqrt{7}i}{14} & 0 & -\frac{\sqrt{7}}{112} & 0 & 0 & -\frac{\sqrt{7}i}{112} \\ -\frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 \\ 0 & \frac{3\sqrt{7}i}{56} & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{7}}{56} & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{14} \\ -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 \end{bmatrix}$ |
| 303 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ $\mathbb{Q}_4^{(1,-1;a)}(B, 4)$ $\begin{bmatrix} 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & -\frac{\sqrt{7}i}{14} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ \frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 \\ 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & 0 & \frac{\sqrt{7}}{28} \\ \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{14} & -\frac{\sqrt{7}}{28} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{105}i}{112} & 0 & -\frac{\sqrt{105}}{112} & 0 & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & \frac{\sqrt{7}}{112} & -\frac{\sqrt{7}i}{14} & 0 \\ 0 & 0 & \frac{\sqrt{105}i}{112} & 0 & \frac{\sqrt{105}}{112} & 0 & 0 & 0 & \frac{\sqrt{7}i}{112} & 0 & -\frac{\sqrt{7}}{112} & 0 & 0 & \frac{\sqrt{7}i}{14} \end{bmatrix}$ |
| 304 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|---------------------------|---------------------------|
| | $\mathbb{Q}_2^{(1,0;a)}(A, 1)$ | 0 | $\frac{\sqrt{210}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{84}$ |
| | | $\frac{\sqrt{210}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ |
| | | $\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{210}}{84}$ | 0 | $\frac{\sqrt{210}i}{84}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{210}}{84}$ | 0 | $\frac{\sqrt{210}i}{84}$ | 0 | 0 | 0 |
| 305 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_2^{(1,0;a)}(A, 2)$ | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | $\frac{\sqrt{70}i}{42}$ | 0 | 0 | $\frac{\sqrt{70}}{84}$ |
| | | $\frac{\sqrt{70}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | $\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{42}$ | $-\frac{\sqrt{70}}{84}$ | 0 |
| | | 0 | $\frac{\sqrt{70}}{84}$ | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ | $-\frac{\sqrt{70}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ |
| | | $-\frac{\sqrt{70}}{84}$ | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | $\frac{\sqrt{70}i}{42}$ | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 |
| | | $-\frac{\sqrt{70}i}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{70}i}{42}$ | $\frac{\sqrt{42}}{84}$ | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{70}}{84}$ | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | 0 | 0 |
| 306 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_2^{(1,0;a)}(A, 3)$ | $-\frac{\sqrt{70}i}{84}$ | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{70}i}{84}$ | $\frac{\sqrt{42}}{28}$ | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{70}}{84}$ | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | 0 | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | $\frac{\sqrt{70}}{42}$ | $\frac{\sqrt{70}i}{84}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ | $\frac{\sqrt{70}i}{84}$ | 0 | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ |
| | | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | 0 | 0 | $\frac{\sqrt{42}}{28}$ | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 | 0 | $-\frac{\sqrt{70}}{84}$ |
| | | $\frac{\sqrt{70}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ | $-\frac{\sqrt{42}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{84}$ | $\frac{\sqrt{70}}{84}$ | 0 |
| 307 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_2^{(1,0;a)}(B, 1)$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{84}$ | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | $\frac{\sqrt{70}i}{42}$ | 0 | $\frac{\sqrt{70}}{84}$ | $\frac{\sqrt{70}i}{84}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | $\frac{\sqrt{70}i}{42}$ | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ |
| | | $\frac{\sqrt{70}i}{84}$ | 0 | 0 | $\frac{\sqrt{42}}{84}$ | 0 | $\frac{\sqrt{42}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{70}i}{84}$ | $-\frac{\sqrt{42}}{84}$ | 0 | $\frac{\sqrt{42}i}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{70}}{84}$ | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{70}}{84}$ | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{28}$ | $-\frac{\sqrt{70}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ |
| | | $\frac{\sqrt{70}}{84}$ | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | 0 | 0 | $-\frac{\sqrt{42}i}{28}$ | 0 | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 |
| 308 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|---------------------------|---------------------------|
| | $\mathbb{Q}_2^{(1,0;a)}(B, 2)$ | 0 | $\frac{\sqrt{70}}{84}$ | $\frac{\sqrt{42i}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42i}}{84}$ | $-\frac{\sqrt{70i}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70i}}{84}$ |
| | | $-\frac{\sqrt{70}}{84}$ | 0 | 0 | $-\frac{\sqrt{42i}}{28}$ | 0 | 0 | $\frac{\sqrt{42i}}{84}$ | 0 | 0 | $\frac{\sqrt{70i}}{84}$ | 0 | 0 | $-\frac{\sqrt{70i}}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{70i}}{84}$ | 0 | 0 | $-\frac{\sqrt{42i}}{28}$ | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | $-\frac{\sqrt{70i}}{84}$ | 0 | 0 | $-\frac{\sqrt{70}}{84}$ |
| | | $-\frac{\sqrt{70i}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42i}}{28}$ | $\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70i}}{84}$ | $\frac{\sqrt{70}}{84}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42i}}{84}$ | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{70i}}{84}$ | 0 | $\frac{\sqrt{70}}{84}$ | $\frac{\sqrt{70i}}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{42i}}{84}$ | 0 | $\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{70i}}{84}$ | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | 0 | $-\frac{\sqrt{70i}}{42}$ |
| 309 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,0;a)}(A, 1)$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15i}}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{1}{8}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15i}}{24}$ | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | $-\frac{1}{8}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15i}}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15i}}{24}$ | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{15i}}{24}$ | 0 | 0 | $\frac{\sqrt{15i}}{24}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $\frac{i}{8}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15i}}{24}$ | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15i}}{24}$ | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 | 0 |
| 310 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,0;a)}(A, 2)$ | 0 | $-\frac{3\sqrt{35i}}{140}$ | 0 | 0 | $-\frac{\sqrt{21i}}{24}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{35i}}{40}$ | 0 | 0 | $-\frac{\sqrt{35}}{280}$ |
| | | $-\frac{3\sqrt{35i}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21i}}{24}$ | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35i}}{40}$ | $\frac{\sqrt{35}}{280}$ | 0 |
| | | 0 | $\frac{3\sqrt{35}}{140}$ | $\frac{\sqrt{21i}}{24}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21i}}{168}$ | $-\frac{\sqrt{35i}}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35i}}{280}$ |
| | | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | $-\frac{\sqrt{21i}}{24}$ | 0 | 0 | $\frac{5\sqrt{21i}}{168}$ | 0 | 0 | $\frac{\sqrt{35i}}{40}$ | 0 | 0 | $-\frac{\sqrt{35i}}{280}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | $-\frac{\sqrt{21i}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{35}$ | 0 | $\frac{\sqrt{35i}}{35}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | $-\frac{\sqrt{21i}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{35}$ | 0 | $\frac{\sqrt{35i}}{35}$ | 0 | 0 | 0 |
| 311 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,0;a)}(A, 3)$ | 0 | $-\frac{\sqrt{105i}}{140}$ | 0 | 0 | $-\frac{\sqrt{7i}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{3\sqrt{105i}}{280}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ |
| | | $-\frac{\sqrt{105i}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{7i}}{56}$ | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105i}}{280}$ | $-\frac{\sqrt{105}}{56}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{140}$ | $-\frac{\sqrt{7i}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7i}}{56}$ | $-\frac{3\sqrt{105i}}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105i}}{56}$ |
| | | $\frac{\sqrt{105}}{140}$ | 0 | 0 | $\frac{\sqrt{7i}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7i}}{56}$ | 0 | 0 | $\frac{3\sqrt{105i}}{280}$ | 0 | 0 | $-\frac{\sqrt{105i}}{56}$ | 0 |
| | | $\frac{\sqrt{105i}}{70}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | $\frac{\sqrt{7i}}{14}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | $-\frac{\sqrt{105i}}{140}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105i}}{70}$ | $-\frac{\sqrt{7}}{14}$ | 0 | $\frac{\sqrt{7i}}{14}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | $-\frac{\sqrt{105i}}{140}$ | 0 | 0 | 0 |
| 312 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---------------------------------------|---------------------------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|------------------------------|
| | $\mathbb{Q}_4^{(1,0;a)}(A, 4)$ | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{40}$ | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{i}{16}$ | 0 | 0 | $-\frac{i}{16}$ | 0 | 0 | $-\frac{\sqrt{15}i}{80}$ | 0 | 0 | $\frac{\sqrt{15}i}{80}$ | 0 |
| | | 0 | 0 | $-\frac{i}{16}$ | 0 | 0 | 0 | 0 | $\frac{i}{16}$ | $-\frac{\sqrt{15}i}{80}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{80}$ |
| | | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{\sqrt{15}}{20}$ |
| | | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | $\frac{\sqrt{15}}{20}$ | 0 |
| 313 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,0;a)}(A, 5)$ | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{56}$ | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | $\frac{\sqrt{7}i}{112}$ | 0 | 0 | $\frac{11\sqrt{105}i}{560}$ | 0 | $\frac{\sqrt{105}}{70}$ | $\frac{11\sqrt{105}i}{560}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | $\frac{11\sqrt{105}i}{560}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{11\sqrt{105}i}{560}$ |
| | | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ |
| | | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | $\frac{\sqrt{105}}{140}$ | 0 |
| 314 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,0;a)}(B, 1)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{16}$ | $-\frac{i}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{80}$ | $-\frac{\sqrt{15}i}{80}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{1}{16}$ | 0 | 0 | $\frac{i}{16}$ | 0 | 0 | $-\frac{\sqrt{15}}{80}$ | 0 | 0 | $\frac{\sqrt{15}i}{80}$ |
| | | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ |
| | | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 |
| 315 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,0;a)}(B, 2)$ | 0 | $\frac{\sqrt{15}}{40}$ | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ |
| | | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $-\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 |
| | | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | $\frac{\sqrt{15}}{40}$ |
| | | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | $-\frac{\sqrt{15}}{40}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{i}{16}$ | 0 | $-\frac{1}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{80}$ | 0 | $-\frac{\sqrt{15}}{80}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{i}{16}$ | 0 | $\frac{1}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{80}$ | 0 | $\frac{\sqrt{15}}{80}$ | 0 | 0 | 0 |
| 316 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|---------------------------|---------------------------|----------------------------|---------------------------|----------------------------|--------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|------------------------------|
| | $\mathbb{Q}_4^{(1,0;a)}(B, 3)$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{112}$ | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | $\frac{11\sqrt{105}}{560}$ | $\frac{11\sqrt{105}i}{560}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | 0 | $\frac{\sqrt{7}i}{112}$ | $\frac{\sqrt{105}i}{70}$ | 0 | $-\frac{11\sqrt{105}}{560}$ | 0 | 0 | $-\frac{11\sqrt{105}i}{560}$ |
| | | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}i}{56}$ | $\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{56}$ | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ |
| | | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 |
| 317 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,0;a)}(B, 4)$ | 0 | $-\frac{\sqrt{105}}{56}$ | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 |
| | | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 |
| | | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ |
| | | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | $\frac{\sqrt{105}}{140}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}i}{112}$ | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | 0 | 0 | $\frac{11\sqrt{105}i}{560}$ | 0 | $\frac{11\sqrt{105}}{560}$ | $\frac{\sqrt{105}i}{70}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}i}{112}$ | 0 | $\frac{\sqrt{7}}{112}$ | 0 | 0 | 0 | $\frac{11\sqrt{105}i}{560}$ | 0 | $-\frac{11\sqrt{105}}{560}$ | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ |
| 318 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_2^{(1,1;a)}(A, 1)$ | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ |
| | | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | $-\frac{\sqrt{105}}{84}$ | 0 |
| | | 0 | $\frac{\sqrt{105}}{84}$ | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ |
| | | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 |
| 319 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_2^{(1,1;a)}(A, 2)$ | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ |
| | | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{168}$ | $-\frac{\sqrt{35}}{42}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}}{84}$ | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | $\frac{\sqrt{35}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ |
| | | $\frac{\sqrt{35}}{84}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{168}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ |
| | | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{24}$ | 0 | $-\frac{\sqrt{21}i}{24}$ | 0 | 0 | 0 | $\frac{5\sqrt{35}}{168}$ | 0 | $-\frac{5\sqrt{35}i}{168}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{24}$ | 0 | $-\frac{\sqrt{21}i}{24}$ | 0 | 0 | 0 | $-\frac{5\sqrt{35}}{168}$ | 0 | $-\frac{5\sqrt{35}i}{168}$ | 0 | 0 | 0 |
| 320 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|-------------------------------|--------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|
| | $\mathbb{Q}_2^{(1,1;a)}(A,3)$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | |
| | | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{35}i}{42}$ | 0 | |
| | | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | $\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | |
| | | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | |
| | | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | $\frac{\sqrt{35}}{42}$ | 0 | |
| 321 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | | |
| | $\mathbb{Q}_2^{(1,1;a)}(B,1)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{35}i}{42}$ | 0 | |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | |
| | | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | |
| | | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | |
| 322 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | | |
| | $\mathbb{Q}_2^{(1,1;a)}(B,2)$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | |
| | | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{84}$ | |
| | | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{84}$ | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | |
| 323 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(a)}(A,1)$ | 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 | $\frac{\sqrt{3}}{6}$ | 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 | |
| 324 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix |
|-----|----------------------------|--|
| | $\mathbb{G}_3^{(a)}(A, 2)$ | $ \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 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 \\ 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 \end{bmatrix} $ |
| 325 | symmetry | $ -\frac{\sqrt{15}y(x-z)(x+z)}{2} $ |
| | $\mathbb{G}_3^{(a)}(A, 3)$ | $ \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} \\ -\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{5}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 \end{bmatrix} $ |
| 326 | symmetry | $ \frac{x(2x^2-3y^2-3z^2)}{2} $ |
| | $\mathbb{G}_3^{(a)}(B, 1)$ | $ \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 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 \end{bmatrix} $ |
| 327 | symmetry | $ -\frac{z(3x^2+3y^2-2z^2)}{2} $ |
| | $\mathbb{G}_3^{(a)}(B, 2)$ | $ \begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 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 & 0 & 0 & 0 & 0 \end{bmatrix} $ |
| 328 | symmetry | $ \frac{\sqrt{15}x(y-z)(y+z)}{2} $ |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|-----------------------------------|--------------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|
| | $\mathbb{G}_3^{(a)}(B, 3)$ | $-\frac{\sqrt{3}}{6}$ | 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 | $-\frac{\sqrt{5}}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 |
| 329 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(a)}(B, 4)$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 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 |
| 330 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,-1;a)}(A, 1)$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ |
| | | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 |
| | | 0 | $\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 |
| | | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 |
| 331 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,-1;a)}(A, 2)$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{3\sqrt{35}}{140}$ | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}i}{42}$ | $\frac{3\sqrt{35}}{140}$ | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | $\frac{3\sqrt{35}}{70}$ | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{3\sqrt{35}}{70}$ | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ |
| | | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ |
| | | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | $\frac{3\sqrt{35}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{21}}{28}$ | 0 |
| 332 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|----------------------------------|--------------------------|----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{G}_3^{(1,-1;a)}(A, 3)$ | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{28}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ |
| | | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{84}$ |
| | | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{35}}{84}$ | 0 |
| 333 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,-1;a)}(B, 1)$ | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{70}$ | 0 | $\frac{\sqrt{35}}{70}$ | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ |
| | | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 | $-\frac{3\sqrt{35}i}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}}{70}$ | 0 | $-\frac{3\sqrt{35}i}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}i}{140}$ | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ |
| | | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | $-\frac{3\sqrt{35}i}{140}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 |
| 334 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,-1;a)}(B, 2)$ | 0 | $-\frac{\sqrt{21}}{42}$ | $-\frac{3\sqrt{35}i}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 |
| | | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{3\sqrt{35}i}{140}$ | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{3\sqrt{35}i}{140}$ | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ |
| | | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{140}$ | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | $-\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | $\frac{\sqrt{35}}{70}$ | $\frac{3\sqrt{35}i}{70}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | $-\frac{3\sqrt{35}i}{70}$ | $\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 |
| 335 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,-1;a)}(B, 3)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ |
| | | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 |
| 336 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------------------------|----------------------------|--------------------------|--------------------------|----------------------------|--|
| | $\mathbb{G}_3^{(1,-1;a)}(B, 4)$ | 0 | $-\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | |
| | | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | |
| | | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | $\frac{\sqrt{35}}{42}$ | |
| | | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | $-\frac{\sqrt{35}}{42}$ | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{35}i}{42}$ | |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | |
| 337 | symmetry | $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_5^{(1,-1;a)}(A, 1)$ | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{\sqrt{15}}{20}$ | |
| | | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | $-\frac{\sqrt{15}}{20}$ | 0 | |
| | | 0 | $-\frac{\sqrt{15}}{20}$ | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | |
| | | $\frac{\sqrt{15}}{20}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | |
| | | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | |
| | | 0 | 0 | $-\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | |
| 338 | symmetry | $\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_5^{(1,-1;a)}(A, 2)$ | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | |
| | | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | $\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}i}{40}$ | 0 | |
| | | 0 | $\frac{\sqrt{5}}{20}$ | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ | $\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | |
| | | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | |
| | | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | $\frac{3\sqrt{5}}{40}$ | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | |
| | | 0 | $\frac{\sqrt{5}i}{10}$ | $-\frac{\sqrt{3}}{24}$ | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | $-\frac{3\sqrt{5}}{40}$ | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | |
| 339 | symmetry | $\frac{y(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_5^{(1,-1;a)}(A, 3)$ | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | |
| | | 0 | $-\frac{\sqrt{21}i}{84}$ | $-\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $\frac{\sqrt{35}}{21}$ | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | |
| | | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $-\frac{\sqrt{35}}{21}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | |
| | | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | $\frac{5\sqrt{21}}{168}$ | |
| | | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | $-\frac{5\sqrt{21}}{168}$ | |
| 340 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|---------------------------|----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|
| | $\mathbb{G}_5^{(1,-1;a)}(A, 4)$ | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}i}{20}$ | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 |
| | | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ |
| | | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ |
| | | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | $\frac{\sqrt{15}}{40}$ | 0 |
| 341 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_5^{(1,-1;a)}(A, 5)$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | $\frac{\sqrt{5}}{10}$ | $-\frac{\sqrt{5}i}{20}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | $-\frac{\sqrt{5}i}{20}$ | 0 | $-\frac{\sqrt{5}}{10}$ | 0 | 0 | $\frac{\sqrt{5}i}{20}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | $-\frac{\sqrt{5}}{20}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ | $\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | $\frac{\sqrt{5}}{20}$ | 0 |
| 342 | symmetry | $\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_5^{(1,-1;a)}(B, 1)$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{21}$ | 0 | $\frac{\sqrt{35}}{56}$ | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | $-\frac{5\sqrt{21}i}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{21}$ | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ |
| | | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{84}$ | $\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}}{84}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ |
| | | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 |
| 343 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_5^{(1,-1;a)}(B, 2)$ | 0 | $\frac{\sqrt{21}}{84}$ | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ |
| | | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 |
| | | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ |
| | | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | $\frac{\sqrt{21}}{84}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $\frac{\sqrt{35}}{56}$ | $\frac{\sqrt{35}i}{21}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{\sqrt{35}i}{21}$ | $\frac{5\sqrt{21}i}{168}$ | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 |
| 344 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix |
|-----|---------------------------------|---|
| | $\mathbb{G}_5^{(1,-1;a)}(B, 3)$ | $ \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & \frac{\sqrt{15}i}{40} & 0 \\ 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & -\frac{\sqrt{15}i}{40} \\ -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} \\ \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 \end{bmatrix} $ |
| 345 | symmetry | $ \frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8} $ |
| | $\mathbb{G}_5^{(1,-1;a)}(B, 4)$ | $ \begin{bmatrix} 0 & -\frac{\sqrt{15}}{20} & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} \\ \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 \\ 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & -\frac{\sqrt{15}}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & \frac{\sqrt{15}}{20} & 0 \\ 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & \frac{\sqrt{15}}{40} & 0 & 0 \\ 0 & 0 & \frac{i}{8} & 0 & -\frac{1}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 \end{bmatrix} $ |
| 346 | symmetry | $ \frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4} $ |
| | $\mathbb{G}_5^{(1,-1;a)}(B, 5)$ | $ \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & \frac{\sqrt{3}i}{12} & 0 & 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{20} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & -\frac{\sqrt{3}i}{12} & \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \end{bmatrix} $ |
| 347 | symmetry | $ -\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4} $ |
| | $\mathbb{G}_5^{(1,-1;a)}(B, 6)$ | $ \begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & \frac{\sqrt{5}i}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{10} \end{bmatrix} $ |
| 348 | symmetry | $ \sqrt{15}xyz $ |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{G}_3^{(1,0;a)}(A, 1)$ | 0 | $\frac{i}{6}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | $\frac{1}{24}$ |
| | | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $\frac{i}{24}$ | $-\frac{1}{24}$ | 0 |
| | | 0 | $\frac{1}{6}$ | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{24}$ |
| | | $-\frac{1}{6}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | $-\frac{i}{24}$ | 0 |
| | | $\frac{i}{6}$ | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | $-\frac{1}{24}$ | 0 | $\frac{i}{24}$ | 0 | 0 |
| | | 0 | $-\frac{i}{6}$ | $-\frac{\sqrt{15}}{24}$ | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | $\frac{1}{24}$ | 0 | $\frac{i}{24}$ | 0 | 0 | 0 |
| 349 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,0;a)}(A, 2)$ | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{i}{16}$ | 0 | 0 | $\frac{i}{16}$ | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 |
| | | 0 | 0 | $\frac{i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{i}{16}$ | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| 350 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,0;a)}(A, 3)$ | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{1}{6}$ | 0 | $\frac{i}{6}$ | 0 |
| | | 0 | $-\frac{i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{1}{6}$ | 0 | $\frac{i}{6}$ | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | $\frac{7i}{48}$ | 0 | $\frac{1}{6}$ | $\frac{7i}{48}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | $\frac{7i}{48}$ | 0 | $-\frac{1}{6}$ | 0 | 0 | $-\frac{7i}{48}$ |
| | | 0 | $-\frac{i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | $\frac{1}{6}$ |
| | | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | $-\frac{1}{6}$ | 0 |
| 351 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,0;a)}(B, 1)$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{16}$ | $\frac{i}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{48}$ | $-\frac{\sqrt{15}i}{48}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{1}{16}$ | 0 | 0 | $-\frac{i}{16}$ | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | $\frac{\sqrt{15}i}{48}$ |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{24}$ | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 |
| 352 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|----------------------------------|--------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|-------------------------|
| | $\mathbb{G}_3^{(1,0;a)}(B, 2)$ | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 |
| | | 0 | 0 | 0 | $\frac{i}{16}$ | 0 | $\frac{1}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 |
| | | 0 | 0 | $\frac{i}{16}$ | 0 | $-\frac{1}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 |
| 353 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,0;a)}(B, 3)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | $\frac{i}{6}$ | 0 | $\frac{7}{48}$ | $\frac{7i}{48}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | $\frac{i}{6}$ | 0 | $-\frac{7}{48}$ | 0 | 0 | $-\frac{7i}{48}$ |
| | | $-\frac{i}{24}$ | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{6}$ | 0 | $\frac{i}{6}$ | 0 | 0 |
| | | 0 | $\frac{i}{24}$ | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{6}$ | 0 | $\frac{i}{6}$ | 0 | 0 | 0 |
| | | 0 | $\frac{1}{24}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | $\frac{i}{6}$ |
| | | $-\frac{1}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | $\frac{i}{6}$ | 0 |
| 354 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,0;a)}(B, 4)$ | 0 | $-\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | $\frac{i}{6}$ |
| | | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | $\frac{i}{6}$ |
| | | 0 | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | $\frac{1}{6}$ |
| | | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | $-\frac{1}{6}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 | $\frac{7i}{48}$ | 0 | $\frac{7}{48}$ | $\frac{i}{6}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 | $\frac{7i}{48}$ | 0 | $-\frac{7}{48}$ | 0 | 0 | $-\frac{i}{6}$ |
| 355 | symmetry | y | | | | | | | | | | | | | |
| | $\mathbb{G}_1^{(1,1;a)}(A)$ | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}i}{28}$ | $\frac{\sqrt{210}}{140}$ | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | $\frac{\sqrt{210}}{70}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{\sqrt{210}}{70}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ |
| | | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | $\frac{\sqrt{14}}{28}$ | 0 |
| 356 | symmetry | x | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|-----------------------------|----------------------------|
| | $\mathbb{G}_1^{(1,1;a)}(B, 1)$ | 0 | 0 | 0 | $\frac{\sqrt{210}i}{70}$ | 0 | $-\frac{\sqrt{210}}{140}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{210}i}{70}$ | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}i}{28}$ | $\frac{\sqrt{210}}{140}$ | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ |
| | | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 |
| 357 | symmetry | z | | | | | | | | | | | | | |
| | $\mathbb{G}_1^{(1,1;a)}(B, 2)$ | 0 | $\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | $\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{\sqrt{210}}{140}$ | $\frac{\sqrt{210}i}{70}$ | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | $\frac{\sqrt{210}}{140}$ | 0 | $-\frac{\sqrt{210}i}{70}$ | $-\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 |
| 358 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,1;a)}(A, 1)$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ |
| | | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | $\frac{3\sqrt{7}}{56}$ | 0 |
| | | 0 | $\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ |
| | | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 |
| | | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{14}$ | $\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 |
| 359 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,1;a)}(A, 2)$ | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | $\frac{5\sqrt{7}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}i}{168}$ | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{5\sqrt{7}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | $\frac{2\sqrt{7}}{21}$ | $-\frac{5\sqrt{7}i}{112}$ | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | $-\frac{2\sqrt{7}}{21}$ | 0 | 0 | $\frac{5\sqrt{7}i}{112}$ | $\frac{5\sqrt{105}i}{336}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ |
| | | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{5\sqrt{7}i}{84}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ |
| | | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{7}i}{84}$ | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | $-\frac{\sqrt{105}}{84}$ | 0 |
| 360 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|-------------------------------|----------------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|---------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|
| | $\mathbb{G}_3^{(1,1;a)}(A,3)$ | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 |
| | | 0 | $\frac{3\sqrt{7}i}{56}$ | $-\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | $\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{7}i}{112}$ | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | 0 | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | $-\frac{\sqrt{7}i}{112}$ | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{112}$ |
| | | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ |
| | | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | $\frac{\sqrt{7}}{28}$ | 0 |
| 361 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,1;a)}(B,1)$ | 0 | 0 | 0 | $\frac{2\sqrt{7}i}{21}$ | 0 | $-\frac{5\sqrt{7}}{112}$ | $-\frac{5\sqrt{7}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ | $\frac{5\sqrt{105}i}{336}$ | 0 |
| | | 0 | 0 | $\frac{2\sqrt{7}i}{21}$ | 0 | $\frac{5\sqrt{7}}{112}$ | 0 | 0 | $\frac{5\sqrt{7}i}{112}$ | 0 | 0 | $\frac{5\sqrt{105}}{336}$ | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ |
| | | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{5\sqrt{7}}{84}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}i}{168}$ | $-\frac{5\sqrt{7}}{84}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{168}$ | $\frac{5\sqrt{7}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ |
| | | $\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{5\sqrt{7}i}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 |
| 362 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,1;a)}(B,2)$ | 0 | $-\frac{\sqrt{105}}{168}$ | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{7}i}{84}$ | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ |
| | | $\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{5\sqrt{7}i}{84}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{5\sqrt{7}}{84}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{\sqrt{105}}{168}$ |
| | | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | $-\frac{5\sqrt{7}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | $-\frac{\sqrt{105}}{168}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | $-\frac{5\sqrt{7}}{112}$ | $\frac{2\sqrt{7}i}{21}$ | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | 0 | $\frac{5\sqrt{105}}{336}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | $\frac{5\sqrt{7}}{112}$ | 0 | 0 | $-\frac{2\sqrt{7}i}{21}$ | $-\frac{5\sqrt{105}i}{336}$ | 0 | $-\frac{5\sqrt{105}}{336}$ | 0 | 0 | 0 |
| 363 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_3^{(1,1;a)}(B,3)$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{105}}{336}$ | $-\frac{5\sqrt{105}i}{336}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{112}$ | $-\frac{\sqrt{7}i}{112}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ | $\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{7}}{112}$ | 0 | 0 | $\frac{\sqrt{7}i}{112}$ |
| | | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{7}i}{56}$ | $\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{7}}{56}$ | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ |
| | | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ |
| 364 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|-------------------------------|--|--------------------------|----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{G}_3^{(1,1;a)}(B,4)$ | 0 | $\frac{3\sqrt{7}}{56}$ | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ |
| | | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ |
| | | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | $-\frac{\sqrt{7}}{14}$ | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ | 0 | $-\frac{5\sqrt{105}}{336}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | $-\frac{\sqrt{7}}{112}$ | $\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ | 0 | $\frac{5\sqrt{105}}{336}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | $\frac{\sqrt{7}}{112}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ |
| 365 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | | |
| | $\mathbb{T}_2^{(a)}(A,1)$ | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 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 |
| 366 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_2^{(a)}(A,2)$ | 0 | 0 | $\frac{3\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 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 |
| 367 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |
| | $\mathbb{T}_2^{(a)}(A,3)$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{42}$ |
| | | $\frac{\sqrt{105}i}{42}$ | 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 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{42}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{42}$ | 0 | 0 | 0 | 0 |
| 368 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|--|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| | $\mathbb{T}_2^{(a)}(B, 1)$ | $\frac{\sqrt{105i}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105i}}{42}$ | 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 | $-\frac{\sqrt{105i}}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105i}}{42}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105i}}{42}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105i}}{42}$ | 0 | 0 |
| 369 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | |
| | $\mathbb{T}_2^{(a)}(B, 2)$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105i}}{42}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105i}}{42}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105i}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105i}}{42}$ | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{105i}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105i}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 370 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(a)}(A, 1)$ | 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 |
| 371 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(a)}(A, 2)$ | 0 | 0 | $-\frac{\sqrt{105i}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105i}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105i}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105i}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105i}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105i}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| 372 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|---------------------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|---------------------------|---------------------------|
| | $\mathbb{T}_4^{(a)}(A, 3)$ | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 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 | $-\frac{\sqrt{21}i}{14}$ | |
| 373 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(a)}(A, 4)$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{8}$ | 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 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | 0 |
| 374 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(a)}(A, 5)$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{21}i}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{21}i}{56}$ |
| | | $\frac{\sqrt{21}i}{14}$ | 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 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 |
| 375 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(a)}(B, 1)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 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 | $-\frac{\sqrt{3}i}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 |
| 376 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix |
|-----|---------------------------------|--|
| | $\mathbb{T}_4^{(a)}(B, 2)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 377 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ |
| | $\mathbb{T}_4^{(a)}(B, 3)$ | $\begin{bmatrix} \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 \end{bmatrix}$ |
| 378 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ |
| | $\mathbb{T}_4^{(a)}(B, 4)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{21}i}{56} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{35}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{21}i}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 379 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ |
| | $\mathbb{T}_4^{(1,-1;a)}(A, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & -\frac{i}{8} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{\sqrt{15}i}{24} \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & \frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & \frac{\sqrt{15}i}{24} & 0 \\ 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & -\frac{1}{8} & \frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} \\ 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & -\frac{1}{8} & 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 \\ 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 \\ 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & 0 \end{bmatrix}$ |
| 380 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|--------------------------|---------------------------|--------------------------|---------------------------|---------------------------|--------------------------|
| | $\mathbb{T}_4^{(1,-1;a)}(A, 2)$ | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ |
| | | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | $-\frac{\sqrt{21}i}{168}$ | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{28}$ | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{168}$ |
| | | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 |
| 381 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(1,-1;a)}(A, 3)$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ |
| | | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | $-\frac{3\sqrt{7}i}{56}$ | 0 |
| | | 0 | $\frac{\sqrt{7}i}{28}$ | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ |
| | | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 |
| | | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 |
| 382 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(1,-1;a)}(A, 4)$ | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}}{16}$ | 0 | 0 | $\frac{\sqrt{15}}{16}$ | 0 | 0 | $\frac{3}{16}$ | 0 | 0 | $-\frac{3}{16}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | $\frac{3}{16}$ | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | 0 |
| | | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 |
| | | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 |
| 383 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(1,-1;a)}(A, 5)$ | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 |
| | | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{112}$ | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{7}}{112}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{112}$ | $-\frac{\sqrt{7}}{112}$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}}{112}$ |
| | | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ |
| | | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | $\frac{\sqrt{7}i}{14}$ | 0 |
| 384 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix |
|-----|---------------------------------|--|
| | $\mathbb{T}_4^{(1,-1;a)}(B, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{16} & \frac{\sqrt{15}}{16} & 0 & 0 & 0 & 0 & \frac{3i}{16} & \frac{3}{16} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{16} & 0 & 0 & -\frac{\sqrt{15}}{16} & 0 & 0 & -\frac{3i}{16} & 0 & 0 & -\frac{3}{16} \\ \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 385 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ |
| | $\mathbb{T}_4^{(1,-1;a)}(B, 2)$ | $\begin{bmatrix} 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} \\ \frac{i}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 \\ 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} \\ \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{16} & 0 & -\frac{\sqrt{15}i}{16} & 0 & 0 & 0 & -\frac{3}{16} & 0 & -\frac{3i}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}}{16} & 0 & \frac{\sqrt{15}i}{16} & 0 & 0 & 0 & -\frac{3}{16} & 0 & \frac{3i}{16} & 0 & 0 & 0 \end{bmatrix}$ |
| 386 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ |
| | $\mathbb{T}_4^{(1,-1;a)}(B, 3)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{112} & \frac{\sqrt{105}}{112} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & \frac{\sqrt{7}i}{112} & -\frac{\sqrt{7}}{112} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{112} & 0 & 0 & -\frac{\sqrt{105}}{112} & \frac{\sqrt{7}}{14} & 0 & -\frac{\sqrt{7}i}{112} & 0 & 0 & \frac{\sqrt{7}}{112} \\ \frac{3\sqrt{7}}{56} & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & -\frac{3\sqrt{7}}{56} & -\frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{7}i}{56} & \frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ -\frac{3\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{28} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \end{bmatrix}$ |
| 387 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ |
| | $\mathbb{T}_4^{(1,-1;a)}(B, 4)$ | $\begin{bmatrix} 0 & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} \\ \frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 \\ 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{56} & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & \frac{\sqrt{7}i}{28} \\ -\frac{3\sqrt{7}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & -\frac{\sqrt{105}i}{112} & 0 & 0 & 0 & -\frac{\sqrt{7}}{112} & 0 & \frac{\sqrt{7}i}{112} & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{112} & 0 & \frac{\sqrt{105}i}{112} & 0 & 0 & 0 & -\frac{\sqrt{7}}{112} & 0 & -\frac{\sqrt{7}i}{112} & 0 & 0 & -\frac{\sqrt{7}}{14} \end{bmatrix}$ |
| 388 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|-------------------------|--------------------------|---------------------------|--------------------------|
| | $\mathbb{T}_2^{(1,0;a)}(A, 1)$ | 0 | $\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{84}$ |
| | | $\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ | 0 |
| | | 0 | $\frac{\sqrt{210}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{84}$ |
| | | $-\frac{\sqrt{210}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{84}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ | 0 | $\frac{\sqrt{210}}{84}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{210}i}{84}$ | 0 | $\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 |
| 389 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_2^{(1,0;a)}(A, 2)$ | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | 0 | 0 | $\frac{\sqrt{70}}{42}$ | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ |
| | | $\frac{\sqrt{70}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{42}$ | $\frac{\sqrt{70}i}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{70}i}{84}$ | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{84}$ |
| | | $\frac{\sqrt{70}i}{84}$ | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | $\frac{\sqrt{70}}{42}$ | 0 | 0 | $-\frac{\sqrt{70}}{84}$ | 0 |
| | | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{70}}{42}$ | $-\frac{\sqrt{42}i}{84}$ | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 | 0 |
| 390 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |
| | $\mathbb{T}_2^{(1,0;a)}(A, 3)$ | $-\frac{\sqrt{70}}{84}$ | 0 | 0 | $\frac{\sqrt{42}i}{28}$ | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{70}}{84}$ | $-\frac{\sqrt{42}i}{28}$ | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | $\frac{\sqrt{42}}{84}$ | 0 | 0 | $\frac{\sqrt{70}}{84}$ | 0 | $-\frac{\sqrt{70}i}{42}$ | $\frac{\sqrt{70}}{84}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | $\frac{\sqrt{70}}{84}$ | 0 | $\frac{\sqrt{70}i}{42}$ | 0 | 0 | $-\frac{\sqrt{70}}{84}$ |
| | | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 | $\frac{\sqrt{42}}{84}$ | 0 | 0 | $-\frac{\sqrt{42}i}{28}$ | 0 | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | 0 | $\frac{\sqrt{70}i}{84}$ |
| | | $\frac{\sqrt{70}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | $\frac{\sqrt{42}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{84}$ | $-\frac{\sqrt{70}i}{84}$ | 0 |
| 391 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |
| | $\mathbb{T}_2^{(1,0;a)}(B, 1)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | $\frac{\sqrt{70}}{42}$ | 0 | $-\frac{\sqrt{70}i}{84}$ | $\frac{\sqrt{70}}{84}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | 0 | 0 | $\frac{\sqrt{42}}{84}$ | $\frac{\sqrt{70}}{42}$ | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | 0 | $-\frac{\sqrt{70}}{84}$ |
| | | $\frac{\sqrt{70}}{84}$ | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | $\frac{\sqrt{42}}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{70}}{84}$ | $\frac{\sqrt{42}i}{84}$ | 0 | $\frac{\sqrt{42}}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{70}i}{84}$ | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | $-\frac{\sqrt{70}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{84}$ |
| | | $-\frac{\sqrt{70}i}{84}$ | 0 | 0 | $\frac{\sqrt{42}}{84}$ | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | 0 | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 | $-\frac{\sqrt{70}}{84}$ | 0 |
| 392 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix |
|-----|--------------------------------|--|
| | $\mathbb{T}_2^{(1,0;a)}(B, 2)$ | $\begin{bmatrix} 0 & -\frac{\sqrt{70}i}{84} & \frac{\sqrt{42}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{84} & -\frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{84} \\ \frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 \\ 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & -\frac{\sqrt{42}}{28} & 0 & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & -\frac{\sqrt{70}}{84} & 0 & 0 & \frac{\sqrt{70}i}{84} \\ -\frac{\sqrt{70}}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{42}}{28} & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & -\frac{\sqrt{70}i}{84} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}}{84} & 0 & \frac{\sqrt{42}i}{84} & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & -\frac{\sqrt{70}i}{84} & \frac{\sqrt{70}}{42} & 0 \\ 0 & 0 & \frac{\sqrt{42}}{84} & 0 & -\frac{\sqrt{42}i}{84} & 0 & 0 & 0 & \frac{\sqrt{70}}{84} & 0 & \frac{\sqrt{70}i}{84} & 0 & 0 & -\frac{\sqrt{70}}{42} \end{bmatrix}$ |
| 393 | symmetry | $\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$ |
| | $\mathbb{T}_4^{(1,0;a)}(A, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & \frac{1}{8} & 0 & 0 & -\frac{i}{8} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{24} & -\frac{\sqrt{15}i}{24} & 0 & 0 & 0 & 0 & -\frac{1}{8} & \frac{i}{8} & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{24} & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{1}{8} \\ 0 & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & \frac{\sqrt{15}}{24} & 0 & 0 & -\frac{1}{8} & 0 & 0 & \frac{1}{8} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & -\frac{\sqrt{15}}{24} & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 \end{bmatrix}$ |
| 394 | symmetry | $-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$ |
| | $\mathbb{T}_4^{(1,0;a)}(A, 2)$ | $\begin{bmatrix} 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & -\frac{\sqrt{21}}{24} & 0 & 0 & \frac{5\sqrt{21}i}{168} & 0 & 0 & -\frac{\sqrt{35}}{40} & 0 & 0 & \frac{\sqrt{35}i}{280} \\ -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{24} & -\frac{5\sqrt{21}i}{168} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{40} & -\frac{\sqrt{35}i}{280} & 0 \\ 0 & -\frac{3\sqrt{35}i}{140} & \frac{\sqrt{21}}{24} & 0 & 0 & 0 & 0 & \frac{5\sqrt{21}}{168} & -\frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{280} \\ \frac{3\sqrt{35}i}{140} & 0 & 0 & -\frac{\sqrt{21}}{24} & 0 & 0 & \frac{5\sqrt{21}}{168} & 0 & 0 & \frac{\sqrt{35}}{40} & 0 & 0 & -\frac{\sqrt{35}}{280} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & \frac{\sqrt{35}}{35} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{21}}{84} & 0 & 0 & 0 & \frac{\sqrt{35}i}{35} & 0 & \frac{\sqrt{35}}{35} & 0 & 0 & 0 \end{bmatrix}$ |
| 395 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ |
| | $\mathbb{T}_4^{(1,0;a)}(A, 3)$ | $\begin{bmatrix} 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & -\frac{\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} & 0 & 0 & \frac{3\sqrt{105}}{280} & 0 & 0 & -\frac{\sqrt{105}i}{56} \\ -\frac{\sqrt{105}}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{56} & -\frac{3\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{105}}{280} & \frac{\sqrt{105}i}{56} & 0 \\ 0 & \frac{\sqrt{105}i}{140} & -\frac{\sqrt{7}}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{56} & -\frac{3\sqrt{105}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} \\ -\frac{\sqrt{105}i}{140} & 0 & 0 & \frac{\sqrt{7}}{56} & 0 & 0 & -\frac{3\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{105}}{280} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 \\ \frac{\sqrt{105}}{70} & 0 & 0 & -\frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & -\frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{70} & \frac{\sqrt{7}i}{14} & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & \frac{\sqrt{105}i}{140} & 0 & -\frac{\sqrt{105}}{140} & 0 & 0 & 0 \end{bmatrix}$ |
| 396 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---------------------------------------|--------------------------|-------------------------|-------------------------|-------------------------|------------------------|-------------------------|-------------------------|----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|-----------------------------|
| | $\mathbb{T}_4^{(1,0;a)}(A, 4)$ | $\frac{\sqrt{15}}{40}$ | 0 | 0 | $-\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}}{40}$ | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{1}{16}$ | 0 | 0 | $-\frac{1}{16}$ | 0 | 0 | $-\frac{\sqrt{15}}{80}$ | 0 | 0 | $\frac{\sqrt{15}}{80}$ | 0 |
| | | 0 | 0 | $-\frac{1}{16}$ | 0 | 0 | 0 | 0 | $\frac{1}{16}$ | $-\frac{\sqrt{15}}{80}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{80}$ |
| | | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{4}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{20}$ |
| | | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | $-\frac{\sqrt{15}i}{20}$ | 0 |
| 397 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(1,0;a)}(A, 5)$ | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{56}$ | $\frac{\sqrt{7}i}{28}$ | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | 0 | $\frac{\sqrt{7}}{112}$ | 0 | 0 | $\frac{11\sqrt{105}}{560}$ | 0 | $-\frac{\sqrt{105}i}{70}$ | $\frac{11\sqrt{105}}{560}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | $\frac{11\sqrt{105}}{560}$ | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | $-\frac{11\sqrt{105}}{560}$ |
| | | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | $\frac{\sqrt{105}i}{140}$ |
| | | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{140}$ | $-\frac{\sqrt{105}i}{140}$ | 0 |
| 398 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(1,0;a)}(B, 1)$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{16}$ | $-\frac{1}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{80}$ | $-\frac{\sqrt{15}}{80}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{i}{16}$ | 0 | 0 | $\frac{1}{16}$ | 0 | 0 | $\frac{\sqrt{15}i}{80}$ | 0 | 0 | $\frac{\sqrt{15}}{80}$ |
| | | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{4}$ | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{20}$ |
| | | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 |
| 399 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(1,0;a)}(B, 2)$ | 0 | $-\frac{\sqrt{15}i}{40}$ | $\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ |
| | | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 |
| | | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ |
| | | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | $\frac{\sqrt{15}i}{40}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{1}{16}$ | 0 | $\frac{i}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{80}$ | 0 | $\frac{\sqrt{15}i}{80}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{1}{16}$ | 0 | $-\frac{i}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{80}$ | 0 | $-\frac{\sqrt{15}i}{80}$ | 0 | 0 | 0 |
| 400 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|----------------------------|----------------------------|-----------------------------|------------------------------|----------------------------|-----------------------------|
| | $\mathbb{T}_4^{(1,0;a)}(B, 3)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | $-\frac{\sqrt{7}}{112}$ | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | $-\frac{11\sqrt{105}i}{560}$ | $\frac{11\sqrt{105}}{560}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{112}$ | 0 | 0 | $\frac{\sqrt{7}}{112}$ | $\frac{\sqrt{105}}{70}$ | 0 | $\frac{11\sqrt{105}i}{560}$ | 0 | 0 | $-\frac{11\sqrt{105}}{560}$ |
| | | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{56}$ | $-\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{56}$ | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{140}$ |
| | | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ |
| 401 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_4^{(1,0;a)}(B, 4)$ | 0 | $\frac{\sqrt{105}i}{56}$ | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{140}$ |
| | | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 |
| | | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | $\frac{\sqrt{105}i}{140}$ |
| | | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{140}$ | $-\frac{\sqrt{105}i}{140}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}}{112}$ | 0 | $\frac{\sqrt{7}i}{112}$ | 0 | 0 | 0 | $\frac{11\sqrt{105}}{560}$ | 0 | $-\frac{11\sqrt{105}i}{560}$ | $\frac{\sqrt{105}}{70}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}}{112}$ | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | 0 | $\frac{11\sqrt{105}}{560}$ | 0 | $\frac{11\sqrt{105}i}{560}$ | 0 | 0 | $-\frac{\sqrt{105}}{70}$ |
| 402 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | | |
| | $\mathbb{T}_2^{(1,1;a)}(A, 1)$ | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{84}$ |
| | | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | $-\frac{\sqrt{105}i}{84}$ | 0 |
| | | 0 | $\frac{\sqrt{105}i}{84}$ | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ |
| | | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 |
| 403 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_2^{(1,1;a)}(A, 2)$ | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ |
| | | $\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | $-\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{84}$ | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ |
| | | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{24}$ | 0 | $\frac{\sqrt{21}}{24}$ | 0 | 0 | 0 | $\frac{5\sqrt{35}i}{168}$ | 0 | $\frac{5\sqrt{35}}{168}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{21}i}{24}$ | 0 | $\frac{\sqrt{21}}{24}$ | 0 | 0 | 0 | $-\frac{5\sqrt{35}i}{168}$ | 0 | $\frac{5\sqrt{35}}{168}$ | 0 | 0 | 0 |
| 404 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|-------------------------------|--------------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--|
| | $\mathbb{T}_2^{(1,1;a)}(A,3)$ | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | |
| | | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{84}$ | $\frac{\sqrt{35}i}{42}$ | 0 | |
| 405 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | | |
| | $\mathbb{T}_2^{(1,1;a)}(B,1)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 | |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | $\frac{\sqrt{21}}{21}$ | $\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | |
| | | 0 | $\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | |
| | | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | |
| 406 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | | |
| | $\mathbb{T}_2^{(1,1;a)}(B,2)$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | |
| | | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | |
| | | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | |
| | | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{84}$ | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{35}}{42}$ | 0 | |
| | | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | |
| 407 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(a)}(A,1)$ | 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 | |
| 408 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix |
|-----|----------------------------|---|
| | $\mathbb{M}_3^{(a)}(A, 2)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 409 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ $\mathbb{M}_3^{(a)}(A, 3)$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 410 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ $\mathbb{M}_3^{(a)}(B, 1)$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 \end{bmatrix}$ |
| 411 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ $\mathbb{M}_3^{(a)}(B, 2)$ $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 412 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ |

continued ...

Table 7

| No. | multipole | matrix |
|-----|---------------------------------|--|
| | $\mathbb{M}_3^{(a)}(B, 3)$ | $\begin{bmatrix} \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 \end{bmatrix}$ |
| 413 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ |
| | $\mathbb{M}_3^{(a)}(B, 4)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 414 | symmetry | $\sqrt{15}xyz$ |
| | $\mathbb{M}_3^{(1,-1;a)}(A, 1)$ | $\begin{bmatrix} 0 & \frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{35}i}{42} \\ \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & -\frac{\sqrt{21}i}{42} & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{42} & \frac{\sqrt{35}i}{42} & 0 \\ 0 & -\frac{\sqrt{35}i}{42} & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} & \frac{\sqrt{35}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{42} \\ \frac{\sqrt{35}i}{42} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 & 0 & -\frac{\sqrt{35}}{42} & 0 \\ \frac{\sqrt{35}}{42} & 0 & 0 & \frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & \frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{42} & -\frac{\sqrt{21}i}{42} & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & -\frac{\sqrt{35}i}{42} & 0 & \frac{\sqrt{35}}{42} & 0 & 0 & 0 \end{bmatrix}$ |
| 415 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ |
| | $\mathbb{M}_3^{(1,-1;a)}(A, 2)$ | $\begin{bmatrix} -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{3\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 \\ 0 & \frac{\sqrt{21}}{42} & -\frac{3\sqrt{35}i}{140} & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & \frac{\sqrt{21}}{42} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & -\frac{3\sqrt{35}i}{70} & \frac{\sqrt{35}}{70} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{21}}{42} & 0 \\ 0 & 0 & \frac{\sqrt{35}}{70} & 0 & \frac{3\sqrt{35}i}{70} & 0 & 0 & -\frac{\sqrt{35}}{70} & -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{42} \\ 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & \frac{3\sqrt{35}i}{140} & 0 & 0 & -\frac{\sqrt{21}}{42} & 0 & 0 & \frac{\sqrt{21}i}{28} \\ -\frac{\sqrt{21}}{42} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & -\frac{3\sqrt{35}i}{140} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{42} & -\frac{\sqrt{21}i}{28} & 0 \end{bmatrix}$ |
| 416 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|----------------------------------|--------------------------|---------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{M}_3^{(1,-1;a)}(A,3)$ | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{21}i}{28}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ |
| | | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{84}$ |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{84}$ | 0 |
| 417 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,-1;a)}(B,1)$ | 0 | 0 | 0 | $\frac{3\sqrt{35}}{70}$ | 0 | $-\frac{\sqrt{35}i}{70}$ | $\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{35}}{70}$ | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ |
| | | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}}{140}$ | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ |
| | | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 |
| 418 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,-1;a)}(B,2)$ | 0 | $\frac{\sqrt{21}i}{42}$ | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{70}$ | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 |
| | | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{3\sqrt{35}}{140}$ | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ |
| | | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{35}}{140}$ | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 | $-\frac{\sqrt{35}i}{70}$ | $\frac{3\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | $-\frac{3\sqrt{35}}{70}$ | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 |
| 419 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,-1;a)}(B,3)$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ |
| | | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 |
| 420 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|-------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|----------------------------|---------------------------|--------------------------|-------------------------|---------------------------|----------------------------|
| | $\mathbb{M}_3^{(1,-1;a)}(B, 4)$ | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ |
| | | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 |
| | | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ |
| | | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{84}$ | $\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{35}}{42}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ |
| 421 | symmetry | $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_5^{(1,-1;a)}(A, 1)$ | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | |
| | | $\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | $\frac{\sqrt{15}i}{20}$ | 0 | |
| | | 0 | $\frac{\sqrt{15}i}{20}$ | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{20}$ | |
| | | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 | |
| | | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | |
| 422 | symmetry | $\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_5^{(1,-1;a)}(A, 2)$ | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $-\frac{3\sqrt{5}}{40}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}}{40}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{5}i}{20}$ | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | $\frac{3\sqrt{5}}{40}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | $-\frac{3\sqrt{5}}{40}$ | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{5}}{10}$ | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | $-\frac{3\sqrt{5}}{40}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{5}}{10}$ | $\frac{\sqrt{3}i}{24}$ | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | $\frac{3\sqrt{5}i}{40}$ | 0 | $-\frac{3\sqrt{5}}{40}$ | 0 | 0 | 0 |
| 423 | symmetry | $\frac{y(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_5^{(1,-1;a)}(A, 3)$ | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{84}$ | $\frac{\sqrt{35}i}{56}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{21}$ | $\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $\frac{\sqrt{35}i}{21}$ | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ |
| | | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ |
| | | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | $\frac{5\sqrt{21}i}{168}$ | 0 |
| 424 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|---------------------------------|--|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|---------------------------|----------------------------|----------------------------|---------------------------|---------------------------|--|
| | $\mathbb{M}_5^{(1,-1;a)}(A, 4)$ | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | |
| | | 0 | $\frac{\sqrt{15}}{20}$ | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | |
| | | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | |
| | | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | |
| | | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | $-\frac{\sqrt{15}i}{40}$ | 0 | |
| 425 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ | | | | | | | | | | | | | | |
| | $\mathbb{M}_5^{(1,-1;a)}(A, 5)$ | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | $-\frac{\sqrt{5}i}{10}$ | $-\frac{\sqrt{5}}{20}$ | 0 | |
| | | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{12}$ | $-\frac{\sqrt{5}}{20}$ | 0 | $\frac{\sqrt{5}i}{10}$ | 0 | 0 | $\frac{\sqrt{5}}{20}$ | |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{20}$ | $-\frac{\sqrt{5}i}{20}$ | 0 | |
| 426 | symmetry | $\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | | |
| | $\mathbb{M}_5^{(1,-1;a)}(B, 1)$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{21}$ | 0 | $-\frac{\sqrt{35}i}{56}$ | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | $-\frac{5\sqrt{21}}{168}$ | 0 | |
| | | 0 | 0 | $\frac{\sqrt{35}}{21}$ | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | |
| | | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{21}}{84}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{21}i}{84}$ | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | |
| | | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | |
| 427 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | | | |
| | $\mathbb{M}_5^{(1,-1;a)}(B, 2)$ | 0 | $-\frac{\sqrt{21}i}{84}$ | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | |
| | | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | |
| | | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | |
| | | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | $-\frac{\sqrt{21}i}{84}$ | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{56}$ | $\frac{\sqrt{35}}{21}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{\sqrt{35}}{21}$ | $\frac{5\sqrt{21}}{168}$ | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | |
| 428 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix |
|-----|---------------------------------|---|
| | $\mathbb{M}_5^{(1,-1;a)}(B, 3)$ | $ \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & \frac{1}{8} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & \frac{\sqrt{15}}{40} & 0 \\ 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & -\frac{1}{8} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & -\frac{\sqrt{15}}{40} \\ -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 \\ 0 & \frac{\sqrt{15}}{20} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} \\ -\frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{1}{8} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 \end{bmatrix} $ |
| 429 | symmetry | $ \frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8} $ |
| | $\mathbb{M}_5^{(1,-1;a)}(B, 4)$ | $ \begin{bmatrix} 0 & \frac{\sqrt{15}i}{20} & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} \\ -\frac{\sqrt{15}i}{20} & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 \\ 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & \frac{1}{8} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & \frac{\sqrt{15}i}{20} \\ -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & -\frac{1}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & -\frac{\sqrt{15}i}{20} & 0 \\ 0 & 0 & 0 & \frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 \\ 0 & 0 & \frac{1}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 \end{bmatrix} $ |
| 430 | symmetry | $ \frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4} $ |
| | $\mathbb{M}_5^{(1,-1;a)}(B, 5)$ | $ \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & \frac{\sqrt{3}}{12} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & -\frac{\sqrt{3}}{12} & \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \end{bmatrix} $ |
| 431 | symmetry | $ -\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4} $ |
| | $\mathbb{M}_5^{(1,-1;a)}(B, 6)$ | $ \begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & -\frac{\sqrt{5}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & -\frac{\sqrt{5}i}{20} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & -\frac{\sqrt{3}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{12} & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{10} \end{bmatrix} $ |
| 432 | symmetry | $ \sqrt{15}xyz $ |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| | $\mathbb{M}_3^{(1,0;a)}(A, 1)$ | 0 | $-\frac{1}{6}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{1}{24}$ | 0 | 0 | $\frac{i}{24}$ |
| | | $-\frac{1}{6}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{1}{24}$ | $-\frac{i}{24}$ | 0 |
| | | 0 | $\frac{i}{6}$ | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | $-\frac{1}{24}$ | 0 | 0 | 0 | 0 | $\frac{1}{24}$ |
| | | $-\frac{i}{6}$ | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{1}{24}$ | 0 | 0 | $\frac{1}{24}$ | 0 |
| | | $-\frac{1}{6}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $-\frac{i}{24}$ | 0 | $-\frac{1}{24}$ | 0 | 0 |
| | | 0 | $\frac{1}{6}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $\frac{i}{24}$ | 0 | $-\frac{1}{24}$ | 0 | 0 | 0 |
| 433 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,0;a)}(A, 2)$ | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{1}{16}$ | 0 | 0 | $-\frac{1}{16}$ | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | 0 |
| | | 0 | 0 | $-\frac{1}{16}$ | 0 | 0 | 0 | 0 | $\frac{1}{16}$ | $\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{48}$ |
| | | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 |
| 434 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,0;a)}(A, 3)$ | $-\frac{1}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | $-\frac{1}{6}$ | 0 | 0 |
| | | 0 | $\frac{1}{24}$ | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $-\frac{i}{6}$ | 0 | $-\frac{1}{6}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 | $-\frac{7}{48}$ | 0 | $\frac{i}{6}$ | $-\frac{7}{48}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | $-\frac{7}{48}$ | 0 | $-\frac{i}{6}$ | 0 | 0 | $\frac{7}{48}$ |
| | | 0 | $\frac{1}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{6}$ | 0 | 0 | $\frac{i}{6}$ |
| | | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{6}$ | $-\frac{i}{6}$ | 0 |
| 435 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,0;a)}(B, 1)$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{16}$ | $-\frac{1}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | $\frac{\sqrt{15}}{48}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{i}{16}$ | 0 | 0 | $\frac{1}{16}$ | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | $-\frac{\sqrt{15}}{48}$ |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{24}$ | $-\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 |
| 436 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|----------------------------------|-------------------------|----------------------------|---------------------------|---------------------------|---------------------------|----------------------------|---------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{M}_3^{(1,0;a)}(B, 2)$ | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ |
| | | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 |
| | | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{1}{16}$ | 0 | $\frac{i}{16}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{1}{16}$ | 0 | $-\frac{i}{16}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 |
| 437 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,0;a)}(B, 3)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | $-\frac{1}{6}$ | 0 | $\frac{7i}{48}$ | $-\frac{7}{48}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | $\frac{\sqrt{15}}{48}$ | $-\frac{1}{6}$ | 0 | $-\frac{7i}{48}$ | 0 | 0 | $\frac{7}{48}$ |
| | | $\frac{1}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | $-\frac{1}{6}$ | 0 | 0 |
| | | 0 | $-\frac{1}{24}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | 0 | $-\frac{1}{6}$ | 0 | 0 | 0 |
| | | 0 | $\frac{i}{24}$ | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{6}$ | 0 | 0 | 0 | 0 | $-\frac{1}{6}$ |
| | | $-\frac{i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{6}$ | 0 | 0 | $-\frac{1}{6}$ | 0 |
| 438 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,0;a)}(B, 4)$ | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | $-\frac{1}{6}$ | 0 | 0 | 0 | 0 | $-\frac{1}{6}$ |
| | | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{1}{6}$ | 0 | 0 | $-\frac{1}{6}$ | 0 |
| | | 0 | $-\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{1}{6}$ | 0 | 0 | $\frac{i}{6}$ |
| | | $-\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{1}{6}$ | $-\frac{i}{6}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 | $-\frac{7}{48}$ | 0 | $\frac{7i}{48}$ | $-\frac{1}{6}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 | $-\frac{7}{48}$ | 0 | $-\frac{7i}{48}$ | 0 | 0 | $\frac{1}{6}$ |
| 439 | symmetry | y | | | | | | | | | | | | | |
| | $\mathbb{M}_1^{(1,1;a)}(A)$ | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $-\frac{\sqrt{210}i}{70}$ | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $\frac{\sqrt{210}i}{70}$ | 0 | 0 | $\frac{\sqrt{210}}{140}$ | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ |
| | | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{14}i}{28}$ | 0 |
| 440 | symmetry | x | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|----------------------------|---------------------------|
| | $\mathbb{M}_1^{(1,1;a)}(B, 1)$ | 0 | 0 | 0 | $\frac{\sqrt{210}}{70}$ | 0 | $\frac{\sqrt{210}i}{140}$ | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | $\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{210}}{70}$ | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}i}{28}$ | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 |
| 441 | symmetry | z | | | | | | | | | | | | | |
| | $\mathbb{M}_1^{(1,1;a)}(B, 2)$ | 0 | $-\frac{\sqrt{14}i}{28}$ | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $\frac{\sqrt{210}i}{140}$ | $\frac{\sqrt{210}}{70}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $-\frac{\sqrt{210}}{70}$ | $-\frac{\sqrt{14}}{28}$ | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 |
| 442 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,1;a)}(A, 1)$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ |
| | | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | $-\frac{3\sqrt{7}i}{56}$ | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ |
| | | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 |
| | | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 |
| 443 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,1;a)}(A, 2)$ | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{5\sqrt{7}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{168}$ | $\frac{\sqrt{7}i}{28}$ | 0 | $\frac{5\sqrt{7}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | $-\frac{2\sqrt{7}i}{21}$ | $-\frac{5\sqrt{7}}{112}$ | 0 | 0 | $\frac{5\sqrt{105}}{336}$ | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | $\frac{2\sqrt{7}i}{21}$ | 0 | 0 | $\frac{5\sqrt{7}}{112}$ | $\frac{5\sqrt{105}}{336}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{105}}{336}$ |
| | | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{5\sqrt{7}}{84}$ | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ |
| | | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{84}$ | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | $\frac{\sqrt{105}i}{84}$ | 0 |
| 444 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|----------------------------------|---------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|---------------------------|----------------------------|
| | $\mathbb{M}_3^{(1,1;a)}(A, 3)$ | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 |
| | | 0 | $\frac{3\sqrt{7}}{56}$ | $\frac{\sqrt{105}i}{84}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ | 0 | 0 | $\frac{5\sqrt{105}}{336}$ | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{7}}{112}$ | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ | 0 | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ | $-\frac{\sqrt{7}}{112}$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{112}$ |
| | | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ |
| | | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{7}i}{28}$ | 0 |
| 445 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,1;a)}(B, 1)$ | 0 | 0 | 0 | $\frac{2\sqrt{7}}{21}$ | 0 | $\frac{5\sqrt{7}i}{112}$ | $-\frac{5\sqrt{7}}{112}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ | $\frac{5\sqrt{105}}{336}$ | 0 |
| | | 0 | 0 | $\frac{2\sqrt{7}}{21}$ | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | 0 | $\frac{5\sqrt{7}}{112}$ | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ |
| | | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{5\sqrt{7}i}{84}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{168}$ | $\frac{5\sqrt{7}i}{84}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}i}{168}$ | $\frac{5\sqrt{7}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ |
| | | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{5\sqrt{7}}{84}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 |
| 446 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,1;a)}(B, 2)$ | 0 | $\frac{\sqrt{105}i}{168}$ | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{7}}{84}$ | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ |
| | | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | $\frac{5\sqrt{7}}{84}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 |
| | | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{5\sqrt{7}i}{84}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ |
| | | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | $\frac{5\sqrt{7}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | $\frac{\sqrt{105}i}{168}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | $\frac{5\sqrt{7}i}{112}$ | $\frac{2\sqrt{7}}{21}$ | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ | 0 | $-\frac{5\sqrt{105}i}{336}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | 0 | $-\frac{2\sqrt{7}}{21}$ | $-\frac{5\sqrt{105}}{336}$ | 0 | $\frac{5\sqrt{105}i}{336}$ | 0 | 0 | 0 |
| 447 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_3^{(1,1;a)}(B, 3)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | $-\frac{5\sqrt{105}}{336}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | $\frac{\sqrt{7}i}{112}$ | $-\frac{\sqrt{7}}{112}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ | 0 | 0 | $\frac{5\sqrt{105}}{336}$ | $\frac{\sqrt{7}}{14}$ | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | $\frac{\sqrt{7}}{112}$ |
| | | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{7}}{56}$ | $-\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 |
| | | 0 | $\frac{3\sqrt{7}i}{56}$ | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ |
| | | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ |
| 448 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 7

| No. | multipole | matrix | | | | | | | | | | | | |
|-------------------------------|-----------|-------------------------|--------------------------|---------------------------|---------------------------|-----------------------------|----------------------------|---------------------------|----------------------------|-------------------------|-------------------------|--------------------------|-------------------------|-------------------------|
| $\mathbb{M}_3^{(1,1;a)}(B,4)$ | | 0 | $-\frac{3\sqrt{7}i}{56}$ | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ |
| | | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ |
| | | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $-\frac{\sqrt{7}i}{14}$ |
| | | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | $\frac{\sqrt{7}i}{14}$ |
| | | 0 | 0 | 0 | $\frac{5\sqrt{105}}{336}$ | 0 | $\frac{5\sqrt{105}i}{336}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | $\frac{\sqrt{7}i}{112}$ | $\frac{\sqrt{7}}{14}$ |
| | | 0 | 0 | $\frac{5\sqrt{105}}{336}$ | 0 | $-\frac{5\sqrt{105}i}{336}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | $-\frac{\sqrt{7}}{14}$ |

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

Table 8: (d,d) block.

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

continued ...

Table 8

| No. | multipole | matrix |
|-----|----------------------------|---|
| | $\mathbb{Q}_2^{(a)}(A, 1)$ | $ \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} $ $ \begin{bmatrix} 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 & 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 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} $ |
| 452 | symmetry | $\sqrt{3}xz$ |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|----------------------------|-----------------------|-----------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|------------------------|------------------------|
| | $\mathbb{Q}_2^{(a)}(A, 3)$ | 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 | $\frac{\sqrt{21}}{14}$ | 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 | $\frac{\sqrt{21}}{14}$ |
| | | $\frac{\sqrt{7}}{14}$ | 0 | $\frac{\sqrt{21}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{14}$ | 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 |
| 453 | symmetry | $\sqrt{3}yz$ | | | | | | | | | |
| | $\mathbb{Q}_2^{(a)}(B, 1)$ | 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 | $-\frac{\sqrt{21}}{14}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{14}$ | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{7}}{14}$ | 0 | $-\frac{\sqrt{21}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{14}$ | 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 | $\frac{\sqrt{21}}{14}$ |
| | | 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 |
| 454 | symmetry | $\sqrt{3}xy$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|----------------------------|--|--|--|--|--|--|--|--|--|--|
| | $\mathbb{Q}_2^{(a)}(B, 2)$ | $ \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 & 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 \\ -\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} $ | | | | | | | | | |
| 455 | symmetry | $ \frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6} $ | | | | | | | | | |
| | $\mathbb{Q}_4^{(a)}(A, 1)$ | $ \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}}{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} \end{bmatrix} $ | | | | | | | | | |
| 456 | symmetry | $ -\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12} $ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|----------------------------|--|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | $\mathbb{Q}_4^{(a)}(A, 2)$ | $\frac{\sqrt{21}}{14}$ | 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 | 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 | $\frac{2\sqrt{21}}{21}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{2\sqrt{21}}{21}$ |
| 457 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | |
| | $\mathbb{Q}_4^{(a)}(A, 3)$ | 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 | 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 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 458 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix |
|-----|----------------------------|--|
| | $\mathbb{Q}_4^{(a)}(A, 4)$ | $ \begin{bmatrix} 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 & 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 \\ \frac{\sqrt{3}}{4} & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{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 \end{bmatrix} $ |
| 459 | symmetry | $ -\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2} $ $ \begin{bmatrix} 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 & 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} \\ -\frac{\sqrt{21}}{28} & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{28} & 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 & 0 & 0 \end{bmatrix} $ |
| 460 | symmetry | $ \frac{\sqrt{35}yz(y-z)(y+z)}{2} $ |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|----------------------------|---|----------------|-----------------------|-----------------------|---|-----------------------|---------------|---------------|---|---|---|---|---|---|---|---|-----------------------|---|---|---|---|---|---|---|---|----------------|---|---|---|---------------|---|---|---|---|---|---|----------------|---|---|---|---------------|-----------------------|---|----------------|---|---|---|---|---|---|---|---|-----------------------|---|----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------|---|---|---|---|---|---|---|---|---|---|---------------|---|---|---|---|---|---|
| | $\mathbb{Q}_4^{(a)}(B, 1)$ | <table><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{3}}{4}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{3}}{4}$</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{1}{4}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{1}{4}$</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>$-\frac{\sqrt{3}}{4}$</td><td>0</td><td>$-\frac{1}{4}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>$-\frac{\sqrt{3}}{4}$</td><td>0</td><td>$-\frac{1}{4}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table> | 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 | 0 | 0 | 0 | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{4}$ | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{4}$ | 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 | $-\frac{\sqrt{3}}{4}$ | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{4}$ | 0 | 0 | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $-\frac{\sqrt{3}}{4}$ | 0 | $-\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | $-\frac{\sqrt{3}}{4}$ | 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 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 461 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ <table><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{1}{2}$</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{1}{2}$</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>$\frac{1}{2}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>$\frac{1}{2}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table> | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{1}{2}$ | 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 | $\frac{1}{2}$ | 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 | $\frac{1}{2}$ | 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 | $\frac{1}{2}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | $\frac{1}{2}$ | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 462 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|---------------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{Q}_2^{(1,-1;a)}(A, 3)$ | 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 | $\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{10}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | $-\frac{\sqrt{10}i}{10}$ | 0 |
| | | $-\frac{\sqrt{30}i}{20}$ | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{20}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{30}i}{20}$ | 0 | $\frac{\sqrt{10}i}{20}$ | 0 | 0 | $\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | $\frac{\sqrt{10}i}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 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 |
| 467 | symmetry | $\sqrt{3}yz$ | | | | | | | | | |
| | $\mathbb{Q}_2^{(1,-1;a)}(B, 1)$ | 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 | $\frac{\sqrt{10}i}{20}$ | 0 | 0 | $-\frac{\sqrt{10}i}{10}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | $\frac{\sqrt{10}i}{10}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{20}$ | $-\frac{\sqrt{10}i}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | $\frac{\sqrt{10}i}{20}$ |
| | | $\frac{\sqrt{30}i}{20}$ | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{30}i}{20}$ | 0 | $\frac{\sqrt{10}i}{20}$ | $\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{10}i}{10}$ | $\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{10}i}{10}$ | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 |
| 468 | symmetry | $\sqrt{3}xy$ | | | | | | | | | |

continued ...

Table 8

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

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|---------------------------------|--|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{Q}_4^{(1,-1;a)}(A, 2)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{84}$ | 0 | $\frac{5\sqrt{21}}{84}$ | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{84}$ | 0 | $-\frac{5\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ |
| | | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{5\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ |
| | | $\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{5\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | $-\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $-\frac{5\sqrt{21}}{84}$ | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ |
| | | $\frac{\sqrt{7}}{28}$ | 0 | $\frac{5\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 |
| 471 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,-1;a)}(A, 3)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | $-\frac{\sqrt{21}}{28}$ | $-\frac{\sqrt{21}i}{14}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | $\frac{\sqrt{21}i}{14}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ |
| | | $\frac{\sqrt{21}i}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 |
| | | 0 | $\frac{\sqrt{21}}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ |
| | | $-\frac{\sqrt{21}}{28}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 |
| | | $\frac{\sqrt{21}i}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 |
| 472 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|---------------------------------|--|--|--|--|--|--|--|--|--|--|
| | $\mathbb{Q}_4^{(1,-1;a)}(A, 4)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & \frac{i}{8} \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & \frac{i}{8} & 0 \\ -\frac{\sqrt{3}i}{8} & 0 & \frac{i}{8} & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{8} & 0 & -\frac{i}{8} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & \frac{i}{4} \\ 0 & \frac{\sqrt{3}i}{8} & 0 & -\frac{i}{8} & 0 & 0 & \frac{i}{4} & 0 & 0 & 0 \\ \frac{\sqrt{3}i}{8} & 0 & -\frac{i}{8} & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \end{bmatrix}$ | | | | | | | | | |
| 473 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{21}}{14} & -\frac{\sqrt{21}i}{56} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{21}i}{56} \\ 0 & 0 & \frac{\sqrt{21}}{14} & 0 & 0 & \frac{\sqrt{21}i}{56} & 0 & 0 & -\frac{3\sqrt{21}i}{56} & 0 \\ 0 & \frac{\sqrt{21}}{14} & 0 & 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{56} \\ -\frac{\sqrt{21}}{14} & 0 & 0 & 0 & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{56} & 0 \\ \frac{\sqrt{21}i}{56} & 0 & -\frac{5\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{56} & 0 & \frac{5\sqrt{7}i}{56} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{28} \\ 0 & \frac{3\sqrt{21}i}{56} & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & \frac{\sqrt{7}i}{28} & 0 & 0 & 0 \\ \frac{3\sqrt{21}i}{56} & 0 & \frac{\sqrt{7}i}{56} & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{28} & 0 & 0 \end{bmatrix}$ | | | | | | | | | |
| 474 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix |
|-----|---------------------------------|--|
| | $\mathbb{Q}_4^{(1,-1;a)}(B, 1)$ | $ \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{8} & 0 & 0 & -\frac{\sqrt{3}}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & \frac{\sqrt{3}}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{i}{8} & 0 & 0 & -\frac{1}{8} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{8} & \frac{1}{8} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & -\frac{i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & \frac{i}{4} \\ -\frac{\sqrt{3}i}{8} & 0 & -\frac{i}{8} & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}i}{8} & 0 & \frac{i}{8} & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{3}}{8} & 0 & \frac{1}{8} & \frac{i}{4} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{8} & 0 & -\frac{1}{8} & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 \end{bmatrix} $ |
| 475 | symmetry | $ \frac{\sqrt{35}xy(x-y)(x+y)}{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{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{i}{4} \\ 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 & 0 & 0 & \frac{i}{4} & 0 \\ 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} \\ 0 & 0 & -\frac{i}{4} & 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} $ |
| 476 | symmetry | $ \frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2} $ |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|---------------------------------|---------------------------------------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|-------------------------|
| | $\mathbb{Q}_4^{(1,-1;a)}(B, 3)$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{14}$ | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | $\frac{3\sqrt{21}}{56}$ |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | $-\frac{3\sqrt{21}}{56}$ | 0 |
| | | 0 | $\frac{\sqrt{21}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ |
| | | $\frac{\sqrt{21}i}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{7}i}{56}$ | $\frac{\sqrt{7}}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | $\frac{\sqrt{7}i}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ |
| | | $-\frac{\sqrt{21}i}{56}$ | 0 | $-\frac{5\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | $\frac{5\sqrt{7}i}{56}$ | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{21}}{56}$ | 0 | $\frac{\sqrt{7}}{56}$ | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{3\sqrt{21}}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 |
| 477 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | |
| | $\mathbb{Q}_4^{(1,-1;a)}(B, 4)$ | 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 |
| | | $\frac{\sqrt{21}i}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ |
| | | $\frac{\sqrt{21}}{28}$ | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ |
| | | $\frac{\sqrt{21}i}{28}$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 |
| 478 | symmetry | 1 | | | | | | | | | |

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|----------------------------|-----------------------------|---------------------------|---------------------------|--------------------------|---------------------------|-----------------------------|----------------------------|-------------------------|--------------------------|
| | $\mathbb{Q}_2^{(1,1;a)}(B, 1)$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{42}$ | 0 | 0 | $-\frac{2\sqrt{105}i}{105}$ | 0 | 0 | $-\frac{\sqrt{105}}{42}$ |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{2\sqrt{105}i}{105}$ | $\frac{\sqrt{105}}{42}$ | 0 |
| | | 0 | $\frac{\sqrt{105}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{35}$ | 0 | 0 | $-\frac{\sqrt{35}}{70}$ |
| | | $\frac{\sqrt{105}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{35}$ | $\frac{\sqrt{35}}{70}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{35}$ | $\frac{\sqrt{35}i}{35}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{35}$ | 0 | 0 | $-\frac{\sqrt{35}i}{35}$ |
| | | $\frac{2\sqrt{105}i}{105}$ | 0 | $\frac{\sqrt{35}i}{35}$ | 0 | 0 | $\frac{\sqrt{35}}{35}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{2\sqrt{105}i}{105}$ | 0 | $-\frac{\sqrt{35}i}{35}$ | $-\frac{\sqrt{35}}{35}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{42}$ | 0 | $\frac{\sqrt{35}}{70}$ | $-\frac{\sqrt{35}i}{35}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{105}}{42}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{35}i}{35}$ | 0 | 0 | 0 | 0 |
| 483 | symmetry | $\sqrt{3}xy$ | | | | | | | | | |
| | $\mathbb{Q}_2^{(1,1;a)}(B, 2)$ | 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 |
| | | $\frac{\sqrt{105}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{35}}{70}$ | 0 | $\frac{3\sqrt{35}i}{70}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{42}$ | 0 | 0 | $-\frac{3\sqrt{35}}{70}$ | 0 | $\frac{3\sqrt{35}i}{70}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{210}$ | 0 | $-\frac{3\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{35}$ |
| | | $-\frac{\sqrt{105}}{210}$ | 0 | $\frac{3\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{35}$ | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{210}$ | 0 | $-\frac{3\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{35}$ |
| | | $-\frac{\sqrt{105}i}{210}$ | 0 | $-\frac{3\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{35}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{35}$ | 0 | $\frac{\sqrt{35}}{35}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{35}$ | 0 | $-\frac{\sqrt{35}}{35}$ | 0 | 0 | 0 |
| 484 | symmetry | y | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|-------------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|
| | $\mathbb{G}_1^{(1,0;a)}(A)$ | 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 | $\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{10}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | $\frac{\sqrt{10}i}{10}$ | 0 |
| | | $-\frac{\sqrt{30}i}{20}$ | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{30}i}{20}$ | 0 | $\frac{\sqrt{10}i}{20}$ | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{20}$ | 0 | 0 | $\frac{\sqrt{10}i}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{20}$ | 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 |
| 485 | symmetry | x | | | | | | | | | |
| | $\mathbb{G}_1^{(1,0;a)}(B,1)$ | 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 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | $-\frac{\sqrt{10}}{10}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{20}$ | $\frac{\sqrt{10}}{10}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}}{20}$ | $\frac{\sqrt{10}i}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ |
| | | $-\frac{\sqrt{30}i}{20}$ | 0 | $\frac{\sqrt{10}i}{20}$ | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{30}i}{20}$ | 0 | $-\frac{\sqrt{10}i}{20}$ | $\frac{\sqrt{10}}{20}$ | 0 | 0 | 0 | 0 | 0 |
| | | 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 |
| 486 | symmetry | z | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|--------------------------------|-------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{G}_1^{(1,0;a)}(B, 2)$ | 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 |
| | | 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 | $\frac{\sqrt{30}}{20}$ | 0 | $\frac{\sqrt{10}}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ |
| | | $-\frac{\sqrt{30}}{20}$ | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 |
| | | 0 | $\frac{\sqrt{30}i}{20}$ | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ |
| | | $\frac{\sqrt{30}i}{20}$ | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | 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 | $\frac{\sqrt{10}i}{20}$ | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | 0 | 0 |
| 487 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | |
| | $\mathbb{G}_3^{(1,0;a)}(A, 1)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | $-\frac{\sqrt{3}}{12}$ | $\frac{\sqrt{3}i}{6}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | $\frac{\sqrt{3}}{12}$ | 0 | 0 | $-\frac{\sqrt{3}i}{6}$ |
| | | 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 | $\frac{\sqrt{3}i}{12}$ | 0 | $-\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{3}i}{12}$ | 0 | $-\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{3}}{12}$ | 0 | $\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{3}}{12}$ | 0 | $-\frac{1}{4}$ | 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 |
| 488 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|-------------------------|---------------------------|--------------------------|--------------------------|---------------------------|-------------------------|--------------------------|--------------------------|-------------------------|
| | $\mathbb{G}_3^{(1,0;a)}(A, 2)$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{8}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{40}$ | 0 | 0 | $\frac{\sqrt{5}i}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{15}i}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 |
| | | $\frac{\sqrt{5}i}{40}$ | 0 | $-\frac{3\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | $\frac{3\sqrt{15}i}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ |
| | | 0 | $-\frac{\sqrt{5}i}{8}$ | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{5}i}{8}$ | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 |
| 489 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | |
| | $\mathbb{G}_3^{(1,0;a)}(A, 3)$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{6}$ | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ |
| | | 0 | 0 | $-\frac{\sqrt{3}}{6}$ | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 |
| | | 0 | $-\frac{\sqrt{3}}{6}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ |
| | | $\frac{\sqrt{3}}{6}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $-\frac{i}{8}$ | 0 |
| | | $-\frac{\sqrt{3}i}{24}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{i}{4}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | $\frac{i}{8}$ | 0 | 0 | $-\frac{i}{4}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | $-\frac{i}{4}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | $\frac{i}{4}$ |
| | | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{3}i}{24}$ | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{i}{4}$ | 0 | 0 |
| 490 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|----------------------------------|-------------------------|--------------------------|---------------------------|--------------------------|--------------------------|---------------------------|--------------------------|--------------------------|-------------------------|
| | $\mathbb{G}_3^{(1,0;a)}(B, 1)$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | $\frac{\sqrt{5}}{8}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{40}$ | $-\frac{\sqrt{5}}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{15}i}{40}$ | $\frac{\sqrt{15}}{40}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | $-\frac{\sqrt{15}i}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | $\frac{\sqrt{15}i}{20}$ |
| | | $\frac{\sqrt{5}i}{40}$ | 0 | $\frac{3\sqrt{15}i}{40}$ | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | $-\frac{3\sqrt{15}i}{40}$ | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{5}}{8}$ | 0 | $\frac{\sqrt{15}}{40}$ | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{5}}{8}$ | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 |
| 491 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | |
| | $\mathbb{G}_3^{(1,0;a)}(B, 2)$ | 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 | $\frac{\sqrt{15}}{20}$ | 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 | $\frac{\sqrt{5}}{10}$ | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ |
| | | $-\frac{\sqrt{5}}{10}$ | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 |
| | | 0 | $\frac{\sqrt{5}i}{10}$ | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{20}$ |
| | | $\frac{\sqrt{5}i}{10}$ | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 |
| 492 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | |

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|-------------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|
| | $\mathbb{T}_2^{(1,0;a)}(A,3)$ | 0 | $-\frac{\sqrt{14}i}{14}$ | 0 | $-\frac{\sqrt{42}i}{42}$ | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ |
| | | $\frac{\sqrt{14}i}{14}$ | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | $\frac{\sqrt{42}}{84}$ | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 |
| | | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{14}i}{14}$ | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{42}i}{42}$ | 0 | $-\frac{\sqrt{14}i}{14}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{42}}{84}$ | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $-\frac{\sqrt{14}i}{14}$ | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{42}}{84}$ | 0 | $-\frac{\sqrt{14}}{28}$ | $\frac{\sqrt{14}i}{14}$ | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ |
| | | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{14}i}{14}$ |
| | | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{14}i}{14}$ | 0 |
| 497 | symmetry | $\sqrt{3}yz$ | | | | | | | | | |
| | $\mathbb{T}_2^{(1,0;a)}(B,1)$ | 0 | $-\frac{\sqrt{14}}{14}$ | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $\frac{\sqrt{42}}{84}$ | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ |
| | | $-\frac{\sqrt{14}}{14}$ | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | $\frac{\sqrt{42}i}{42}$ | 0 |
| | | 0 | $\frac{\sqrt{42}}{42}$ | 0 | $\frac{\sqrt{14}}{14}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{42}}{42}$ | 0 | $\frac{\sqrt{14}}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | $\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | $\frac{\sqrt{42}}{84}$ | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{14}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | $-\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{14}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{14}$ |
| | | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{14}}{14}$ | 0 |
| 498 | symmetry | $\sqrt{3}xy$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|--|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|
| | $\mathbb{T}_2^{(1,0;a)}(B, 2)$ | 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 |
| | | $-\frac{\sqrt{42}}{21}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{42}}{21}$ | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | $\frac{\sqrt{14}i}{28}$ | $-\frac{\sqrt{14}}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | $\frac{\sqrt{42}i}{84}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | $\frac{\sqrt{14}}{14}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{14}}{14}$ | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | $-\frac{\sqrt{42}}{84}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{14}$ | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 |
| 499 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ | | | | | | | | | |
| | $\mathbb{T}_4^{(1,0;a)}(A, 1)$ | 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 | $\frac{\sqrt{3}}{12}$ | 0 | $-\frac{\sqrt{3}i}{12}$ | $-\frac{\sqrt{3}}{6}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $\frac{\sqrt{3}}{6}$ |
| | | 0 | $\frac{1}{4}$ | 0 | $\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{1}{4}$ | 0 | $\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{i}{4}$ | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{i}{4}$ | 0 | $\frac{\sqrt{3}i}{12}$ | 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 |
| 500 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|--|----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|--------------------------|---------------------------|
| | $\mathbb{T}_4^{(1,0;a)}(A, 2)$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{420}$ | 0 | $\frac{\sqrt{105}i}{420}$ | $\frac{\sqrt{105}}{30}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{420}$ | 0 | $-\frac{\sqrt{105}i}{420}$ | 0 | 0 | $-\frac{\sqrt{105}}{30}$ |
| | | 0 | $\frac{\sqrt{35}}{28}$ | 0 | $-\frac{\sqrt{105}}{420}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ |
| | | $\frac{\sqrt{35}}{28}$ | 0 | $-\frac{\sqrt{105}}{420}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 |
| | | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | $\frac{\sqrt{105}i}{420}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ |
| | | $-\frac{\sqrt{35}i}{28}$ | 0 | $-\frac{\sqrt{105}i}{420}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}}{30}$ | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{30}$ | $\frac{\sqrt{105}i}{70}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 |
| 501 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | |
| | $\mathbb{T}_4^{(1,0;a)}(A, 3)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}}{140}$ | 0 | $\frac{3\sqrt{105}i}{140}$ | $\frac{\sqrt{105}}{70}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}}{140}$ | 0 | $-\frac{3\sqrt{105}i}{140}$ | 0 | 0 | $-\frac{\sqrt{105}}{70}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{105}}{140}$ | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | $\frac{\sqrt{35}}{35}$ | 0 | 0 | $\frac{\sqrt{35}i}{70}$ |
| | | $-\frac{3\sqrt{105}}{140}$ | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{35}$ | $-\frac{\sqrt{35}i}{70}$ | 0 |
| | | 0 | $\frac{3\sqrt{105}i}{140}$ | 0 | $-\frac{\sqrt{35}i}{28}$ | $\frac{\sqrt{35}}{35}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{70}$ |
| | | $-\frac{3\sqrt{105}i}{140}$ | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | $-\frac{\sqrt{35}}{35}$ | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 |
| | | $\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 |
| 502 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|--|--|--|--|--|--|--|--|--|--|
| | $\mathbb{T}_4^{(1,0;a)}(A, 4)$ | $\begin{bmatrix} 0 & -\frac{3\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} \\ \frac{3\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 \\ 0 & \frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{5}i}{20} & \frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} \\ -\frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 \\ -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & \frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{5} & \frac{\sqrt{5}}{20} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & -\frac{\sqrt{5}}{20} \\ 0 & \frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ \frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & 0 & 0 \end{bmatrix}$ | | | | | | | | | |
| 503 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ $\begin{bmatrix} 0 & \frac{3\sqrt{35}i}{140} & 0 & \frac{\sqrt{105}i}{140} & \frac{\sqrt{105}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{56} \\ -\frac{3\sqrt{35}i}{140} & 0 & -\frac{\sqrt{105}i}{140} & 0 & 0 & -\frac{\sqrt{105}}{280} & 0 & 0 & -\frac{\sqrt{105}}{56} & 0 \\ 0 & \frac{\sqrt{105}i}{140} & 0 & -\frac{3\sqrt{35}i}{140} & \frac{11\sqrt{35}}{280} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{40} \\ -\frac{\sqrt{105}i}{140} & 0 & \frac{3\sqrt{35}i}{140} & 0 & 0 & -\frac{11\sqrt{35}}{280} & 0 & 0 & -\frac{\sqrt{35}}{40} & 0 \\ \frac{\sqrt{105}}{280} & 0 & \frac{11\sqrt{35}}{280} & 0 & 0 & -\frac{\sqrt{35}i}{35} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 \\ 0 & -\frac{\sqrt{105}}{280} & 0 & -\frac{11\sqrt{35}}{280} & \frac{\sqrt{35}i}{35} & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & \frac{\sqrt{35}}{28} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} \\ 0 & -\frac{\sqrt{105}}{56} & 0 & -\frac{\sqrt{35}}{40} & 0 & 0 & \frac{\sqrt{35}}{28} & 0 & 0 & \frac{\sqrt{35}i}{35} \\ -\frac{\sqrt{105}}{56} & 0 & -\frac{\sqrt{35}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{28} & -\frac{\sqrt{35}i}{35} & 0 \end{bmatrix}$ | | | | | | | | | |
| 504 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|-------------------------------|--------------------------------------|--------------------------|------------------------|-------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|
| | $\mathbb{T}_4^{(1,0;a)}(B,1)$ | 0 | $\frac{3\sqrt{5}}{20}$ | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ |
| | | $\frac{3\sqrt{5}}{20}$ | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | $\frac{\sqrt{15}i}{40}$ | 0 |
| | | 0 | $\frac{\sqrt{15}}{20}$ | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ |
| | | $\frac{\sqrt{15}}{20}$ | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{40}$ | $\frac{\sqrt{5}i}{40}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{5}$ | 0 | $-\frac{\sqrt{5}i}{20}$ | $\frac{\sqrt{5}}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{5}$ | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | $-\frac{\sqrt{5}}{20}$ |
| | | $-\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{5}}{40}$ | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{5}i}{40}$ | $\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{15}i}{40}$ | 0 | $\frac{\sqrt{5}i}{40}$ | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 |
| 505 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | |
| | $\mathbb{T}_4^{(1,0;a)}(B,2)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{5}}{5}$ | 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 | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{20}$ |
| | | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ |
| | | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 | $-\frac{\sqrt{5}i}{20}$ | $-\frac{\sqrt{5}}{5}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | $\frac{\sqrt{5}}{5}$ |
| 506 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|---------------------------------------|-----------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|--------------------------|---------------------------|
| | $\mathbb{T}_4^{(1,0;a)}(B, 3)$ | 0 | $\frac{3\sqrt{35}}{140}$ | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ |
| | | $\frac{3\sqrt{35}}{140}$ | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{280}$ | $\frac{\sqrt{105}i}{56}$ | 0 |
| | | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | $\frac{11\sqrt{35}}{280}$ | 0 | 0 | $\frac{\sqrt{35}i}{40}$ |
| | | $-\frac{\sqrt{105}}{140}$ | 0 | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{35}}{280}$ | $-\frac{\sqrt{35}i}{40}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | $-\frac{\sqrt{35}}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | $\frac{\sqrt{35}}{28}$ |
| | | $-\frac{\sqrt{105}}{280}$ | 0 | $\frac{11\sqrt{35}}{280}$ | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | $-\frac{\sqrt{35}}{35}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{280}$ | 0 | $-\frac{11\sqrt{35}}{280}$ | $\frac{\sqrt{35}i}{28}$ | 0 | $-\frac{\sqrt{35}}{35}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | $\frac{\sqrt{35}i}{40}$ | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{35}$ |
| | | $\frac{\sqrt{105}i}{56}$ | 0 | $-\frac{\sqrt{35}i}{40}$ | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 | 0 | $\frac{\sqrt{35}}{35}$ | 0 |
| 507 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | |
| | $\mathbb{T}_4^{(1,0;a)}(B, 4)$ | 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 |
| | | $\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{105}i}{140}$ | 0 | $\frac{\sqrt{35}i}{70}$ | $-\frac{\sqrt{35}}{35}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ |
| | | $\frac{3\sqrt{105}i}{140}$ | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | $\frac{\sqrt{35}}{35}$ | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 |
| | | 0 | $-\frac{3\sqrt{105}}{140}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{35}}{35}$ | 0 | 0 | $\frac{\sqrt{35}i}{28}$ |
| | | $-\frac{3\sqrt{105}}{140}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{35}$ | $-\frac{\sqrt{35}i}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 |
| 508 | symmetry | y | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|-------------------------|-------------------------|
| | $\mathbb{M}_1^{(a)}(A)$ | 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 | 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 | $-\frac{\sqrt{5}i}{10}$ |
| | | $\frac{\sqrt{15}i}{10}$ | 0 | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}i}{10}$ | 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 |
| 509 | symmetry | x | | | | | | | | | |
| | $\mathbb{M}_1^{(a)}(B, 1)$ | 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 |
| | | 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 |
| | | $-\frac{\sqrt{15}i}{10}$ | 0 | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{10}$ | 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 | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 |
| 510 | symmetry | z | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix |
|-----|-------------------|---|
| | $M_1^{(a)}(B, 2)$ | $ \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 & -\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}{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}{5} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} $ |
| 511 | symmetry | $ \sqrt{15}xyz $ $ \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 \\ \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 & 0 & 0 & 0 & 0 & 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} $ |
| 512 | symmetry | $ -\frac{y(3x^2-2y^2+3z^2)}{2} $ |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|-------------------|--|--------------------------|------------------------|------------------------|-----------------------|-----------------------|-------------------------|-------------------------|------------------------|------------------------|
| | $M_3^{(a)}(A, 2)$ | 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 | 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 | $-\frac{\sqrt{5}i}{5}$ |
| | | $-\frac{\sqrt{15}i}{20}$ | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{20}$ | 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 | 0 | 0 |
| 513 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | |
| | $M_3^{(a)}(A, 3)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{4} & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{4} & 0 & \frac{\sqrt{3}i}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | |
| 514 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|----------------------------|----------------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|------------------------|------------------------|------------------------|-----------------------|
| | $\mathbb{M}_3^{(a)}(B, 1)$ | 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 |
| | | 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 |
| | | $\frac{\sqrt{15}i}{20}$ | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | $\frac{\sqrt{5}i}{20}$ | 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 |
| 515 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | |
| | $\mathbb{M}_3^{(a)}(B, 2)$ | 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 | $\frac{\sqrt{5}i}{10}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{10}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{5}$ | 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 | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| 516 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | |

continued ...

Table 8

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

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|---|
| | $\mathbb{M}_1^{(1,-1;a)}(A)$ | 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 | $-\frac{\sqrt{10}i}{10}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{10}$ | 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 |
| 519 | symmetry | x | | | | | | | | | |
| | $\mathbb{M}_1^{(1,-1;a)}(B,1)$ | 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 | $\frac{\sqrt{10}}{10}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}}{10}$ | 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 |
| 520 | symmetry | z | | | | | | | | | |

continued ...

Table 8

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

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|---------------------------------|-----------------------------------|---------------------------|--------------------------|---------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---------------------------|
| | $\mathbb{M}_3^{(1,-1;a)}(A, 2)$ | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | $-\frac{3\sqrt{35}i}{70}$ | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{35}$ |
| | | $-\frac{\sqrt{105}i}{70}$ | 0 | $\frac{3\sqrt{35}i}{70}$ | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{35}}{35}$ | 0 |
| | | 0 | $-\frac{3\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{105}i}{70}$ | $\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{3\sqrt{35}i}{70}$ | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{35}}{70}$ | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{70}$ | 0 | $-\frac{\sqrt{105}}{70}$ | $\frac{\sqrt{105}i}{70}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | $\frac{\sqrt{105}i}{35}$ | $-\frac{\sqrt{105}}{70}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | $-\frac{\sqrt{105}i}{35}$ | 0 | 0 | $\frac{\sqrt{105}}{70}$ |
| | | 0 | $\frac{\sqrt{35}}{35}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ |
| | | $\frac{\sqrt{35}}{35}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{70}$ | $\frac{\sqrt{105}i}{70}$ | 0 |
| 523 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | |
| | $\mathbb{M}_3^{(1,-1;a)}(A, 3)$ | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{21}$ |
| | | $\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{7}}{14}$ | $\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ |
| | | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ |
| | | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{7}i}{14}$ | 0 |
| 524 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|----------------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
| | $\mathbb{M}_3^{(1,-1;a)}(B,1)$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | $-\frac{3\sqrt{35}}{70}$ | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | $-\frac{\sqrt{35}i}{35}$ |
| | | $-\frac{\sqrt{105}}{70}$ | 0 | $-\frac{3\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{70}$ | $\frac{\sqrt{35}i}{35}$ | 0 |
| | | 0 | $-\frac{3\sqrt{35}}{70}$ | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 |
| | | $-\frac{3\sqrt{35}}{70}$ | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{35}$ | 0 | $\frac{\sqrt{105}i}{70}$ | $-\frac{\sqrt{105}}{70}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{35}$ | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | $\frac{\sqrt{105}}{70}$ |
| | | $-\frac{\sqrt{35}}{70}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{70}$ | 0 | $\frac{\sqrt{105}}{70}$ | $-\frac{\sqrt{105}i}{70}$ | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | 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 | 0 | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 |
| 525 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | |
| | $\mathbb{M}_3^{(1,-1;a)}(B,2)$ | $\frac{\sqrt{105}}{35}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{35}$ | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 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 | $\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{105}i}{70}$ | $\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ |
| | | $-\frac{\sqrt{35}i}{70}$ | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $\frac{\sqrt{105}i}{70}$ |
| | | $-\frac{\sqrt{35}}{70}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | $-\frac{\sqrt{105}i}{70}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | $\frac{\sqrt{105}i}{70}$ | $-\frac{\sqrt{105}}{35}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | $\frac{\sqrt{105}}{35}$ |
| 526 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | |

continued ...

Table 8

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

continued ...

Table 8

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

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|---------------------------------|---|----------------------------|---------------------------|----------------------------|--------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|
| | $\mathbb{M}_5^{(1,-1;a)}(A, 3)$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{5\sqrt{21}i}{168}$ | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ |
| | | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 |
| | | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | $-\frac{19\sqrt{7}i}{168}$ | $\frac{5\sqrt{7}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{12}$ |
| | | $\frac{5\sqrt{21}i}{168}$ | 0 | $\frac{19\sqrt{7}i}{168}$ | 0 | 0 | $-\frac{5\sqrt{7}}{84}$ | 0 | 0 | $\frac{\sqrt{7}}{12}$ | 0 |
| | | $\frac{\sqrt{21}}{28}$ | 0 | $\frac{5\sqrt{7}}{84}$ | 0 | 0 | $\frac{2\sqrt{7}i}{21}$ | 0 | $\frac{\sqrt{7}}{42}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | $-\frac{5\sqrt{7}}{84}$ | $-\frac{2\sqrt{7}i}{21}$ | 0 | $\frac{\sqrt{7}}{42}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{42}$ | 0 | $-\frac{\sqrt{7}i}{42}$ | $\frac{\sqrt{7}}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{42}$ | 0 | $\frac{\sqrt{7}i}{42}$ | 0 | 0 | $-\frac{\sqrt{7}}{42}$ |
| | | 0 | $\frac{\sqrt{21}}{84}$ | 0 | $\frac{\sqrt{7}}{12}$ | 0 | 0 | $\frac{\sqrt{7}}{42}$ | 0 | 0 | $\frac{2\sqrt{7}i}{21}$ |
| | | $\frac{\sqrt{21}}{84}$ | 0 | $\frac{\sqrt{7}}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{42}$ | $-\frac{2\sqrt{7}i}{21}$ | 0 |
| 531 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | |
| | $\mathbb{M}_5^{(1,-1;a)}(A, 4)$ | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | $\frac{\sqrt{15}i}{40}$ | $\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{20}$ |
| | | $\frac{3\sqrt{5}i}{40}$ | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | 0 |
| | | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{5}i}{40}$ | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{20}$ |
| | | $-\frac{\sqrt{15}i}{40}$ | 0 | $\frac{\sqrt{5}i}{40}$ | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 |
| | | $\frac{\sqrt{15}}{20}$ | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{10}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $-\frac{\sqrt{5}}{10}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{10}$ | 0 | $\frac{\sqrt{5}i}{10}$ | $-\frac{\sqrt{5}}{10}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{10}$ | 0 | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 | $\frac{\sqrt{5}}{10}$ |
| | | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $-\frac{\sqrt{5}}{10}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}}{20}$ | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{10}$ | 0 | 0 |
| 532 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix |
|-----|---------------------------------|---|
| | $\mathbb{M}_5^{(1,-1;a)}(A, 5)$ | $ \begin{bmatrix} 0 & \frac{\sqrt{15}i}{20} & 0 & \frac{\sqrt{5}i}{20} & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{15}i}{20} & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}i}{20} & 0 & -\frac{\sqrt{15}i}{20} & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{15} \\ -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & \frac{\sqrt{15}}{30} & 0 & 0 & \frac{\sqrt{15}}{15} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{15}}{30} & \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 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{15} \\ 0 & 0 & \frac{\sqrt{15}}{15} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{15} & 0 \end{bmatrix} $ |
| 533 | symmetry | $ \frac{x(8x^4 - 40x^2y^2 - 40x^2z^2 + 15y^4 + 30y^2z^2 + 15z^4)}{8} $ $ \begin{bmatrix} 0 & \frac{3\sqrt{7}}{56} & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 & \frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{21}i}{84} \\ \frac{3\sqrt{7}}{56} & 0 & -\frac{5\sqrt{21}}{168} & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & \frac{\sqrt{21}i}{84} & 0 \\ 0 & -\frac{5\sqrt{21}}{168} & 0 & \frac{19\sqrt{7}}{168} & 0 & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & \frac{\sqrt{7}i}{12} \\ -\frac{5\sqrt{21}}{168} & 0 & \frac{19\sqrt{7}}{168} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{84} & -\frac{\sqrt{7}i}{12} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & -\frac{\sqrt{7}i}{42} & \frac{\sqrt{7}}{42} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{42} & 0 & \frac{\sqrt{7}i}{42} & 0 & 0 & -\frac{\sqrt{7}}{42} \\ \frac{\sqrt{21}}{28} & 0 & -\frac{5\sqrt{7}}{84} & 0 & 0 & -\frac{\sqrt{7}i}{42} & 0 & -\frac{2\sqrt{7}}{21} & 0 & 0 \\ 0 & -\frac{\sqrt{21}}{28} & 0 & \frac{5\sqrt{7}}{84} & \frac{\sqrt{7}i}{42} & 0 & -\frac{2\sqrt{7}}{21} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{21}i}{84} & 0 & \frac{\sqrt{7}i}{12} & \frac{\sqrt{7}}{42} & 0 & 0 & 0 & 0 & -\frac{2\sqrt{7}}{21} \\ \frac{\sqrt{21}i}{84} & 0 & -\frac{\sqrt{7}i}{12} & 0 & 0 & -\frac{\sqrt{7}}{42} & 0 & 0 & -\frac{2\sqrt{7}}{21} & 0 \end{bmatrix} $ |
| 534 | symmetry | $ \frac{z(15x^4 + 30x^2y^2 - 40x^2z^2 + 15y^4 - 40y^2z^2 + 8z^4)}{8} $ |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|---------------------------------|---|-------------------------|-------------------------|------------------------|--------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|
| | $\mathbb{M}_5^{(1,-1;a)}(B, 2)$ | $\frac{\sqrt{7}}{7}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}}{7}$ | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | $-\frac{\sqrt{21}}{21}$ | 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 | $\frac{\sqrt{21}i}{21}$ | 0 | $\frac{\sqrt{7}i}{42}$ | $-\frac{2\sqrt{7}}{21}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{42}$ |
| | | $-\frac{\sqrt{21}i}{21}$ | 0 | $-\frac{\sqrt{7}i}{42}$ | 0 | 0 | $\frac{2\sqrt{7}}{21}$ | 0 | 0 | $\frac{\sqrt{7}}{42}$ | 0 |
| | | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | $\frac{\sqrt{7}}{42}$ | 0 | 0 | $-\frac{2\sqrt{7}}{21}$ | 0 | 0 | $-\frac{\sqrt{7}i}{42}$ |
| | | $-\frac{\sqrt{21}}{21}$ | 0 | $\frac{\sqrt{7}}{42}$ | 0 | 0 | 0 | 0 | $\frac{2\sqrt{7}}{21}$ | $\frac{\sqrt{7}i}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{42}$ | 0 | $-\frac{\sqrt{7}i}{42}$ | $\frac{\sqrt{7}}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{42}$ | 0 | $\frac{\sqrt{7}i}{42}$ | 0 | 0 | $-\frac{\sqrt{7}}{42}$ |
| 535 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | |
| | $\mathbb{M}_5^{(1,-1;a)}(B, 3)$ | 0 | $\frac{3\sqrt{5}}{40}$ | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | $\frac{\sqrt{15}i}{20}$ |
| | | $\frac{3\sqrt{5}}{40}$ | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | $-\frac{\sqrt{15}i}{20}$ | 0 |
| | | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{5}}{40}$ | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{\sqrt{5}i}{20}$ |
| | | $\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | $-\frac{\sqrt{5}i}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{10}$ | 0 | $\frac{\sqrt{5}i}{10}$ | $-\frac{\sqrt{5}}{10}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{10}$ | 0 | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 | $\frac{\sqrt{5}}{10}$ |
| | | $\frac{\sqrt{15}}{20}$ | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{\sqrt{5}i}{10}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | $-\frac{\sqrt{5}}{20}$ | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | $\frac{\sqrt{5}i}{20}$ | $-\frac{\sqrt{5}}{10}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}i}{20}$ | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | $\frac{\sqrt{5}}{10}$ | 0 | 0 | 0 | 0 |
| 536 | symmetry | $\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ | | | | | | | | | |

continued ...

Table 8

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

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|---------------------------|
| | $\mathbb{M}_5^{(1,-1;a)}(B,6)$ | 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 | $\frac{\sqrt{15}i}{30}$ | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{5}}{10}$ | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{5}i}{10}$ | 0 | $\frac{\sqrt{15}i}{30}$ | $-\frac{\sqrt{15}}{15}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{5}i}{10}$ | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | $\frac{\sqrt{15}}{15}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{5}}{10}$ | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | $\frac{\sqrt{15}}{15}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{5}}{10}$ | 0 | $-\frac{\sqrt{15}}{30}$ | 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 |
| 539 | symmetry | y | | | | | | | | | |
| | $\mathbb{M}_1^{(1,1;a)}(A)$ | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | $-\frac{\sqrt{210}i}{70}$ | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{70}$ |
| | | $-\frac{\sqrt{70}i}{70}$ | 0 | $\frac{\sqrt{210}i}{70}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $-\frac{\sqrt{210}}{70}$ | 0 |
| | | 0 | $-\frac{\sqrt{210}i}{70}$ | 0 | $-\frac{\sqrt{70}i}{70}$ | $-\frac{3\sqrt{70}}{140}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{210}i}{70}$ | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{210}}{140}$ | 0 | $-\frac{3\sqrt{70}}{140}$ | 0 | 0 | $-\frac{\sqrt{70}i}{70}$ | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $\frac{3\sqrt{70}}{140}$ | $\frac{\sqrt{70}i}{70}$ | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | $\frac{\sqrt{70}i}{35}$ | $\frac{3\sqrt{70}}{140}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | $-\frac{\sqrt{70}i}{35}$ | 0 | 0 | $-\frac{3\sqrt{70}}{140}$ |
| | | 0 | $-\frac{\sqrt{210}}{70}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 | $-\frac{\sqrt{70}i}{70}$ |
| | | $-\frac{\sqrt{210}}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{140}$ | $\frac{\sqrt{70}i}{70}$ | 0 |
| 540 | symmetry | x | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|----------------------|---------------------------|----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|----------------------------|--------------------------|----------------------------|
| | $M_1^{(1,1;a)}(B,1)$ | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | $-\frac{\sqrt{210}}{70}$ | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{210}i}{70}$ |
| | | $-\frac{\sqrt{70}}{70}$ | 0 | $-\frac{\sqrt{210}}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | $-\frac{\sqrt{210}i}{70}$ | 0 | |
| | | 0 | $-\frac{\sqrt{210}}{70}$ | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{210}}{70}$ | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{140}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{35}$ | 0 | $-\frac{3\sqrt{70}i}{140}$ | $\frac{3\sqrt{70}}{140}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{35}$ | 0 | $\frac{3\sqrt{70}i}{140}$ | 0 | 0 | $-\frac{3\sqrt{70}}{140}$ |
| | | $\frac{\sqrt{210}}{140}$ | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 | $-\frac{3\sqrt{70}i}{140}$ | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $-\frac{3\sqrt{70}}{140}$ | $\frac{3\sqrt{70}i}{140}$ | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{210}i}{70}$ | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{70}$ |
| | | $-\frac{\sqrt{210}i}{70}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{140}$ | 0 | 0 | $\frac{\sqrt{70}}{70}$ | 0 |
| | | | | | | | | | | | |
| 541 | symmetry | z | | | | | | | | | |
| | $M_1^{(1,1;a)}(B,2)$ | $\frac{\sqrt{70}}{35}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{70}}{35}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | $\frac{\sqrt{210}}{140}$ | 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 | $-\frac{\sqrt{210}i}{140}$ | 0 | $\frac{3\sqrt{70}i}{140}$ | $\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{140}$ |
| | | $\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{3\sqrt{70}i}{140}$ | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 |
| | | 0 | $\frac{\sqrt{210}}{140}$ | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | $-\frac{3\sqrt{70}i}{140}$ |
| | | $\frac{\sqrt{210}}{140}$ | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | $\frac{3\sqrt{70}i}{140}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | $-\frac{3\sqrt{70}i}{140}$ | $-\frac{\sqrt{70}}{35}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | $\frac{3\sqrt{70}i}{140}$ | 0 | 0 | $\frac{\sqrt{70}}{35}$ |
| | | | | | | | | | | | |
| 542 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|---------------------------|--------------------------|---------------------------|----------------------------|---------------------------|
| | $\mathbb{M}_3^{(1,1;a)}(A, 1)$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{7}i}{28}$ | $\frac{\sqrt{7}}{14}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ |
| | | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | $\frac{\sqrt{21}i}{21}$ | 0 |
| | | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{21}i}{28}$ | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{21}$ |
| | | $-\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 |
| | | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 |
| 543 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | |
| | $\mathbb{M}_3^{(1,1;a)}(A, 2)$ | 0 | $-\frac{3\sqrt{35}i}{140}$ | 0 | $-\frac{\sqrt{105}i}{84}$ | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ |
| | | $\frac{3\sqrt{35}i}{140}$ | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | $-\frac{19\sqrt{35}i}{420}$ | $-\frac{5\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{24}$ |
| | | $\frac{\sqrt{105}i}{84}$ | 0 | $\frac{19\sqrt{35}i}{420}$ | 0 | 0 | $\frac{5\sqrt{35}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}}{24}$ | 0 |
| | | $-\frac{\sqrt{105}}{56}$ | 0 | $-\frac{5\sqrt{35}}{168}$ | 0 | 0 | $\frac{4\sqrt{35}i}{105}$ | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{56}$ | 0 | $\frac{5\sqrt{35}}{168}$ | $-\frac{4\sqrt{35}i}{105}$ | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | $-\frac{\sqrt{35}i}{105}$ | $-\frac{\sqrt{35}}{84}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | $\frac{\sqrt{35}i}{105}$ | 0 | 0 | $\frac{\sqrt{35}}{84}$ |
| | | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{35}}{24}$ | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | $\frac{4\sqrt{35}i}{105}$ |
| | | $-\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{35}}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{84}$ | $-\frac{4\sqrt{35}i}{105}$ | 0 |
| 544 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|-------------------------------|--------------------------------|---------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---------------------------|---------------------------|----------------------------|---------------------------|
| | $\mathbb{M}_3^{(1,1;a)}(A,3)$ | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | $\frac{\sqrt{7}i}{28}$ | $\frac{5\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ |
| | | $-\frac{\sqrt{21}i}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | $-\frac{5\sqrt{7}}{56}$ | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 |
| | | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{24}$ |
| | | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}}{24}$ | 0 |
| | | $\frac{5\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 |
| | | 0 | $-\frac{5\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{21}}{168}$ | $\frac{\sqrt{21}i}{21}$ | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ |
| | | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{21}}{24}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | $\frac{\sqrt{21}i}{21}$ |
| | | $\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{21}}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | $-\frac{\sqrt{21}i}{21}$ | 0 |
| 545 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | |
| | $\mathbb{M}_3^{(1,1;a)}(B,1)$ | 0 | $\frac{3\sqrt{35}}{140}$ | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ |
| | | $\frac{3\sqrt{35}}{140}$ | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | $-\frac{\sqrt{105}i}{168}$ | 0 |
| | | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | $\frac{19\sqrt{35}}{420}$ | 0 | 0 | $\frac{5\sqrt{35}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}i}{24}$ |
| | | $-\frac{\sqrt{105}}{84}$ | 0 | $\frac{19\sqrt{35}}{420}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{35}}{168}$ | $\frac{\sqrt{35}i}{24}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{105}$ | 0 | $\frac{\sqrt{35}i}{84}$ | $-\frac{\sqrt{35}}{84}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{105}$ | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{84}$ |
| | | $-\frac{\sqrt{105}}{56}$ | 0 | $\frac{5\sqrt{35}}{168}$ | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | $-\frac{4\sqrt{35}}{105}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{56}$ | 0 | $-\frac{5\sqrt{35}}{168}$ | $-\frac{\sqrt{35}i}{84}$ | 0 | $-\frac{4\sqrt{35}}{105}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{35}i}{24}$ | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{4\sqrt{35}}{105}$ |
| | | $-\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{35}i}{24}$ | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | $-\frac{4\sqrt{35}}{105}$ | 0 |
| 546 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-----|----------------------|--|--|--|--|--|--|--|--|--|--|
| | $M_3^{(1,1;a)}(B,2)$ | $ \begin{bmatrix} \frac{2\sqrt{35}}{35} & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & 0 & 0 \\ 0 & -\frac{2\sqrt{35}}{35} & 0 & 0 & \frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{105}}{42} & 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{105}i}{42} & 0 & -\frac{\sqrt{35}i}{84} & -\frac{4\sqrt{35}}{105} & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} \\ \frac{\sqrt{105}i}{42} & 0 & \frac{\sqrt{35}i}{84} & 0 & 0 & \frac{4\sqrt{35}}{105} & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 \\ 0 & \frac{\sqrt{105}}{42} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & -\frac{4\sqrt{35}}{105} & 0 & 0 & \frac{\sqrt{35}i}{84} \\ \frac{\sqrt{105}}{42} & 0 & -\frac{\sqrt{35}}{84} & 0 & 0 & 0 & 0 & \frac{4\sqrt{35}}{105} & -\frac{\sqrt{35}i}{84} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & \frac{\sqrt{35}i}{84} & \frac{\sqrt{35}}{105} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{84} & 0 & -\frac{\sqrt{35}i}{84} & 0 & 0 & -\frac{\sqrt{35}}{105} \end{bmatrix} $ | | | | | | | | | |
| 547 | symmetry | $ \begin{matrix} \frac{\sqrt{15}x(y-z)(y+z)}{2} \\ \begin{bmatrix} 0 & \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & -\frac{5\sqrt{7}}{56} & 0 & 0 & \frac{3\sqrt{7}i}{56} \\ \frac{\sqrt{21}}{28} & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & \frac{5\sqrt{7}}{56} & -\frac{3\sqrt{7}i}{56} & 0 \\ 0 & -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & 0 & \frac{\sqrt{21}i}{24} \\ -\frac{\sqrt{7}}{28} & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{168} & -\frac{\sqrt{21}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}i}{28} & \frac{\sqrt{21}}{28} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}i}{28} & 0 & 0 & -\frac{\sqrt{21}}{28} \\ -\frac{5\sqrt{7}}{56} & 0 & -\frac{\sqrt{21}}{168} & 0 & 0 & \frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 \\ 0 & \frac{5\sqrt{7}}{56} & 0 & \frac{\sqrt{21}}{168} & -\frac{\sqrt{21}i}{28} & 0 & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 \\ 0 & \frac{3\sqrt{7}i}{56} & 0 & \frac{\sqrt{21}i}{24} & \frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{21} \\ -\frac{3\sqrt{7}i}{56} & 0 & -\frac{\sqrt{21}i}{24} & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & \frac{\sqrt{21}}{21} & 0 \end{bmatrix} \end{matrix} $ | | | | | | | | | |
| 548 | symmetry | $ \begin{matrix} \frac{\sqrt{15}z(x-y)(x+y)}{2} \\ \end{matrix} $ | | | | | | | | | |

continued ...

Table 8

| No. | multipole | matrix | | | | | | | | | |
|-------------------------------|-----------|------------------------|-------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|
| $\mathbb{M}_3^{(1,1;a)}(B,4)$ | | 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 |
| | | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{21}i}{21}$ | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ |
| | | $\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 |
| | | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ |
| | | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | $\frac{\sqrt{21}i}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 |

bra: = $\langle d_u, \uparrow |, \langle d_u, \downarrow |, \langle d_v, \uparrow |, \langle d_v, \downarrow |, \langle d_{yz}, \uparrow |, \langle d_{yz}, \downarrow |, \langle d_{xz}, \uparrow |, \langle d_{xz}, \downarrow |, \langle d_{xy}, \uparrow |, \langle d_{xy}, \downarrow |$
ket: = $|f_3, \uparrow \rangle, |f_3, \downarrow \rangle, |f_{ax}, \uparrow \rangle, |f_{ax}, \downarrow \rangle, |f_{ay}, \uparrow \rangle, |f_{ay}, \downarrow \rangle, |f_{az}, \uparrow \rangle, |f_{az}, \downarrow \rangle, |f_{bx}, \uparrow \rangle, |f_{bx}, \downarrow \rangle, |f_{by}, \uparrow \rangle, |f_{by}, \downarrow \rangle, |f_{bz}, \uparrow \rangle, |f_{bz}, \downarrow \rangle$

Table 9: (d,f) block.

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------|-----------|-----------------------|-----------------------|--------------------------|--------------------------|----------------------------|----------------------------|--------------------------|--------------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|
| 549 | symmetry | y | | | | | | | | | | | | | |
| $\mathbb{Q}_1^{(a)}(A)$ | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ |
| | | $\frac{\sqrt{7}}{14}$ | 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 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 |

continued ...

Table 9

| No. | multipole | matrix |
|-----|-----------|--|
| 550 | symmetry | x $\begin{bmatrix} 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{35}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{28} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{105}}{140} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{28} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 \end{bmatrix}$ |
| 551 | symmetry | z $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}}{14} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{105}}{70} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{7}}{14} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 552 | symmetry | $\sqrt{15}xyz$ |

continued ...

Table 9

| No. | multipole | matrix |
|-----|----------------------------|--|
| | $\mathbb{Q}_3^{(a)}(A, 1)$ | <div>$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$</div> |
| 553 | symmetry | <div>$-\frac{y(3x^2-2y^2+3z^2)}{2}$<div>$\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{1}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$</div></div> |
| 554 | symmetry | <div>$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$</div> |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | $\mathbb{Q}_3^{(a)}(A, 3)$ | $ \begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{1}{4} & 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 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 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 & -\frac{\sqrt{5}}{8} & 0 \\ 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 & 0 & 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 & -\frac{\sqrt{5}}{8} & 0 & 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 \end{bmatrix} $ | | | | | | | | | | | | | |
| 555 | symmetry | $ \frac{x(2x^2-3y^2-3z^2)}{2} $ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(a)}(B, 1)$ | $ \begin{bmatrix} 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{30} & 0 & 0 & 0 & 0 & 0 & \frac{1}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{12} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 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 & 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 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{24} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 \end{bmatrix} $ | | | | | | | | | | | | | |
| 556 | symmetry | $ -\frac{z(3x^2+3y^2-2z^2)}{2} $ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|----------------------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | $\mathbb{Q}_3^{(a)}(B, 2)$ | 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 | 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 | $-\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 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 |
| 557 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(a)}(B, 3)$ | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{1}{4}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 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 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{8}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{8}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{8}$ | 0 | 0 | |
| 558 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix |
|-----|----------------------------|--|
| | $\mathbb{Q}_3^{(a)}(B, 4)$ | $ \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 & 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 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{24} & 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 & 0 & 0 & 0 & 0 \end{bmatrix} $ |
| 559 | symmetry | $ \frac{3\sqrt{35}xyz(x-y)(x+y)}{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 \\ \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{2}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{40} & 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} \end{bmatrix} $ |
| 560 | symmetry | $ \frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2} $ |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | $\mathbb{Q}_5^{(a)}(A, 2)$ | $\begin{bmatrix} -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{10}}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{40} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{10}}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | | | | | |
| 561 | symmetry | $\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(a)}(A, 3)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}}{84} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{14}}{56} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{42}}{168} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{5\sqrt{42}}{168} & 0 \\ \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{42}}{84} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{5\sqrt{42}}{168} & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | | | | | |
| 562 | symmetry | $\frac{3\sqrt{35}y(x^2 - 2xz - z^2)(x^2 + 2xz - z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|--|-------------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--|
| | $\mathbb{Q}_5^{(a)}(A, 4)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}}{40}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}}{40}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | |
| | | 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 | $-\frac{\sqrt{30}}{40}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | |
| | | $-\frac{\sqrt{30}}{20}$ | 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 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | 0 | |
| 563 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(a)}(A, 5)$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}}{40}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}}{40}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | |
| | | 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 | $\frac{\sqrt{6}}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{6}}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | 0 | 0 | 0 | |
| 564 | symmetry | $\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | |
|-----|----------------------------|--|------------------------|--------------------------|--------------------------|------------------------|------------------------|-------------------------|-------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|
| | $\mathbb{Q}_5^{(a)}(B, 1)$ | 0 | 0 | $-\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{42}}{84}$ | 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 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 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 | $\frac{5\sqrt{42}}{168}$ | 0 | 0 |
| 565 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(a)}(B, 2)$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{42}$ | 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 | $\frac{\sqrt{42}}{84}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{84}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 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 | $-\frac{5\sqrt{42}}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 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 | $\frac{5\sqrt{42}}{168}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{42}}{84}$ | 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 |
| 566 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|----------------------------|---|-------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------------|------------------------|------------------------|
| | $\mathbb{Q}_5^{(a)}(B, 3)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}}{40}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{30}}{20}$ | 0 | 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 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}}{40}$ | 0 | 0 |
| | | 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 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 |
| 567 | symmetry | $\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ | | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(a)}(B, 4)$ | 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 | $\frac{\sqrt{30}}{20}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{30}}{20}$ | 0 | 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 |
| 568 | symmetry | $\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|--|---|------------------------|------------------------|------------------------|------------------------|-----------------------|-----------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | $\mathbb{Q}_5^{(a)}(B, 5)$ | 0 | 0 | $-\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{2}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{6}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}}{40}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{6}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 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 | $-\frac{\sqrt{10}}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | 0 |
| 569 | symmetry | $-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(a)}(B, 6)$ | 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 | $\frac{\sqrt{6}}{12}$ | 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 | $\frac{\sqrt{6}}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{6}}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{6}}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{20}$ | 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 |
| 570 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|--------------------------|----------------------------|---------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
| | $\mathbb{Q}_3^{(1,-1;a)}(A,1)$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{210}i}{168}$ | 0 | $\frac{\sqrt{210}}{168}$ | $-\frac{\sqrt{210}i}{84}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{210}i}{168}$ | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 | $\frac{\sqrt{210}i}{84}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | $\frac{\sqrt{42}}{168}$ | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | $-\frac{\sqrt{70}i}{56}$ | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 571 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(1,-1;a)}(A,2)$ | 0 | $-\frac{3\sqrt{14}}{56}$ | $-\frac{\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ |
| | | $\frac{3\sqrt{14}}{56}$ | 0 | 0 | $\frac{\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{42}}{56}$ | $-\frac{\sqrt{70}i}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{140}$ | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | $\frac{\sqrt{70}i}{280}$ | 0 | 0 | $\frac{\sqrt{70}i}{140}$ | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{70}}{280}$ | 0 | $-\frac{\sqrt{70}i}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | $-\frac{\sqrt{70}i}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | $-\frac{\sqrt{70}i}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{28}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{70}$ | $\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 |
| 572 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------------|---------------------------|--------------------------|---------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{Q}_3^{(1,-1;a)}(A,3)$ | 0 | $-\frac{\sqrt{210}}{168}$ | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{84}$ |
| | | $\frac{\sqrt{210}}{168}$ | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{168}$ | 0 | 0 | $\frac{\sqrt{210}i}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{70}}{56}$ | $\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{70}}{56}$ | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{42}}{84}$ | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 |
| 573 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(1,-1;a)}(B,1)$ | 0 | $\frac{3\sqrt{14}i}{56}$ | 0 | 0 | $\frac{\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ |
| | | $\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | $-\frac{\sqrt{70}i}{280}$ | 0 | 0 | $\frac{\sqrt{70}}{140}$ | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{280}$ | $-\frac{\sqrt{70}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | $\frac{\sqrt{42}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | $-\frac{\sqrt{70}i}{70}$ | $\frac{\sqrt{42}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{70}$ | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70}i}{70}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | $\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 |
| 574 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|----------------------------------|----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|---------------------------|---------------------------|-------------------------|----------------------------|---------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{Q}_3^{(1,-1;a)}(B, 2)$ | 0 | 0 | 0 | $-\frac{\sqrt{210}}{280}$ | 0 | $\frac{\sqrt{210}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{210}}{280}$ | 0 | $\frac{\sqrt{210}i}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{42}i}{28}$ | 0 | 0 | $-\frac{\sqrt{70}}{280}$ | 0 | $-\frac{\sqrt{70}i}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{42}i}{28}$ | $\frac{\sqrt{70}}{280}$ | 0 | $-\frac{\sqrt{70}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{70}i}{70}$ | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{280}$ | 0 | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{280}$ | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | $\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{70}$ | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{28}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70}i}{70}$ | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{28}$ |
| 575 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(1,-1;a)}(B, 3)$ | 0 | $-\frac{\sqrt{210}i}{168}$ | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{168}$ | 0 | 0 | $-\frac{\sqrt{210}}{84}$ | |
| | | $-\frac{\sqrt{210}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{168}$ | $\frac{\sqrt{210}}{84}$ | 0 | |
| | | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | |
| | | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | $\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | 0 | $\frac{\sqrt{42}}{42}$ | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | |
| 576 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|-----------------|-----------------|
| | $\mathbb{Q}_3^{(1,-1;a)}(B,4)$ | $\frac{\sqrt{210}i}{84}$ | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | $\frac{\sqrt{210}i}{168}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{210}i}{84}$ | $\frac{\sqrt{14}}{56}$ | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 | $\frac{\sqrt{210}i}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{42}}{42}$ | $\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| 577 | symmetry | $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(1,-1;a)}(A,1)$ | 0 | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | $-\frac{3\sqrt{5}}{40}$ | 0 | 0 | 0 | $\frac{3\sqrt{3}i}{40}$ | 0 | $-\frac{3\sqrt{3}}{40}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | $\frac{3\sqrt{5}}{40}$ | 0 | 0 | 0 | $\frac{3\sqrt{3}i}{40}$ | 0 | $\frac{3\sqrt{3}}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | $\frac{i}{10}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | $\frac{1}{8}$ | 0 | 0 | $-\frac{i}{10}$ |
| | | 0 | $\frac{i}{20}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{3i}{40}$ | 0 | 0 | 0 | $\frac{1}{20}$ |
| | | $\frac{i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3i}{40}$ | $-\frac{1}{20}$ | 0 |
| | | 0 | $\frac{1}{20}$ | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{i}{20}$ |
| | | $-\frac{1}{20}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{3i}{40}$ | 0 | 0 | 0 | $-\frac{i}{20}$ | 0 |
| | | $-\frac{i}{10}$ | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 |
| | | 0 | $\frac{i}{10}$ | $-\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 |
| 578 | symmetry | $\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|----------------------------|-----------------------------|---------------------------|---------------------------|----------------------------|----------------------------|
| | $\mathbb{Q}_5^{(1,-1;a)}(A, 2)$ | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | $-\frac{i}{40}$ | 0 | $-\frac{1}{40}$ | $\frac{i}{5}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | $-\frac{i}{40}$ | 0 | $\frac{1}{40}$ | 0 | 0 | $-\frac{i}{5}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | $-\frac{\sqrt{5}}{40}$ | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 | $-\frac{3\sqrt{3}i}{40}$ | 0 | $\frac{3\sqrt{3}}{40}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | $\frac{\sqrt{5}}{40}$ | 0 | 0 | $\frac{\sqrt{5}i}{10}$ | $-\frac{3\sqrt{3}i}{40}$ | 0 | $-\frac{3\sqrt{3}}{40}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{3}i}{20}$ | 0 | 0 | $\frac{\sqrt{5}i}{40}$ | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{7\sqrt{3}i}{120}$ | 0 | 0 | $-\frac{\sqrt{3}}{15}$ |
| | | $-\frac{\sqrt{3}i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{3}i}{120}$ | $\frac{\sqrt{3}}{15}$ | 0 |
| | | 0 | $\frac{\sqrt{3}}{20}$ | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | $\frac{7\sqrt{3}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{15}$ |
| | | $-\frac{\sqrt{3}}{20}$ | 0 | 0 | $\frac{\sqrt{5}i}{40}$ | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | $-\frac{7\sqrt{3}i}{120}$ | 0 | 0 | $-\frac{\sqrt{3}i}{15}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{5}}{40}$ | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{120}$ | 0 | $\frac{\sqrt{3}i}{120}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}}{120}$ | 0 | $\frac{\sqrt{3}i}{120}$ | 0 | 0 | 0 |
| 579 | symmetry | $\frac{y(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(1,-1;a)}(A, 3)$ | 0 | $\frac{\sqrt{105}}{84}$ | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{210}$ |
| | | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}i}{280}$ | 0 | 0 | $-\frac{\sqrt{105}i}{210}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}}{84}$ | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | $\frac{\sqrt{35}i}{840}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{60}$ |
| | | $\frac{\sqrt{35}}{84}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{840}$ | 0 | 0 | $\frac{\sqrt{35}i}{60}$ |
| | | $\frac{\sqrt{35}i}{60}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $-\frac{5\sqrt{35}}{168}$ | 0 | $-\frac{\sqrt{35}i}{60}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{60}$ | $-\frac{5\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $\frac{5\sqrt{35}}{168}$ | 0 | $-\frac{\sqrt{35}i}{60}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | $\frac{\sqrt{35}i}{120}$ | 0 | $-\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{35}i}{120}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | $\frac{\sqrt{35}i}{120}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{120}$ |
| | | 0 | $-\frac{\sqrt{35}i}{60}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}i}{60}$ | 0 | 0 | $-\frac{5\sqrt{35}}{168}$ |
| | | $-\frac{\sqrt{35}i}{60}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{60}$ | $\frac{5\sqrt{35}}{168}$ | 0 |
| 580 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|-------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|-------------------------|--|
| | $\mathbb{Q}_5^{(1,-1;a)}(A,4)$ | 0 | $-\frac{\sqrt{3}}{20}$ | $\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{10}$ | |
| | | $\frac{\sqrt{3}}{20}$ | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{40}$ | 0 | 0 | $\frac{\sqrt{3}i}{10}$ | |
| | | 0 | $\frac{1}{20}$ | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | $\frac{7i}{40}$ | 0 | 0 | 0 | 0 | $\frac{i}{20}$ | |
| | | $-\frac{1}{20}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | $-\frac{7i}{40}$ | 0 | 0 | $\frac{i}{20}$ | |
| | | $\frac{i}{20}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3}{40}$ | 0 | $\frac{i}{20}$ | 0 | |
| | | 0 | $-\frac{i}{20}$ | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | $\frac{3}{40}$ | 0 | $\frac{i}{20}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{i}{8}$ | 0 | $-\frac{1}{10}$ | $\frac{i}{8}$ | |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | $\frac{i}{8}$ | 0 | $\frac{1}{10}$ | 0 | 0 | $-\frac{i}{8}$ | |
| | | 0 | $-\frac{i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{i}{20}$ | 0 | 0 | $-\frac{3}{40}$ | |
| | | $-\frac{i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | $-\frac{i}{20}$ | $\frac{3}{40}$ | 0 | |
| 581 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(1,-1;a)}(A,5)$ | 0 | $-\frac{1}{10}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{10}$ | 0 | 0 | 0 | 0 | 0 | |
| | | $\frac{1}{10}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{i}{10}$ | 0 | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{3}}{10}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{30}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{15}$ | |
| | | $\frac{\sqrt{3}}{10}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{30}$ | 0 | 0 | $\frac{\sqrt{3}i}{15}$ | 0 | |
| | | $-\frac{\sqrt{3}i}{15}$ | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{60}$ | 0 | $-\frac{\sqrt{3}i}{20}$ | 0 | |
| | | 0 | $\frac{\sqrt{3}i}{15}$ | $-\frac{\sqrt{5}}{20}$ | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | $-\frac{\sqrt{3}}{60}$ | 0 | $-\frac{\sqrt{3}i}{20}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | $-\frac{\sqrt{5}}{10}$ | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | $\frac{\sqrt{3}i}{20}$ | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ | |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | $\frac{\sqrt{5}}{10}$ | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | $\frac{\sqrt{3}i}{20}$ | 0 | 0 | 0 | $\frac{\sqrt{3}i}{20}$ | |
| | | 0 | $-\frac{\sqrt{3}i}{15}$ | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{\sqrt{3}i}{20}$ | 0 | $-\frac{\sqrt{3}}{60}$ | |
| | | $-\frac{\sqrt{3}i}{15}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ | $\frac{\sqrt{3}}{60}$ | |
| 582 | symmetry | $\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|---------------------------|--|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|--|
| $\mathbb{Q}_5^{(1,-1;a)}(B,1)$ | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | 0 | $-\frac{\sqrt{105}}{210}$ | |
| | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}i}{280}$ | $\frac{\sqrt{105}}{210}$ | 0 | |
| | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{840}$ | 0 | 0 | $-\frac{\sqrt{35}}{60}$ | |
| | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{840}$ | $\frac{\sqrt{35}}{60}$ | 0 | |
| | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{56}$ | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{120}$ | $\frac{\sqrt{35}i}{120}$ | 0 | |
| | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{120}$ | 0 | 0 | $-\frac{\sqrt{35}i}{120}$ | |
| | $-\frac{\sqrt{35}i}{60}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{60}$ | 0 | $-\frac{5\sqrt{35}i}{168}$ | 0 | 0 | |
| | 0 | $\frac{\sqrt{35}i}{60}$ | $-\frac{\sqrt{21}}{42}$ | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{60}$ | 0 | $-\frac{5\sqrt{35}i}{168}$ | 0 | 0 | 0 | |
| | 0 | $\frac{\sqrt{35}}{60}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | $-\frac{\sqrt{35}i}{60}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{35}i}{168}$ | |
| | $-\frac{\sqrt{35}}{60}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{35}i}{60}$ | 0 | 0 | $-\frac{5\sqrt{35}i}{168}$ | 0 | |
| 583 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | | |
| $\mathbb{Q}_5^{(1,-1;a)}(B,2)$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | |
| | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | |
| | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $-\frac{13\sqrt{35}}{840}$ | 0 | $\frac{13\sqrt{35}i}{840}$ | 0 | 0 | |
| | 0 | $-\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $\frac{13\sqrt{35}}{840}$ | 0 | $\frac{13\sqrt{35}i}{840}$ | 0 | 0 | 0 | |
| | 0 | $-\frac{\sqrt{35}}{60}$ | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | $-\frac{5\sqrt{35}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{60}$ | |
| | $\frac{\sqrt{35}}{60}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{5\sqrt{35}i}{168}$ | 0 | 0 | $-\frac{\sqrt{35}i}{60}$ | 0 | |
| | 0 | $\frac{\sqrt{35}i}{60}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{5\sqrt{35}i}{168}$ | 0 | 0 | $-\frac{\sqrt{35}}{60}$ | |
| | $\frac{\sqrt{35}i}{60}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{35}i}{168}$ | $\frac{\sqrt{35}}{60}$ | 0 | |
| | 0 | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{120}$ | 0 | $\frac{\sqrt{35}}{120}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | |
| | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | $\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{120}$ | 0 | $-\frac{\sqrt{35}}{120}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | |
| 584 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------|--|---|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------|-------------------------|--------------------------|--------------------------|------------------------|-----------------------|--|---|------------------------|---|------------------------|--------------------------|--------------------------|---|---|---|-------------------------|-------------------------|--------------------------|---|-----------------------|------------------------|---|-------------------------|---|--------------------------|-------------------------|---|---|------------------------|---|--------------------------|------------------------|------------------------|---|-----------------|----------------|---|------------------------|-------------------------|-------------------------|---|-------------------------|---|---------------|------------------|----------------|---|-----------------|----------------|----------------|-------------------------|---|-------------------------|--------------------------|------------------------|---|----------------|---|----------------|-----------------|----------------|---|---|-----------------|-------------------------|---|---|------------------------|--------------------------|---|------------------|-----------------|---|---------------|---------------|----------------|----------------|---|---|--------------------------|-------------------------|---|---|-------------------------|-----------------|-----------------|----------------|---|----------------|----------------|-----------------|----------------|---|---|--------------------------|-------------------------|---|---|---|----------------|------------------|------------------|---|----------------|----------------|----------------|---|---|-------------------------|-------------------------|---|---|-----------------|---|------------------|-----------------|-----------------|---|---|----------------|---|-------------------------|---|-------------------------|---|--------------------------|----------------|---------------|---|---------------|-----------------|------------------|-----------------|---|-------------------------|---|------------------------|---|--------------------------|---|---------------|-----------------|----------------|---|------------------|----------------|
| $\mathbb{Q}_5^{(1,-1;a)}(B,3)$ | <table><tr><td>0</td><td>$\frac{\sqrt{3}i}{20}$</td><td>0</td><td>0</td><td>$-\frac{3\sqrt{5}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{3}i}{40}$</td><td>0</td><td>0</td><td>$\frac{\sqrt{3}}{10}$</td></tr><tr><td>$\frac{\sqrt{3}i}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{3\sqrt{5}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{3}i}{40}$</td><td>$-\frac{\sqrt{3}}{10}$</td><td>0</td></tr><tr><td>0</td><td>$\frac{i}{20}$</td><td>0</td><td>0</td><td>$\frac{\sqrt{15}i}{40}$</td><td>0</td><td>0</td><td>$-\frac{\sqrt{15}}{20}$</td><td>0</td><td>0</td><td>$-\frac{7i}{40}$</td><td>0</td><td>0</td><td>$-\frac{1}{20}$</td></tr><tr><td>$\frac{i}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{15}i}{40}$</td><td>$\frac{\sqrt{15}}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{7i}{40}$</td><td>$\frac{1}{20}$</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{15}}{40}$</td><td>$-\frac{\sqrt{15}i}{40}$</td><td>0</td><td>0</td><td>$-\frac{i}{10}$</td><td>0</td><td>$\frac{1}{8}$</td><td>$\frac{i}{8}$</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{15}}{40}$</td><td>0</td><td>0</td><td>$\frac{\sqrt{15}i}{40}$</td><td>$-\frac{i}{10}$</td><td>0</td><td>$-\frac{1}{8}$</td><td>0</td><td>0</td><td>$-\frac{i}{8}$</td></tr><tr><td>$-\frac{i}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{15}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>$\frac{1}{20}$</td><td>0</td><td>$-\frac{3i}{40}$</td><td>0</td><td>0</td></tr><tr><td>0</td><td>$\frac{i}{20}$</td><td>0</td><td>0</td><td>$\frac{\sqrt{15}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>$-\frac{1}{20}$</td><td>0</td><td>$-\frac{3i}{40}$</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>$\frac{1}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{15}i}{40}$</td><td>$\frac{i}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{3i}{40}$</td></tr><tr><td>$-\frac{1}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{15}i}{40}$</td><td>0</td><td>0</td><td>$-\frac{i}{20}$</td><td>0</td><td>0</td><td>$-\frac{3i}{40}$</td><td>0</td></tr></table> | | | | | | | | | | | | | | | 0 | $\frac{\sqrt{3}i}{20}$ | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{40}$ | 0 | 0 | $\frac{\sqrt{3}}{10}$ | $\frac{\sqrt{3}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{40}$ | $-\frac{\sqrt{3}}{10}$ | 0 | 0 | $\frac{i}{20}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | $-\frac{7i}{40}$ | 0 | 0 | $-\frac{1}{20}$ | $\frac{i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | $\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | $\frac{7i}{40}$ | $\frac{1}{20}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{i}{10}$ | 0 | $\frac{1}{8}$ | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | $-\frac{i}{10}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | $-\frac{i}{8}$ | $-\frac{i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $\frac{1}{20}$ | 0 | $-\frac{3i}{40}$ | 0 | 0 | 0 | $\frac{i}{20}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $-\frac{1}{20}$ | 0 | $-\frac{3i}{40}$ | 0 | 0 | 0 | 0 | $\frac{1}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | $\frac{i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{3i}{40}$ | $-\frac{1}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{i}{20}$ | 0 | 0 | $-\frac{3i}{40}$ | 0 |
| | 0 | $\frac{\sqrt{3}i}{20}$ | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{40}$ | 0 | 0 | $\frac{\sqrt{3}}{10}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $\frac{\sqrt{3}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{40}$ | $-\frac{\sqrt{3}}{10}$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | $\frac{i}{20}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | $-\frac{7i}{40}$ | 0 | 0 | $-\frac{1}{20}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $\frac{i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | $\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | $\frac{7i}{40}$ | $\frac{1}{20}$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{i}{10}$ | 0 | $\frac{1}{8}$ | $\frac{i}{8}$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | $-\frac{i}{10}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | $-\frac{i}{8}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $-\frac{i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $\frac{1}{20}$ | 0 | $-\frac{3i}{40}$ | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | $\frac{i}{20}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $-\frac{1}{20}$ | 0 | $-\frac{3i}{40}$ | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | $\frac{1}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | $\frac{i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{3i}{40}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $-\frac{1}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{i}{20}$ | 0 | 0 | $-\frac{3i}{40}$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 585 | symmetry | $\frac{3\sqrt{35}z\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $\mathbb{Q}_5^{(1,-1;a)}(B,4)$ | <table><tr><td>0</td><td>0</td><td>0</td><td>$\frac{3\sqrt{5}}{40}$</td><td>0</td><td>$-\frac{3\sqrt{5}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>$-\frac{3\sqrt{3}}{40}$</td><td>0</td><td>$-\frac{3\sqrt{3}i}{40}$</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>$-\frac{3\sqrt{5}}{40}$</td><td>0</td><td>$-\frac{3\sqrt{5}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>$\frac{3\sqrt{3}}{40}$</td><td>0</td><td>$-\frac{3\sqrt{3}i}{40}$</td><td>0</td><td>0</td><td>0</td></tr><tr><td>$-\frac{i}{10}$</td><td>0</td><td>0</td><td>$\frac{\sqrt{15}}{40}$</td><td>0</td><td>$\frac{\sqrt{15}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>$\frac{1}{8}$</td><td>0</td><td>$-\frac{i}{8}$</td><td>0</td><td>0</td></tr><tr><td>0</td><td>$\frac{i}{10}$</td><td>$-\frac{\sqrt{15}}{40}$</td><td>0</td><td>$\frac{\sqrt{15}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>$-\frac{1}{8}$</td><td>0</td><td>$-\frac{i}{8}$</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>$-\frac{1}{20}$</td><td>$\frac{\sqrt{15}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{3i}{40}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{i}{20}$</td></tr><tr><td>$\frac{1}{20}$</td><td>0</td><td>0</td><td>$-\frac{\sqrt{15}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{3i}{40}$</td><td>0</td><td>0</td><td>$\frac{i}{20}$</td><td>0</td></tr><tr><td>0</td><td>$\frac{i}{20}$</td><td>0</td><td>0</td><td>$-\frac{\sqrt{15}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{3i}{40}$</td><td>0</td><td>0</td><td>$\frac{1}{20}$</td></tr><tr><td>$\frac{i}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{15}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{3i}{40}$</td><td>$-\frac{1}{20}$</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{15}i}{40}$</td><td>0</td><td>$-\frac{\sqrt{15}}{40}$</td><td>0</td><td>0</td><td>0</td><td>$\frac{i}{8}$</td><td>0</td><td>$\frac{1}{8}$</td><td>$-\frac{i}{10}$</td><td>0</td></tr><tr><td>0</td><td>0</td><td>$\frac{\sqrt{15}i}{40}$</td><td>0</td><td>$\frac{\sqrt{15}}{40}$</td><td>0</td><td>0</td><td>0</td><td>$\frac{i}{8}$</td><td>0</td><td>$-\frac{1}{8}$</td><td>0</td><td>0</td><td>$\frac{i}{10}$</td></tr></table> | | | | | | | | | | | | | | | 0 | 0 | 0 | $\frac{3\sqrt{5}}{40}$ | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | $-\frac{3\sqrt{3}}{40}$ | 0 | $-\frac{3\sqrt{3}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}}{40}$ | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | $\frac{3\sqrt{3}}{40}$ | 0 | $-\frac{3\sqrt{3}i}{40}$ | 0 | 0 | 0 | $-\frac{i}{10}$ | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | $\frac{i}{10}$ | $-\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{1}{20}$ | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3i}{40}$ | 0 | 0 | 0 | 0 | $\frac{i}{20}$ | $\frac{1}{20}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3i}{40}$ | 0 | 0 | $\frac{i}{20}$ | 0 | 0 | $\frac{i}{20}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3i}{40}$ | 0 | 0 | $\frac{1}{20}$ | $\frac{i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3i}{40}$ | $-\frac{1}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | $\frac{1}{8}$ | $-\frac{i}{10}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | $\frac{i}{10}$ |
| | 0 | 0 | 0 | $\frac{3\sqrt{5}}{40}$ | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | $-\frac{3\sqrt{3}}{40}$ | 0 | $-\frac{3\sqrt{3}i}{40}$ | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | 0 | $-\frac{3\sqrt{5}}{40}$ | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | $\frac{3\sqrt{3}}{40}$ | 0 | $-\frac{3\sqrt{3}i}{40}$ | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $-\frac{i}{10}$ | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | $\frac{i}{10}$ | $-\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | $-\frac{1}{20}$ | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3i}{40}$ | 0 | 0 | 0 | 0 | $\frac{i}{20}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $\frac{1}{20}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3i}{40}$ | 0 | 0 | $\frac{i}{20}$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | $\frac{i}{20}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3i}{40}$ | 0 | 0 | $\frac{1}{20}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | $\frac{i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3i}{40}$ | $-\frac{1}{20}$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | $\frac{1}{8}$ | $-\frac{i}{10}$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | $\frac{i}{10}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 586 | symmetry | $\frac{\sqrt{105}x(y-z)(y+z)\left(2x^2-y^2-z^2\right)}{4}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|-------------------------|-------------------------|-------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|-------------------------|
| | $\mathbb{Q}_5^{(1,-1;a)}(B, 5)$ | 0 | $-\frac{i}{10}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{i}{10}$ | 0 | 0 | 0 |
| | | $-\frac{i}{10}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{10}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{3}i}{10}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{30}$ | 0 | 0 | $\frac{\sqrt{3}}{15}$ |
| | | $\frac{\sqrt{3}i}{10}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{30}$ | $-\frac{\sqrt{3}}{15}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{10}$ | 0 | $-\frac{\sqrt{5}}{20}$ | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{20}$ | $\frac{\sqrt{3}i}{20}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{10}$ | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | $\frac{\sqrt{3}}{20}$ | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ |
| | | $-\frac{\sqrt{3}i}{15}$ | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{20}$ | 0 | $-\frac{\sqrt{3}i}{60}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{3}i}{15}$ | $\frac{\sqrt{5}}{20}$ | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}}{20}$ | 0 | $-\frac{\sqrt{3}i}{60}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{3}}{15}$ | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | $-\frac{\sqrt{3}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{60}$ |
| | | $\frac{\sqrt{3}}{15}$ | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | $\frac{\sqrt{3}i}{20}$ | 0 | 0 | $\frac{\sqrt{3}i}{60}$ | 0 |
| 587 | symmetry | $-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(1,-1;a)}(B, 6)$ | $\frac{i}{5}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{10}$ | 0 | $\frac{i}{10}$ | 0 | 0 |
| | | 0 | $-\frac{i}{5}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{1}{10}$ | 0 | $\frac{i}{10}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{30}$ | 0 | $-\frac{\sqrt{3}i}{30}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{30}$ | 0 | $-\frac{\sqrt{3}i}{30}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{3}}{15}$ | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | $-\frac{\sqrt{3}i}{60}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{20}$ |
| | | $\frac{\sqrt{3}}{15}$ | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | $\frac{\sqrt{3}i}{60}$ | 0 | 0 | $\frac{\sqrt{3}i}{20}$ | 0 |
| | | 0 | $-\frac{\sqrt{3}i}{15}$ | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{\sqrt{3}i}{60}$ | 0 | 0 | $-\frac{\sqrt{3}}{20}$ |
| | | $-\frac{\sqrt{3}i}{15}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | $\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{60}$ | $\frac{\sqrt{3}}{20}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | $-\frac{\sqrt{5}}{20}$ | $-\frac{\sqrt{5}i}{10}$ | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ | 0 | $\frac{\sqrt{3}}{20}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{\sqrt{5}i}{10}$ | $-\frac{\sqrt{3}i}{20}$ | 0 | $-\frac{\sqrt{3}}{20}$ | 0 | 0 | 0 |
| 588 | symmetry | y | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------|--------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{Q}_1^{(1,0;a)}(A)$ | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{140}$ | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{280}$ | 0 | 0 | $-\frac{3\sqrt{70}i}{140}$ | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ |
| | | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| | | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 |
| 589 | symmetry | x | | | | | | | | | | | | |
| | $\mathbb{Q}_1^{(1,0;a)}(B, 1)$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{280}$ | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | $-\frac{3\sqrt{70}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | $\frac{\sqrt{14}}{28}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | $-\frac{\sqrt{14}}{28}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | $\frac{\sqrt{14}i}{28}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{14}i}{28}$ | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{14}}{28}$ | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 |
| 590 | symmetry | z | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---|-------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{Q}_1^{(1,0;a)}(B, 2)$ | 0 | 0 | 0 | $\frac{3\sqrt{70}}{280}$ | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{210}}{280}$ | 0 | $-\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{210}}{280}$ | 0 | $-\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 |
| 591 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(1,0;a)}(A, 1)$ | 0 | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | $\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{i}{12}$ | 0 | $\frac{1}{12}$ | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{i}{12}$ | 0 | $-\frac{1}{12}$ | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | $\frac{1}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{i}{24}$ | $-\frac{1}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | $\frac{\sqrt{15}}{24}$ | 0 | 0 |
| | | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | 0 | $-\frac{i}{24}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{1}{24}$ | 0 | $\frac{i}{24}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| | | 0 | 0 | $\frac{1}{24}$ | 0 | $\frac{i}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| 592 | symmetry | $-\frac{y\left(3x^2-2y^2+3z^2\right)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-----------------------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|--------------------------|-------------------------|----------------|----------------|--------------------------|-------------------------|
| $\mathbb{Q}_3^{(1,0;a)}(A, 2)$ | | 0 | 0 | $\frac{7\sqrt{5}i}{80}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | $-\frac{\sqrt{3}i}{16}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{7\sqrt{5}i}{80}$ | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | $\frac{\sqrt{3}i}{16}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{240}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | $-\frac{i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{240}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{i}{16}$ | 0 | 0 | $-\frac{i}{8}$ | 0 |
| | | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 |
| | | 0 | $-\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{240}$ | 0 | 0 | $-\frac{\sqrt{15}i}{240}$ | 0 | 0 | $-\frac{3i}{16}$ | 0 | 0 | $-\frac{3i}{16}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}i}{240}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{240}$ | $-\frac{3i}{16}$ | 0 | 0 | 0 | 0 | $\frac{3i}{16}$ |
| | | 0 | $-\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 |
| | | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 |
| 593 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| $\mathbb{Q}_3^{(1,0;a)}(A, 3)$ | | 0 | 0 | $\frac{\sqrt{3}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ | $-\frac{\sqrt{5}i}{16}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{16}$ | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | $\frac{\sqrt{5}i}{16}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{5i}{48}$ | 0 | 0 | 0 | 0 | $\frac{i}{24}$ | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ |
| | | 0 | 0 | 0 | $\frac{5i}{48}$ | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{1}{6}$ | 0 | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | $-\frac{1}{6}$ | 0 | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{i}{48}$ | 0 | $\frac{1}{6}$ | $\frac{i}{48}$ | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 |
| | | 0 | 0 | $\frac{i}{48}$ | 0 | $-\frac{1}{6}$ | 0 | 0 | $-\frac{i}{48}$ | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{24}$ | $-\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 594 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|----------------------------------|----------------|----------------------------|---------------------------|----------------------------|----------------------------|--------------------------|---------------------------|------------------------|-----------------------|-------------------------|------------------------|------------------|-----------------|
| | $\mathbb{Q}_3^{(1,0;a)}(B, 1)$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{5}i}{80}$ | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | 0 | $-\frac{\sqrt{3}i}{16}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{7\sqrt{5}i}{80}$ | $\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{16}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{240}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{i}{16}$ | 0 | 0 | $\frac{1}{8}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{240}$ | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{16}$ | $-\frac{1}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{240}$ | $\frac{\sqrt{15}i}{240}$ | 0 | 0 | 0 | 0 | $-\frac{3}{16}$ | $-\frac{3i}{16}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{240}$ | 0 | 0 | $-\frac{\sqrt{15}i}{240}$ | 0 | 0 | $\frac{3}{16}$ | 0 | 0 | $\frac{3i}{16}$ |
| | | $-\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{i}{8}$ | $-\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{1}{8}$ | $-\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 |
| 595 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(1,0;a)}(B, 2)$ | 0 | 0 | 0 | $\frac{3\sqrt{5}}{80}$ | 0 | $-\frac{3\sqrt{5}i}{80}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{16}$ | 0 | $\frac{\sqrt{3}i}{16}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{5}}{80}$ | 0 | $-\frac{3\sqrt{5}i}{80}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}}{16}$ | 0 | $\frac{\sqrt{3}i}{16}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{11\sqrt{15}}{240}$ | 0 | $\frac{11\sqrt{15}i}{240}$ | 0 | 0 | 0 | $\frac{1}{16}$ | 0 | $-\frac{i}{16}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{11\sqrt{15}}{240}$ | 0 | $\frac{11\sqrt{15}i}{240}$ | 0 | 0 | 0 | $-\frac{1}{16}$ | 0 | $-\frac{i}{16}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ |
| | | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 |
| | | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ |
| | | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{240}$ | 0 | $\frac{\sqrt{15}}{240}$ | 0 | 0 | 0 | $-\frac{3i}{16}$ | 0 | $-\frac{3}{16}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{240}$ | 0 | $-\frac{\sqrt{15}}{240}$ | 0 | 0 | 0 | $-\frac{3i}{16}$ | 0 | $\frac{3}{16}$ | 0 | 0 | 0 |
| 596 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-------------------------------------|--------------------------|------------------------|-----------------------|------------------------|-------------------------|-----------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|
| | $\mathbb{Q}_3^{(1,0;a)}(B, 3)$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{16}$ | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | $\frac{\sqrt{5}i}{16}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{16}$ | $\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{16}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{5i}{48}$ | 0 | 0 | $-\frac{1}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | $\frac{\sqrt{15}}{24}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{5i}{48}$ | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | $-\frac{\sqrt{15}}{24}$ | 0 |
| | | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | $\frac{1}{48}$ | $\frac{i}{48}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | $\frac{\sqrt{15}i}{48}$ | 0 |
| | | 0 | 0 | $\frac{i}{6}$ | 0 | $-\frac{1}{48}$ | 0 | 0 | $-\frac{i}{48}$ | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{1}{24}$ | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | $-\frac{1}{24}$ | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{24}$ | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 597 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(1,0;a)}(B, 4)$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{48}$ | 0 | $\frac{\sqrt{3}i}{48}$ | 0 | 0 | 0 | $-\frac{\sqrt{5}}{16}$ | 0 | $\frac{\sqrt{5}i}{16}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{3}}{48}$ | 0 | $\frac{\sqrt{3}i}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{5}}{16}$ | 0 | $\frac{\sqrt{5}i}{16}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{7}{48}$ | 0 | $\frac{7i}{48}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 |
| | | 0 | 0 | $\frac{7}{48}$ | 0 | $\frac{7i}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{24}$ | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | $-\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{i}{48}$ | 0 | $\frac{1}{48}$ | $\frac{i}{6}$ | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 |
| | | 0 | 0 | $\frac{i}{48}$ | 0 | $-\frac{1}{48}$ | 0 | 0 | $-\frac{i}{6}$ | $-\frac{\sqrt{15}i}{48}$ | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 |
| 598 | symmetry | $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|-------------------------|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|
| | $\mathbb{Q}_5^{(1,0;a)}(A, 1)$ | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | $\frac{\sqrt{3}i}{40}$ | 0 | $-\frac{\sqrt{3}}{40}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | $\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | $\frac{\sqrt{3}i}{40}$ | 0 | $\frac{\sqrt{3}}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | $\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | $\frac{1}{8}$ | $\frac{i}{5}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | $-\frac{i}{5}$ |
| | | 0 | $\frac{i}{10}$ | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{10}$ | 0 | 0 | $\frac{1}{10}$ |
| | | $\frac{i}{10}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{10}$ | $-\frac{1}{10}$ | 0 |
| | | 0 | $\frac{1}{10}$ | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | $-\frac{i}{10}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{10}$ |
| | | $-\frac{1}{10}$ | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{10}$ | 0 | 0 | $-\frac{i}{10}$ | 0 |
| | | $-\frac{i}{5}$ | 0 | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{i}{5}$ | $\frac{\sqrt{15}}{30}$ | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 599 | symmetry | $\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(1,0;a)}(A, 2)$ | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | $\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | $-\frac{7i}{40}$ | 0 | $-\frac{7}{40}$ | $-\frac{i}{10}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | $-\frac{7i}{40}$ | 0 | $\frac{7}{40}$ | 0 | 0 | $\frac{i}{10}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{120}$ | 0 | $-\frac{\sqrt{5}}{120}$ | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | $-\frac{\sqrt{3}i}{40}$ | 0 | $\frac{\sqrt{3}}{40}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{120}$ | 0 | $\frac{\sqrt{5}}{120}$ | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | $-\frac{\sqrt{3}i}{40}$ | 0 | $-\frac{\sqrt{3}}{40}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{3}i}{10}$ | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | $-\frac{\sqrt{5}}{15}$ | 0 | 0 | $\frac{\sqrt{3}i}{30}$ | 0 | 0 | $\frac{\sqrt{3}}{30}$ |
| | | $-\frac{\sqrt{3}i}{10}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | $\frac{\sqrt{5}}{15}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{30}$ | $-\frac{\sqrt{3}}{30}$ | 0 |
| | | 0 | $\frac{\sqrt{3}}{10}$ | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{15}$ | $\frac{\sqrt{3}i}{30}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{30}$ |
| | | $-\frac{\sqrt{3}}{10}$ | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | $\frac{\sqrt{5}i}{15}$ | 0 | 0 | $-\frac{\sqrt{3}i}{30}$ | 0 | 0 | $\frac{\sqrt{3}i}{30}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}}{30}$ | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}}{15}$ | 0 | $-\frac{\sqrt{3}i}{15}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{5}}{30}$ | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{15}$ | 0 | $-\frac{\sqrt{3}i}{15}$ | 0 | 0 | 0 |
| 600 | symmetry | $\frac{y(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---|-------------------------|----------------------------|-----------------------------|--------------------------|--------------------------|---------------------------|---------------------------|-----------------------------|----------------------------|-------------------------|--------------------------|-----------------------------|-----------------------------|
| | $\mathbb{Q}_5^{(1,0;a)}(A, 3)$ | 0 | 0 | $\frac{\sqrt{7}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{7}i}{112}$ | $-\frac{3\sqrt{105}i}{560}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{80}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | 0 | $\frac{3\sqrt{105}i}{560}$ | 0 | 0 | $-\frac{\sqrt{105}i}{80}$ | 0 |
| | | 0 | 0 | $\frac{11\sqrt{21}i}{336}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{48}$ | $-\frac{17\sqrt{35}i}{560}$ | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{35}i}{560}$ |
| | | 0 | 0 | 0 | $-\frac{11\sqrt{21}i}{336}$ | 0 | 0 | $-\frac{\sqrt{21}i}{48}$ | 0 | 0 | $\frac{17\sqrt{35}i}{560}$ | 0 | 0 | $-\frac{13\sqrt{35}i}{560}$ | 0 |
| | | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | $\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}i}{280}$ |
| | | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 |
| 601 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(1,0;a)}(A, 4)$ | 0 | $-\frac{\sqrt{3}}{10}$ | $-\frac{3\sqrt{5}i}{80}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{16}$ | $\frac{\sqrt{3}i}{80}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{80}$ |
| | | $\frac{\sqrt{3}}{10}$ | 0 | 0 | $\frac{3\sqrt{5}i}{80}$ | 0 | 0 | $-\frac{\sqrt{5}i}{16}$ | 0 | 0 | $-\frac{\sqrt{3}i}{80}$ | 0 | 0 | $\frac{\sqrt{3}i}{80}$ | 0 |
| | | 0 | $\frac{1}{10}$ | $\frac{7\sqrt{15}i}{240}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{240}$ | $\frac{3i}{80}$ | 0 | 0 | 0 | 0 | $\frac{3i}{80}$ |
| | | $-\frac{1}{10}$ | 0 | 0 | $-\frac{7\sqrt{15}i}{240}$ | 0 | 0 | $\frac{\sqrt{15}i}{240}$ | 0 | 0 | $-\frac{3i}{80}$ | 0 | 0 | $\frac{3i}{80}$ | 0 |
| | | $\frac{i}{10}$ | 0 | 0 | $\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{10}$ | 0 | $\frac{i}{10}$ | 0 | 0 |
| | | 0 | $-\frac{i}{10}$ | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{10}$ | 0 | $\frac{i}{10}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | $-\frac{1}{5}$ | $-\frac{i}{8}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | $-\frac{i}{8}$ | 0 | $\frac{1}{5}$ | 0 | 0 | $\frac{i}{8}$ |
| | | 0 | $-\frac{i}{10}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | $\frac{i}{10}$ | 0 | 0 | $\frac{1}{10}$ |
| | | $-\frac{i}{10}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | $-\frac{i}{10}$ | $-\frac{1}{10}$ | 0 |
| 602 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|--------------------------------|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | $\mathbb{Q}_5^{(1,0;a)}(A, 5)$ | $\begin{bmatrix} 0 & \frac{1}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & \frac{i}{20} & 0 & 0 & 0 & 0 & \frac{i}{8} \\ -\frac{1}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{24} & 0 & 0 & -\frac{i}{20} & 0 & 0 & \frac{i}{8} & 0 \\ 0 & \frac{\sqrt{3}}{20} & \frac{\sqrt{5}i}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{5}i}{24} & -\frac{\sqrt{3}i}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{120} \\ -\frac{\sqrt{3}}{20} & 0 & 0 & -\frac{\sqrt{5}i}{12} & 0 & 0 & \frac{\sqrt{5}i}{24} & 0 & 0 & \frac{\sqrt{3}i}{15} & 0 & 0 & \frac{\sqrt{3}i}{120} & 0 \\ \frac{\sqrt{3}i}{30} & 0 & 0 & \frac{\sqrt{5}}{60} & 0 & \frac{\sqrt{5}i}{15} & 0 & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{30} & -\frac{\sqrt{5}}{60} & 0 & \frac{\sqrt{5}i}{15} & 0 & 0 & 0 & \frac{\sqrt{3}}{20} & 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{60} & 0 & -\frac{\sqrt{5}}{30} & -\frac{\sqrt{5}i}{60} & 0 & 0 & \frac{\sqrt{3}i}{60} & 0 & 0 & -\frac{\sqrt{3}i}{60} & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{60} & 0 & \frac{\sqrt{5}}{30} & 0 & 0 & \frac{\sqrt{5}i}{60} & \frac{\sqrt{3}i}{60} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} \\ 0 & \frac{\sqrt{3}i}{30} & 0 & 0 & \frac{\sqrt{5}i}{15} & 0 & 0 & \frac{\sqrt{5}}{60} & 0 & 0 & \frac{\sqrt{3}i}{10} & 0 & 0 & \frac{\sqrt{3}}{20} \\ \frac{\sqrt{3}i}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{15} & -\frac{\sqrt{5}}{60} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{10} & -\frac{\sqrt{3}}{20} & 0 \end{bmatrix}$ | | | | | | | | | | | | | | |
| 603 | symmetry | $\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(1,0;a)}(B, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{7}i}{112} & 0 & 0 & \frac{5\sqrt{7}}{112} & 0 & 0 & -\frac{3\sqrt{105}i}{560} & 0 & 0 & -\frac{\sqrt{105}}{80} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{7}i}{112} & -\frac{5\sqrt{7}}{112} & 0 & 0 & 0 & 0 & \frac{3\sqrt{105}i}{560} & \frac{\sqrt{105}}{80} & 0 \\ 0 & 0 & 0 & 0 & \frac{11\sqrt{21}i}{336} & 0 & 0 & -\frac{\sqrt{21}}{48} & 0 & 0 & \frac{17\sqrt{35}i}{560} & 0 & 0 & \frac{13\sqrt{35}}{560} \\ 0 & 0 & 0 & 0 & 0 & -\frac{11\sqrt{21}i}{336} & \frac{\sqrt{21}}{48} & 0 & 0 & 0 & 0 & -\frac{17\sqrt{35}i}{560} & -\frac{13\sqrt{35}}{560} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{21}}{168} & -\frac{\sqrt{21}i}{168} & 0 & 0 & 0 & 0 & \frac{3\sqrt{35}}{280} & \frac{3\sqrt{35}i}{280} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{21}}{168} & 0 & 0 & \frac{\sqrt{21}i}{168} & 0 & 0 & -\frac{3\sqrt{35}}{280} & 0 & 0 & -\frac{3\sqrt{35}i}{280} \\ \frac{\sqrt{35}i}{70} & 0 & 0 & \frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}i}{70} & -\frac{\sqrt{21}}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}}{70} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{35}}{70} & -\frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{35}}{70} & 0 & 0 & \frac{\sqrt{21}i}{21} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{35}i}{70} & 0 & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | | | | | | |
| 604 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---|--------------------------|--------------------------|--------------------------|---------------------------|----------------------------|---------------------------|--------------------------|---------------------------|---------------------------|---------------------------|--------------------------|-------------------------|-------------------------|
| | $\mathbb{Q}_5^{(1,0;a)}(B, 2)$ | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{140}$ | 0 | $\frac{\sqrt{35}i}{140}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{140}$ | 0 | $\frac{\sqrt{35}i}{140}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ |
| | | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{70}$ |
| | | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | $-\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 |
| 605 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(1,0;a)}(B, 3)$ | 0 | $\frac{\sqrt{3}i}{10}$ | 0 | 0 | $\frac{3\sqrt{5}i}{80}$ | 0 | 0 | $\frac{\sqrt{5}}{16}$ | 0 | 0 | $\frac{\sqrt{3}i}{80}$ | 0 | 0 | $\frac{\sqrt{3}}{80}$ |
| | | $\frac{\sqrt{3}i}{10}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}i}{80}$ | $-\frac{\sqrt{5}}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{80}$ | $-\frac{\sqrt{3}}{80}$ | 0 |
| | | 0 | $\frac{i}{10}$ | 0 | 0 | $\frac{7\sqrt{15}i}{240}$ | 0 | 0 | $\frac{\sqrt{15}}{240}$ | 0 | 0 | $-\frac{3i}{80}$ | 0 | 0 | $-\frac{3}{80}$ |
| | | $\frac{i}{10}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{15}i}{240}$ | $-\frac{\sqrt{15}}{240}$ | 0 | 0 | 0 | 0 | $\frac{3i}{80}$ | $\frac{3}{80}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{120}$ | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | $-\frac{i}{5}$ | 0 | $-\frac{1}{8}$ | $-\frac{i}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | $\frac{\sqrt{15}i}{120}$ | $-\frac{i}{5}$ | 0 | $\frac{1}{8}$ | 0 | 0 | $\frac{i}{8}$ |
| | | $-\frac{i}{10}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | $\frac{1}{10}$ | 0 | $\frac{i}{10}$ | 0 | 0 |
| | | 0 | $\frac{i}{10}$ | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | $-\frac{1}{10}$ | 0 | $\frac{i}{10}$ | 0 | 0 | 0 |
| | | 0 | $\frac{1}{10}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | $\frac{i}{10}$ | 0 | 0 | 0 | 0 | $\frac{i}{10}$ |
| | | $-\frac{1}{10}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | $-\frac{i}{10}$ | 0 | 0 | $\frac{i}{10}$ | 0 |
| 606 | symmetry | $\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | $\mathbb{Q}_5^{(1,0;a)}(B, 4)$ | 0 | 0 | 0 | $\frac{\sqrt{5}}{40}$ | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}}{40}$ | 0 | $-\frac{\sqrt{3}i}{40}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{40}$ | 0 | $-\frac{\sqrt{3}i}{40}$ | 0 | 0 | 0 |
| | | $-\frac{i}{5}$ | 0 | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{i}{5}$ | $\frac{\sqrt{15}}{30}$ | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{1}{10}$ | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | $\frac{i}{10}$ | 0 | 0 | 0 | 0 | $\frac{i}{10}$ | 0 |
| | | $\frac{1}{10}$ | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{10}$ | 0 | 0 | $\frac{i}{10}$ | 0 |
| | | 0 | $\frac{i}{10}$ | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{10}$ | 0 | 0 | $\frac{1}{10}$ |
| | | $\frac{i}{10}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{10}$ | $-\frac{1}{10}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | $-\frac{i}{5}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | $\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | $\frac{1}{8}$ | 0 | 0 | $\frac{i}{5}$ |
| 607 | symmetry | $\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_5^{(1,0;a)}(B, 5)$ | 0 | $\frac{i}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{i}{20}$ | 0 | 0 | $-\frac{1}{8}$ |
| | | $\frac{i}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $\frac{i}{20}$ | $\frac{1}{8}$ | 0 |
| | | 0 | $-\frac{\sqrt{3}i}{20}$ | 0 | 0 | $-\frac{\sqrt{5}i}{12}$ | 0 | 0 | $-\frac{\sqrt{5}}{24}$ | 0 | 0 | $-\frac{\sqrt{3}i}{15}$ | 0 | 0 | $\frac{\sqrt{3}}{120}$ |
| | | $-\frac{\sqrt{3}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{12}$ | $\frac{\sqrt{5}}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{15}$ | $-\frac{\sqrt{3}}{120}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | $-\frac{\sqrt{5}}{60}$ | $-\frac{\sqrt{5}i}{60}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{60}$ | $\frac{\sqrt{3}i}{60}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | $\frac{\sqrt{5}}{60}$ | 0 | 0 | $\frac{\sqrt{5}i}{60}$ | 0 | 0 | $\frac{\sqrt{3}}{60}$ | 0 | 0 | $-\frac{\sqrt{3}i}{60}$ |
| | | $\frac{\sqrt{3}i}{30}$ | 0 | 0 | $\frac{\sqrt{5}}{15}$ | 0 | $\frac{\sqrt{5}i}{60}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{10}$ | 0 | $\frac{\sqrt{3}i}{20}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{3}i}{30}$ | $-\frac{\sqrt{5}}{15}$ | 0 | $\frac{\sqrt{5}i}{60}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}}{10}$ | 0 | $\frac{\sqrt{3}i}{20}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{3}}{30}$ | $\frac{\sqrt{5}i}{15}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{60}$ | $-\frac{\sqrt{3}i}{10}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ |
| | | $-\frac{\sqrt{3}}{30}$ | 0 | 0 | $-\frac{\sqrt{5}i}{15}$ | 0 | 0 | $\frac{\sqrt{5}}{60}$ | 0 | 0 | $\frac{\sqrt{3}i}{10}$ | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ | 0 |
| 608 | symmetry | $-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|-------------------------------|------------------------|-------------------------|---------------------------|----------------------------|---------------------------|--------------------------|----------------------------|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{Q}_5^{(1,0;a)}(B,6)$ | $-\frac{i}{10}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | $-\frac{3}{40}$ | 0 | $\frac{3i}{40}$ | 0 | 0 |
| | | 0 | $\frac{i}{10}$ | $\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | $\frac{3}{40}$ | 0 | $\frac{3i}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{5}}{24}$ | 0 | $-\frac{\sqrt{5}i}{24}$ | 0 | 0 | 0 | $\frac{7\sqrt{3}}{120}$ | 0 | $\frac{7\sqrt{3}i}{120}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}}{24}$ | 0 | $-\frac{\sqrt{5}i}{24}$ | 0 | 0 | 0 | $-\frac{7\sqrt{3}}{120}$ | 0 | $\frac{7\sqrt{3}i}{120}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{3}}{30}$ | $\frac{\sqrt{5}i}{60}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{15}$ | $\frac{\sqrt{3}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{10}$ |
| | | $-\frac{\sqrt{3}}{30}$ | 0 | 0 | $-\frac{\sqrt{5}i}{60}$ | 0 | 0 | $\frac{\sqrt{5}i}{15}$ | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ | 0 | 0 | $\frac{\sqrt{3}i}{10}$ | 0 |
| | | 0 | $\frac{\sqrt{3}i}{30}$ | 0 | 0 | $\frac{\sqrt{5}i}{60}$ | 0 | 0 | $\frac{\sqrt{5}}{15}$ | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ | 0 | 0 | $-\frac{\sqrt{3}}{10}$ |
| | | $\frac{\sqrt{3}i}{30}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{60}$ | $-\frac{\sqrt{5}}{15}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{20}$ | $\frac{\sqrt{3}}{10}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{60}$ | 0 | $-\frac{\sqrt{5}}{60}$ | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | $-\frac{\sqrt{3}i}{60}$ | 0 | $\frac{\sqrt{3}}{60}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{60}$ | 0 | $\frac{\sqrt{5}}{60}$ | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | $-\frac{\sqrt{3}i}{60}$ | 0 | $-\frac{\sqrt{3}}{60}$ | 0 | 0 | 0 |
| 609 | symmetry | y | | | | | | | | | | | | | |
| | $\mathbb{Q}_1^{(1,1;a)}(A)$ | 0 | $-\frac{\sqrt{21}}{28}$ | $\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ |
| | | $\frac{\sqrt{21}}{28}$ | 0 | 0 | $-\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{7}}{28}$ | $\frac{\sqrt{105}i}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{\sqrt{105}i}{280}$ | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | $\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 |
| 610 | symmetry | x | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|-------------------------------|-------------------------|-------------------------|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|---------------------------|-------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| | $\mathbb{Q}_1^{(1,1;a)}(B,1)$ | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $-\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | |
| | | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | $\frac{\sqrt{21}}{28}$ | 0 | |
| | | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{\sqrt{105}i}{280}$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | |
| | | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{280}$ | $\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{70}$ | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | |
| 611 | symmetry | z | | | | | | | | | | | | | |
| | $\mathbb{Q}_1^{(1,1;a)}(B,2)$ | 0 | 0 | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | $-\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{56}$ | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{35}}{280}$ | 0 | $-\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}}{280}$ | 0 | $\frac{\sqrt{105}i}{280}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{105}}{280}$ | 0 | $\frac{\sqrt{105}i}{280}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ |
| 612 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|------------------------|---------------------------|----------------------------|---------------------------|--------------------------|----------------------------|----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | $\mathbb{Q}_3^{(1,1;a)}(A, 1)$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | $\frac{\sqrt{35}}{70}$ | $-\frac{\sqrt{35}i}{35}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{35}i}{35}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{7}}{28}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{105}i}{70}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{120}$ | 0 | 0 | $-\frac{\sqrt{105}}{120}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{120}$ | $\frac{\sqrt{105}}{120}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | $-\frac{\sqrt{105}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{120}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{120}$ | 0 | 0 | $-\frac{\sqrt{105}i}{120}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{120}$ | 0 | $-\frac{\sqrt{105}i}{120}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{120}$ | 0 | $-\frac{\sqrt{105}i}{120}$ | 0 | 0 | 0 |
| 613 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(1,1;a)}(A, 2)$ | 0 | $\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{35}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{21}i}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ |
| | | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{21}i}{112}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{7}}{42}$ | $\frac{\sqrt{105}i}{336}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | $-\frac{\sqrt{7}i}{336}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{24}$ |
| | | $\frac{\sqrt{7}}{42}$ | 0 | 0 | $-\frac{\sqrt{105}i}{336}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{7}i}{336}$ | 0 | 0 | $-\frac{\sqrt{7}i}{24}$ | 0 |
| | | $-\frac{\sqrt{7}i}{24}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{84}$ | 0 | $\frac{\sqrt{7}i}{24}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{24}$ | $-\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | $\frac{5\sqrt{7}}{84}$ | 0 | $\frac{\sqrt{7}i}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{112}$ | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | 0 | 0 | $-\frac{\sqrt{7}i}{48}$ | 0 | $-\frac{\sqrt{7}}{21}$ | $-\frac{\sqrt{7}i}{48}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}i}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{112}$ | $-\frac{\sqrt{7}i}{48}$ | 0 | $\frac{\sqrt{7}}{21}$ | 0 | 0 | $\frac{\sqrt{7}i}{48}$ |
| | | 0 | $\frac{\sqrt{7}i}{24}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{24}$ | 0 | 0 | $-\frac{5\sqrt{7}}{84}$ |
| | | $\frac{\sqrt{7}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{24}$ | $\frac{5\sqrt{7}}{84}$ | 0 |
| 614 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------------|----------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|--------------------------|---------------------------|----------------------------|--|
| | $\mathbb{Q}_3^{(1,1;a)}(A, 3)$ | 0 | $-\frac{\sqrt{35}}{70}$ | $\frac{3\sqrt{21}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{560}$ | 0 | 0 | 0 | $-\frac{3\sqrt{35}i}{140}$ | |
| | | $\frac{\sqrt{35}}{70}$ | 0 | 0 | $-\frac{3\sqrt{21}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{560}$ | 0 | 0 | $-\frac{3\sqrt{35}i}{140}$ | |
| | | 0 | $-\frac{\sqrt{105}}{70}$ | $\frac{3\sqrt{7}i}{112}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | $\frac{5\sqrt{105}i}{336}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{120}$ | |
| | | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{112}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | 0 | 0 | $-\frac{\sqrt{105}i}{120}$ | |
| | | $\frac{\sqrt{105}i}{120}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{420}$ | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{105}i}{120}$ | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{420}$ | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{5\sqrt{7}i}{112}$ | 0 | $-\frac{\sqrt{7}}{14}$ | $\frac{5\sqrt{7}i}{112}$ | 0 | 0 | $-\frac{\sqrt{105}i}{80}$ | 0 | 0 | $\frac{\sqrt{105}i}{80}$ | |
| | | 0 | 0 | $\frac{5\sqrt{7}i}{112}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{5\sqrt{7}i}{112}$ | $-\frac{\sqrt{105}i}{80}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{80}$ | |
| | | 0 | $\frac{\sqrt{105}i}{120}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{420}$ | |
| | | $\frac{\sqrt{105}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{420}$ | |
| 615 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(1,1;a)}(B, 1)$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{21}i}{112}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | |
| | | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{21}i}{112}$ | $-\frac{\sqrt{21}}{84}$ | |
| | | 0 | $-\frac{\sqrt{7}i}{42}$ | 0 | 0 | $\frac{\sqrt{105}i}{336}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{\sqrt{7}i}{336}$ | 0 | $\frac{\sqrt{7}}{24}$ | |
| | | $-\frac{\sqrt{7}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{336}$ | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{336}$ | $-\frac{\sqrt{7}}{24}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | $\frac{\sqrt{105}i}{112}$ | 0 | 0 | $-\frac{\sqrt{7}i}{21}$ | 0 | $-\frac{\sqrt{7}}{48}$ | $-\frac{\sqrt{7}i}{48}$ | |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{112}$ | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | $-\frac{\sqrt{7}i}{21}$ | 0 | $\frac{\sqrt{7}}{48}$ | 0 | $\frac{\sqrt{7}i}{48}$ | |
| | | $\frac{\sqrt{7}i}{24}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{24}$ | 0 | $-\frac{5\sqrt{7}i}{84}$ | 0 | |
| | | 0 | $-\frac{\sqrt{7}i}{24}$ | $\frac{\sqrt{105}}{84}$ | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{24}$ | 0 | $-\frac{5\sqrt{7}i}{84}$ | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{7}}{24}$ | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | $\frac{\sqrt{7}i}{24}$ | 0 | 0 | 0 | $-\frac{5\sqrt{7}i}{84}$ | |
| | | $\frac{\sqrt{7}}{24}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{7}i}{24}$ | 0 | 0 | $-\frac{5\sqrt{7}i}{84}$ | |
| 616 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|----------------------------------|----------------------------|----------------------------|----------------------------|---------------------------|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-----------------------------|----------------------------|--------------------------|---------------------------|
| | $\mathbb{Q}_3^{(1,1;a)}(B, 2)$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{112}$ | 0 | $-\frac{\sqrt{35}i}{112}$ | 0 | 0 | 0 | $\frac{5\sqrt{21}}{336}$ | 0 | $\frac{5\sqrt{21}i}{336}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}}{112}$ | 0 | $-\frac{\sqrt{35}i}{112}$ | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{336}$ | 0 | $\frac{5\sqrt{21}i}{336}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{7}i}{21}$ | 0 | 0 | $\frac{\sqrt{105}}{336}$ | 0 | $\frac{\sqrt{105}i}{336}$ | 0 | 0 | 0 | $\frac{13\sqrt{7}}{336}$ | 0 | $-\frac{13\sqrt{7}i}{336}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{21}$ | $-\frac{\sqrt{105}}{336}$ | 0 | $\frac{\sqrt{105}i}{336}$ | 0 | 0 | 0 | $-\frac{13\sqrt{7}}{336}$ | 0 | $-\frac{13\sqrt{7}i}{336}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{24}$ | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | $-\frac{5\sqrt{7}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{24}$ |
| | | $-\frac{\sqrt{7}}{24}$ | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{5\sqrt{7}i}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{24}$ | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{24}$ | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{5\sqrt{7}i}{84}$ | 0 | 0 | $\frac{\sqrt{7}}{24}$ |
| | | $-\frac{\sqrt{7}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{7}i}{84}$ | $-\frac{\sqrt{7}}{24}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | 0 | $\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{48}$ | 0 | $-\frac{\sqrt{7}}{48}$ | $-\frac{\sqrt{7}i}{21}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | $-\frac{\sqrt{7}i}{48}$ | 0 | $\frac{\sqrt{7}}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{21}$ |
| 617 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{Q}_3^{(1,1;a)}(B, 3)$ | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | $\frac{3\sqrt{21}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{560}$ | 0 | 0 | $\frac{3\sqrt{35}}{140}$ | |
| | | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{21}i}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{560}$ | $-\frac{3\sqrt{35}}{140}$ | 0 | |
| | | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{112}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ | 0 | 0 | $-\frac{\sqrt{105}}{120}$ |
| | | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{112}$ | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | $\frac{\sqrt{105}}{120}$ | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $\frac{5\sqrt{7}}{112}$ | $\frac{5\sqrt{7}i}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{80}$ | $-\frac{\sqrt{105}i}{80}$ | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | 0 | $-\frac{\sqrt{105}}{80}$ | 0 | 0 | $\frac{\sqrt{105}i}{80}$ |
| | | $\frac{\sqrt{105}i}{120}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{420}$ | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{105}i}{120}$ | $-\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{420}$ | 0 | 0 | 0 | |
| | | 0 | $\frac{\sqrt{105}}{120}$ | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{420}$ |
| | | $-\frac{\sqrt{105}}{120}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{420}$ | 0 | |
| 618 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | |
|-----|--------------------------------|--|---------------------------|--------------------------|---------------------------|----------------------------|----------------------------|-------------------------|----------------------------|-----------------------------|------------------------------|-------------------------------|-------------------------------|---|
| | $\mathbb{Q}_3^{(1,1;a)}(B, 4)$ | $\frac{\sqrt{35}i}{35}$ | 0 | 0 | $-\frac{3\sqrt{21}}{112}$ | 0 | $-\frac{3\sqrt{21}i}{112}$ | 0 | 0 | 0 | $\frac{13\sqrt{35}}{560}$ | 0 | $-\frac{13\sqrt{35}i}{560}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{35}$ | $\frac{3\sqrt{21}}{112}$ | 0 | $-\frac{3\sqrt{21}i}{112}$ | 0 | 0 | 0 | $-\frac{13\sqrt{35}}{560}$ | 0 | $-\frac{13\sqrt{35}i}{560}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{112}$ | 0 | $\frac{3\sqrt{7}i}{112}$ | 0 | 0 | 0 | $-\frac{11\sqrt{105}}{1680}$ | 0 | $-\frac{11\sqrt{105}i}{1680}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}}{112}$ | 0 | $\frac{3\sqrt{7}i}{112}$ | 0 | 0 | 0 | $\frac{11\sqrt{105}}{1680}$ | 0 | $-\frac{11\sqrt{105}i}{1680}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{120}$ | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | $-\frac{\sqrt{105}i}{420}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{105}}{120}$ | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{420}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}i}{120}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{420}$ | 0 | 0 |
| | | $\frac{\sqrt{105}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{420}$ | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{7}i}{112}$ | 0 | $\frac{5\sqrt{7}}{112}$ | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{80}$ | 0 | $-\frac{\sqrt{105}}{80}$ | 0 |
| | | 0 | 0 | $\frac{5\sqrt{7}i}{112}$ | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | $\frac{\sqrt{7}i}{14}$ | $\frac{\sqrt{105}i}{80}$ | 0 | $\frac{\sqrt{105}}{80}$ | 0 | 0 | 0 |
| 619 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | |
| | $\mathbb{G}_2^{(a)}(A, 1)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{70}}{28}$ | 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 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 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 | $-\frac{\sqrt{70}}{28}$ | 0 |
| 620 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|---|---|
| | $\mathbb{G}_2^{(a)}(A, 2)$ | $-\frac{\sqrt{70}}{28}$ | 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 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{56}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{56}$ | 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 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 621 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |
| | $\mathbb{G}_2^{(a)}(A, 3)$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{56}$ | 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 | $-\frac{\sqrt{14}}{14}$ | 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 |
| 622 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix |
|-----|----------------------------|--|
| | $\mathbb{G}_2^{(a)}(B, 1)$ | $ \begin{bmatrix} 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{42}}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{70}}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{14}}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{210}}{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 & 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{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 \end{bmatrix} $ |
| 623 | symmetry | $ \begin{matrix} \sqrt{3}xy \\ \begin{bmatrix} 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 & \frac{\sqrt{70}}{28} \\ 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 & -\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{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 & 0 & 0 \end{bmatrix} \end{matrix} $ |
| 624 | symmetry | $ \frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6} $ |

continued ...

Table 9

| No. | multipole | matrix |
|-----|----------------------------|---|
| | $\mathbb{G}_4^{(a)}(A, 1)$ | $ \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 & 0 & 0 & 0 & 0 & 0 \\ 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 & 0 & \frac{\sqrt{3}}{6} & 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 & 0 & \frac{\sqrt{3}}{6} & 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 & 0 & \frac{\sqrt{3}}{6} \end{bmatrix} $ |
| 625 | symmetry | $ -\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12} $ $ \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 \\ -\frac{\sqrt{105}}{35} & 0 & 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 & 0 & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{7}}{28} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}}{420} & 0 & 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 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}}{210} & 0 \end{bmatrix} $ |
| 626 | symmetry | $ \frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4} $ |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|--|-------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|--------------------------|--------------------------|-------------------------|-------------------------|---|---|
| | $\mathbb{G}_4^{(a)}(A, 3)$ | $\frac{\sqrt{105}}{35}$ | 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 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{140}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{140}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{140}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{140}$ | 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 |
| 627 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(a)}(A, 4)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{40} \\ \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}}{8} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | | | | | |
| 628 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|-----------------------------------|-----------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|--------------------------|--------------------------|------------------------|------------------------|
| | $\mathbb{G}_4^{(a)}(A, 5)$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}}{70}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}}{70}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{40}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{40}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{40}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{40}$ | 0 | 0 | 0 | 0 |
| 629 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(a)}(B, 1)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 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 | $\frac{\sqrt{3}}{8}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}}{40}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{8}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}}{40}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}}{40}$ | 0 | 0 |
| 630 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|----------------------------|---------------------------------------|-----------------------|------------------------|------------------------|-------------------------|-------------------------|------------------------|--------------------------|--------------------------|---|------------------------|------------------------|------------------------|------------------------|---|
| | $\mathbb{G}_4^{(a)}(B, 2)$ | 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 | $-\frac{\sqrt{5}}{10}$ | 0 | | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{10}$ | | |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{3}}{8}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{3}}{8}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}}{40}$ | 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 | $\frac{\sqrt{5}}{10}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 631 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(a)}(B, 3)$ | 0 | 0 | $\frac{3\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{40}$ | 0 | 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 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{40}$ | 0 | 0 | 0 |
| 632 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|------------------------------------|--------------------------|----------------------------|----------------------------|---------------------------|--------------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{G}_4^{(a)}(B, 4)$ | 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 | 0 | 0 | 0 | $\frac{\sqrt{105}}{35}$ | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{14}$ | 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 | $\frac{\sqrt{21}}{56}$ | 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 | $\frac{\sqrt{35}}{40}$ | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 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 | $\frac{\sqrt{35}}{40}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 633 | symmetry | $-\frac{x^2}{2}-\frac{y^2}{2}+z^2$ | | | | | | | | | | | | | |
| | $\mathbb{G}_2^{(1,-1;a)}(A, 1)$ | 0 | 0 | 0 | $\frac{\sqrt{210}i}{280}$ | 0 | $\frac{\sqrt{210}}{280}$ | $\frac{\sqrt{210}i}{70}$ | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{210}i}{280}$ | 0 | $-\frac{\sqrt{210}}{280}$ | 0 | 0 | $-\frac{\sqrt{210}i}{70}$ | $\frac{\sqrt{14}i}{56}$ | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | $\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | $\frac{\sqrt{42}}{168}$ | $\frac{\sqrt{42}i}{42}$ | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ |
| | | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | $-\frac{\sqrt{70}i}{70}$ | 0 | 0 | $\frac{\sqrt{70}}{140}$ | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | $\frac{\sqrt{42}}{84}$ |
| | | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{70}$ | $-\frac{\sqrt{70}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | $-\frac{\sqrt{42}}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{42}}{84}$ | $-\frac{\sqrt{70}i}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{70}i}{140}$ | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ |
| | | $\frac{\sqrt{42}}{84}$ | 0 | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | $\frac{\sqrt{70}i}{140}$ | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 |
| | | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | $\frac{\sqrt{70}}{140}$ | 0 | $\frac{\sqrt{70}i}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | $\frac{\sqrt{42}i}{84}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{42}i}{42}$ | $-\frac{\sqrt{70}}{140}$ | 0 | $\frac{\sqrt{70}i}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{42}}{84}$ | 0 | $\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 |
| 634 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|-------------------------|--------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|
| | $\mathbb{G}_2^{(1,-1;a)}(A, 2)$ | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | $\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{210}i}{280}$ | 0 | $\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{210}i}{280}$ | 0 | $-\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 |
| 635 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |
| | $\mathbb{G}_2^{(1,-1;a)}(A, 3)$ | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{140}$ | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{280}$ | 0 | 0 | $\frac{3\sqrt{70}i}{140}$ | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| 636 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|--------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{G}_2^{(1,-1;a)}(B,1)$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{280}$ | $-\frac{3\sqrt{70}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}i}{28}$ | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 |
| 637 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | |
| | $\mathbb{G}_2^{(1,-1;a)}(B,2)$ | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{70}}{280}$ | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{210}}{280}$ | 0 | $-\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{210}}{280}$ | 0 | $-\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 |
| 638 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|-------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|----------------------------|
| | $\mathbb{G}_4^{(1,-1;a)}(A,1)$ | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | $-\frac{\sqrt{5}}{30}$ | $\frac{\sqrt{5}i}{15}$ | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | $\frac{\sqrt{5}}{30}$ | 0 | 0 | $-\frac{\sqrt{5}i}{15}$ | $\frac{\sqrt{3}i}{12}$ | 0 | $\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | $\frac{i}{12}$ | 0 | $\frac{1}{12}$ | $-\frac{i}{6}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | $\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | $\frac{i}{12}$ | 0 | $-\frac{1}{12}$ | 0 | 0 | $\frac{i}{6}$ |
| | | 0 | $-\frac{i}{6}$ | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | $-\frac{1}{24}$ |
| | | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{120}$ | $\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | 0 | $-\frac{i}{24}$ | $\frac{1}{24}$ | 0 |
| | | 0 | $-\frac{1}{6}$ | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | $\frac{i}{24}$ |
| | | $\frac{1}{6}$ | 0 | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | $\frac{i}{24}$ | 0 |
| | | $-\frac{i}{6}$ | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $\frac{1}{24}$ | 0 | $-\frac{i}{24}$ | 0 | 0 |
| | | 0 | $\frac{i}{6}$ | $\frac{\sqrt{15}}{120}$ | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $-\frac{1}{24}$ | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 |
| 639 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(1,-1;a)}(A,2)$ | 0 | 0 | 0 | $\frac{11\sqrt{7}i}{168}$ | 0 | $\frac{11\sqrt{7}}{168}$ | $\frac{\sqrt{7}i}{21}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{11\sqrt{7}i}{168}$ | 0 | $-\frac{11\sqrt{7}}{168}$ | 0 | 0 | $-\frac{\sqrt{7}i}{21}$ | $-\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{168}$ | 0 | $-\frac{\sqrt{35}}{168}$ | $-\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{168}$ | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ |
| | | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{35}i}{168}$ | 0 | 0 | $\frac{5\sqrt{35}}{168}$ |
| | | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | $\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{168}$ | $-\frac{5\sqrt{35}}{168}$ | 0 |
| | | 0 | $\frac{\sqrt{35}}{84}$ | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | $-\frac{\sqrt{35}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{35}i}{168}$ |
| | | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{35}i}{168}$ | 0 | 0 | $-\frac{5\sqrt{35}i}{168}$ | 0 |
| | | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{21}}{84}$ | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 |
| 640 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---------------------------------------|---------------------------|--------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----------------------------|----------------------------|
| | $\mathbb{G}_4^{(1,-1;a)}(A,3)$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{56}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | $\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ |
| | | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | $\frac{\sqrt{105}}{168}$ | 0 |
| | | 0 | $\frac{\sqrt{105}}{84}$ | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ |
| | | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 |
| 641 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(1,-1;a)}(A,4)$ | 0 | 0 | $-\frac{\sqrt{3}i}{48}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | $-\frac{\sqrt{5}i}{16}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{3}i}{48}$ | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $\frac{\sqrt{5}i}{16}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{3i}{16}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ |
| | | 0 | 0 | 0 | $\frac{3i}{16}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{i}{16}$ | 0 | 0 | $\frac{i}{16}$ | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 |
| | | 0 | 0 | $-\frac{i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{i}{16}$ | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| 642 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | |
|-----|---------------------------------|-----------------------------------|----------------------------|----------------------------|-----------------------------|------------------------|-------------------------|--------------------------|--------------------------|----------------------------|----------------------------|---------------------------|--------------------------|-----------------------------|
| | $\mathbb{G}_4^{(1,-1;a)}(A, 5)$ | 0 | 0 | $\frac{11\sqrt{21}i}{336}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | $-\frac{\sqrt{35}i}{112}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{11\sqrt{21}i}{336}$ | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}i}{112}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}i}{112}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | $-\frac{\sqrt{105}i}{336}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{336}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ |
| | | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{168}$ | $\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}i}{112}$ | $\frac{5\sqrt{105}i}{336}$ | 0 | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ |
| | | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 |
| | | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 |
| 643 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(1,-1;a)}(B, 1)$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{48}$ | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | $-\frac{\sqrt{5}i}{16}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{48}$ | $\frac{\sqrt{3}}{12}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{16}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3i}{16}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | $\frac{\sqrt{15}}{24}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3i}{16}$ | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | $-\frac{\sqrt{15}}{24}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{1}{16}$ | $-\frac{i}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{48}$ | $\frac{\sqrt{15}i}{48}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{1}{16}$ | 0 | 0 | $\frac{i}{16}$ | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | $-\frac{\sqrt{15}i}{48}$ |
| | | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| 644 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|---------------------------------|---------------------------------------|----------------------------|-------------------------|-------------------------|----------------------------|-----------------------------|--------------------------|--------------------------|-------------------------|---------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|--|
| | $\mathbb{G}_4^{(1,-1;a)}(B, 2)$ | 0 | 0 | 0 | $-\frac{5\sqrt{3}}{48}$ | 0 | $\frac{5\sqrt{3}i}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{5}}{16}$ | 0 | $\frac{\sqrt{5}i}{16}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{5\sqrt{3}}{48}$ | 0 | $\frac{5\sqrt{3}i}{48}$ | 0 | 0 | 0 | $-\frac{\sqrt{5}}{16}$ | 0 | $\frac{\sqrt{5}i}{16}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{1}{16}$ | 0 | $\frac{i}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | |
| | | 0 | 0 | $-\frac{1}{16}$ | 0 | $\frac{i}{16}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | |
| | | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | |
| | | 0 | 0 | 0 | $\frac{i}{16}$ | 0 | $-\frac{1}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{i}{16}$ | 0 | $\frac{1}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 | |
| 645 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(1,-1;a)}(B, 3)$ | 0 | 0 | 0 | 0 | $\frac{11\sqrt{21}i}{336}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{35}i}{112}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{21}i}{336}$ | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{112}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{336}$ | 0 | 0 | $\frac{\sqrt{105}}{168}$ | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{112}$ | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{336}$ | $-\frac{\sqrt{105}}{168}$ | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{112}$ | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ | $\frac{5\sqrt{105}i}{336}$ | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{7}}{112}$ | 0 | 0 | $\frac{\sqrt{7}i}{112}$ | 0 | 0 | $\frac{5\sqrt{105}}{336}$ | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | |
| | | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{105}i}{168}$ | $-\frac{\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | $\frac{\sqrt{105}}{168}$ | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | |
| 646 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|---|---------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|
| | $\mathbb{G}_4^{(1,-1;a)}(B, 4)$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{48}$ | 0 | $-\frac{\sqrt{21}i}{48}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{112}$ | 0 | $\frac{\sqrt{35}i}{112}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{48}$ | 0 | $-\frac{\sqrt{21}i}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{112}$ | 0 | $\frac{\sqrt{35}i}{112}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | $\frac{5\sqrt{7}i}{112}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{336}$ | 0 | $-\frac{\sqrt{105}i}{336}$ | 0 | 0 |
| | | 0 | 0 | $\frac{5\sqrt{7}}{112}$ | 0 | $\frac{5\sqrt{7}i}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{336}$ | 0 | $-\frac{\sqrt{105}i}{336}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{168}$ | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ |
| | | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 |
| | | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ |
| | | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | $-\frac{\sqrt{7}}{112}$ | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | 0 | $\frac{5\sqrt{105}}{336}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | $\frac{\sqrt{7}}{112}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | $-\frac{5\sqrt{105}i}{336}$ | 0 | $-\frac{5\sqrt{105}}{336}$ | 0 | 0 | 0 |
| 647 | symmetry | $\frac{\sqrt{2}(2x^6-15x^4y^2-15x^4z^2-15x^2y^4+180x^2y^2z^2-15x^2z^4+2y^6-15y^4z^2-15y^2z^4+2z^6)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_6^{(1,-1;a)}(A, 1)$ | 0 | 0 | 0 | $-\frac{\sqrt{770}i}{616}$ | 0 | $-\frac{\sqrt{770}}{616}$ | $\frac{\sqrt{770}i}{308}$ | 0 | 0 | $\frac{3\sqrt{462}i}{616}$ | 0 | $-\frac{3\sqrt{462}}{616}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{770}i}{616}$ | 0 | $\frac{\sqrt{770}}{616}$ | 0 | 0 | $-\frac{\sqrt{770}}{308}$ | $\frac{3\sqrt{462}i}{616}$ | 0 | $\frac{3\sqrt{462}}{616}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{2310}i}{616}$ | 0 | $-\frac{\sqrt{2310}}{616}$ | 0 | 0 | 0 | $\frac{3\sqrt{154}i}{616}$ | 0 | $\frac{3\sqrt{154}}{616}$ | $-\frac{3\sqrt{154}i}{308}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{2310}i}{616}$ | 0 | $\frac{\sqrt{2310}}{616}$ | 0 | 0 | 0 | $\frac{3\sqrt{154}i}{616}$ | 0 | $-\frac{3\sqrt{154}}{616}$ | 0 | 0 | $\frac{3\sqrt{154}i}{308}$ |
| | | 0 | $\frac{\sqrt{154}i}{77}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{924}$ | 0 | 0 | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | $-\frac{3\sqrt{154}i}{308}$ | 0 | 0 | $\frac{3\sqrt{154}}{308}$ |
| | | $\frac{\sqrt{154}i}{77}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}i}{924}$ | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{154}i}{308}$ | $-\frac{3\sqrt{154}}{308}$ | 0 |
| | | 0 | $\frac{\sqrt{154}}{77}$ | $-\frac{\sqrt{2310}i}{924}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2310}i}{924}$ | $\frac{3\sqrt{154}i}{308}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{154}i}{308}$ |
| | | $-\frac{\sqrt{154}}{77}$ | 0 | 0 | $\frac{\sqrt{2310}i}{924}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{924}$ | 0 | 0 | $-\frac{3\sqrt{154}i}{308}$ | 0 | 0 | $-\frac{3\sqrt{154}i}{308}$ | 0 |
| | | $\frac{\sqrt{154}i}{77}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{924}$ | 0 | $-\frac{\sqrt{2310}i}{924}$ | 0 | 0 | 0 | $-\frac{3\sqrt{154}}{308}$ | 0 | $\frac{3\sqrt{154}i}{308}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{154}i}{77}$ | $\frac{\sqrt{2310}}{924}$ | 0 | $-\frac{\sqrt{2310}i}{924}$ | 0 | 0 | 0 | $\frac{3\sqrt{154}}{308}$ | 0 | $\frac{3\sqrt{154}i}{308}$ | 0 | 0 | 0 |
| 648 | symmetry | $-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|---|----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{G}_6^{(1,-1;a)}(A, 2)$ | 0 | 0 | 0 | $\frac{\sqrt{6}i}{24}$ | 0 | $-\frac{\sqrt{6}}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{10}i}{40}$ | 0 | $\frac{\sqrt{10}}{40}$ | $-\frac{\sqrt{10}i}{20}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{6}i}{24}$ | 0 | $\frac{\sqrt{6}}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{10}i}{40}$ | 0 | $-\frac{\sqrt{10}}{40}$ | 0 | 0 | $\frac{\sqrt{10}i}{20}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{2}i}{24}$ | 0 | $\frac{\sqrt{2}}{24}$ | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | $\frac{\sqrt{30}}{40}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{2}i}{24}$ | 0 | $-\frac{\sqrt{2}}{24}$ | 0 | 0 | $\frac{\sqrt{2}i}{12}$ | $-\frac{\sqrt{30}i}{40}$ | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 | $\frac{\sqrt{2}}{12}$ | 0 | 0 | $\frac{\sqrt{30}i}{60}$ | 0 | 0 | $\frac{\sqrt{30}}{60}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}}{12}$ | $-\frac{\sqrt{2}}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{60}$ | $-\frac{\sqrt{30}}{60}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{2}i}{12}$ | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{12}$ | $\frac{\sqrt{30}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{60}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 | $-\frac{\sqrt{30}i}{60}$ | 0 | 0 | $\frac{\sqrt{30}i}{60}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{2}}{12}$ | 0 | $\frac{\sqrt{2}i}{12}$ | 0 | 0 | 0 | $\frac{\sqrt{30}}{60}$ | 0 | $\frac{\sqrt{30}i}{60}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{2}}{12}$ | 0 | $\frac{\sqrt{2}i}{12}$ | 0 | 0 | 0 | $-\frac{\sqrt{30}}{60}$ | 0 | $\frac{\sqrt{30}i}{60}$ | 0 | 0 | 0 |
| 649 | symmetry | $-\frac{\sqrt{14}(x^6-15x^4z^2+15x^2z^4+y^6-15y^4z^2+15y^2z^4-2z^6)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_6^{(1,-1;a)}(A, 3)$ | 0 | 0 | 0 | $\frac{\sqrt{110}i}{88}$ | 0 | $\frac{\sqrt{110}}{88}$ | $\frac{\sqrt{110}i}{44}$ | 0 | 0 | $\frac{\sqrt{66}i}{88}$ | 0 | $-\frac{\sqrt{66}}{88}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{110}i}{88}$ | 0 | $-\frac{\sqrt{110}}{88}$ | 0 | 0 | $-\frac{\sqrt{110}i}{44}$ | $\frac{\sqrt{66}i}{88}$ | 0 | $\frac{\sqrt{66}}{88}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{264}$ | 0 | $\frac{\sqrt{330}}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{88}$ | 0 | $-\frac{\sqrt{22}}{88}$ | $\frac{\sqrt{22}i}{44}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{330}i}{264}$ | 0 | $-\frac{\sqrt{330}}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{88}$ | 0 | $\frac{\sqrt{22}}{88}$ | 0 | 0 | $-\frac{\sqrt{22}i}{44}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | $-\frac{\sqrt{22}i}{44}$ | 0 | 0 | $-\frac{\sqrt{22}}{44}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}i}{44}$ | $\frac{\sqrt{22}}{44}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | $\frac{\sqrt{22}i}{44}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}i}{44}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | $-\frac{\sqrt{22}i}{44}$ | 0 | 0 | $\frac{\sqrt{22}i}{44}$ | 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 |
| 650 | symmetry | $\frac{\sqrt{42}(x-y)(x+y)(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | |
|--------------------------------|--------------------------|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|--------------------------|---------------------------|--------------------------|---------------------------|---------------------------|
| $\mathbb{G}_6^{(1,-1;a)}(A,4)$ | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{264}$ | 0 | $\frac{\sqrt{330}}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{88}$ | 0 | $-\frac{\sqrt{22}}{88}$ | $\frac{\sqrt{22}i}{44}$ | 0 |
| | 0 | 0 | $-\frac{\sqrt{330}i}{264}$ | 0 | $-\frac{\sqrt{330}}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{88}$ | 0 | $\frac{\sqrt{22}}{88}$ | 0 | 0 | $-\frac{\sqrt{22}i}{44}$ |
| | 0 | 0 | 0 | $\frac{5\sqrt{110}i}{264}$ | 0 | $\frac{5\sqrt{110}}{264}$ | $\frac{\sqrt{110}i}{132}$ | 0 | 0 | $-\frac{\sqrt{66}i}{88}$ | 0 | $\frac{\sqrt{66}}{88}$ | 0 | 0 |
| | 0 | 0 | $\frac{5\sqrt{110}i}{264}$ | 0 | $-\frac{5\sqrt{110}}{264}$ | 0 | 0 | $-\frac{\sqrt{110}i}{132}$ | $-\frac{\sqrt{66}i}{88}$ | 0 | $-\frac{\sqrt{66}}{88}$ | 0 | 0 | 0 |
| | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{132}$ | 0 | 0 | $-\frac{\sqrt{110}}{132}$ | 0 | 0 | $-\frac{\sqrt{66}i}{132}$ | 0 | 0 | $-\frac{\sqrt{66}}{132}$ |
| | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{132}$ | $\frac{\sqrt{110}}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}i}{132}$ | $\frac{\sqrt{66}}{132}$ | 0 |
| | 0 | 0 | $-\frac{\sqrt{110}i}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{132}$ | $-\frac{\sqrt{66}i}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{132}$ |
| | 0 | 0 | 0 | $\frac{\sqrt{110}i}{132}$ | 0 | 0 | $\frac{\sqrt{110}i}{132}$ | 0 | 0 | $\frac{\sqrt{66}i}{132}$ | 0 | 0 | $-\frac{\sqrt{66}i}{132}$ | 0 |
| | 0 | 0 | 0 | $-\frac{\sqrt{110}}{66}$ | 0 | $\frac{\sqrt{110}i}{66}$ | 0 | 0 | 0 | $\frac{\sqrt{66}}{66}$ | 0 | $\frac{\sqrt{66}i}{66}$ | 0 | 0 |
| | 0 | 0 | $\frac{\sqrt{110}}{66}$ | 0 | $\frac{\sqrt{110}i}{66}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}}{66}$ | 0 | $\frac{\sqrt{66}i}{66}$ | 0 | 0 | 0 |
| 651 | symmetry | $\frac{3\sqrt{7}xz(x-z)(x+z)(x^2-10y^2+z^2)}{4}$ | | | | | | | | | | | | |
| $\mathbb{G}_6^{(1,-1;a)}(A,5)$ | 0 | $\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}i}{88}$ | $\frac{\sqrt{33}i}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}i}{88}$ |
| | $-\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}i}{88}$ | 0 | 0 | $-\frac{\sqrt{33}i}{44}$ | 0 | 0 | $-\frac{\sqrt{33}i}{88}$ | 0 |
| | 0 | $-\frac{\sqrt{11}}{44}$ | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{264}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ |
| | $\frac{\sqrt{11}}{44}$ | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | $-\frac{\sqrt{165}i}{264}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ | 0 |
| | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | $\frac{\sqrt{11}i}{22}$ | 0 | 0 |
| | 0 | $-\frac{\sqrt{11}i}{22}$ | $\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{44}$ | 0 | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | 0 |
| | 0 | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | $\frac{\sqrt{11}}{22}$ | $-\frac{\sqrt{11}i}{44}$ | 0 |
| | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | $-\frac{\sqrt{11}i}{44}$ | 0 | $-\frac{\sqrt{11}}{22}$ | 0 | 0 | $\frac{\sqrt{11}i}{44}$ |
| | 0 | $-\frac{\sqrt{11}i}{22}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{132}$ | 0 | 0 | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | $-\frac{\sqrt{11}}{44}$ |
| | $-\frac{\sqrt{11}i}{22}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{22}$ | $\frac{\sqrt{11}}{44}$ | 0 |
| 652 | symmetry | $\frac{\sqrt{462}xz(x^2-3z^2)(3x^2-z^2)}{16}$ | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|---------------------------------|-----------|--|----------------------------|-----------------------------|------------------------------|-------------------------|--------------------------|---------------------------|----------------------------|-------------------------------|----------------------------|------------------------------|---|---------------------------|------------------------------|
| $\mathbb{G}_6^{(1,-1;a)}(A, 6)$ | | 0 | 0 | $-\frac{\sqrt{30}i}{32}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{32}$ | $-\frac{3\sqrt{2}i}{32}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{2}i}{32}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{30}i}{32}$ | 0 | 0 | $\frac{\sqrt{30}i}{32}$ | 0 | 0 | $\frac{3\sqrt{2}i}{32}$ | 0 | 0 | $-\frac{3\sqrt{2}i}{32}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{10}i}{32}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{32}$ | $\frac{\sqrt{6}i}{32}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{32}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{32}$ | 0 | 0 | $-\frac{\sqrt{10}i}{32}$ | 0 | 0 | $-\frac{\sqrt{6}i}{32}$ | 0 | 0 | $\frac{\sqrt{6}i}{32}$ | 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 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | $\frac{\sqrt{6}i}{16}$ | 0 | 0 | $-\frac{\sqrt{6}i}{16}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{16}$ | $\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{16}$ |
| | | 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 |
| 653 | symmetry | $\frac{\sqrt{210}xz(x^4-16x^2y^2+2x^2z^2+16y^4-16y^2z^2+z^4)}{16}$ | | | | | | | | | | | | | |
| $\mathbb{G}_6^{(1,-1;a)}(A, 7)$ | | 0 | $-\frac{\sqrt{110}}{110}$ | $\frac{\sqrt{66}i}{352}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{66}i}{1056}$ | $-\frac{13\sqrt{110}i}{1760}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{160}$ |
| | | $\frac{\sqrt{110}}{110}$ | 0 | 0 | $-\frac{\sqrt{66}i}{352}$ | 0 | 0 | 0 | $\frac{5\sqrt{66}i}{1056}$ | 0 | 0 | $\frac{13\sqrt{110}i}{1760}$ | 0 | 0 | $\frac{\sqrt{110}i}{160}$ |
| | | 0 | $-\frac{\sqrt{330}}{110}$ | $\frac{13\sqrt{22}i}{1056}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}i}{96}$ | $-\frac{7\sqrt{330}i}{1056}$ | 0 | 0 | 0 | 0 | $\frac{37\sqrt{330}i}{5280}$ |
| | | $\frac{\sqrt{330}}{110}$ | 0 | 0 | $-\frac{13\sqrt{22}i}{1056}$ | 0 | 0 | 0 | $\frac{\sqrt{22}i}{96}$ | 0 | 0 | $\frac{7\sqrt{330}i}{1056}$ | 0 | 0 | $\frac{37\sqrt{330}i}{5280}$ |
| | | $-\frac{\sqrt{330}i}{165}$ | 0 | 0 | $-\frac{\sqrt{22}}{66}$ | 0 | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{110}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{330}i}{165}$ | $\frac{\sqrt{22}}{66}$ | 0 | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | 0 | $-\frac{\sqrt{330}}{110}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{22}i}{528}$ | 0 | $\frac{\sqrt{22}}{33}$ | $\frac{5\sqrt{22}i}{528}$ | 0 | 0 | $-\frac{\sqrt{330}i}{240}$ | 0 | 0 | $\frac{\sqrt{330}i}{240}$ | 0 |
| | | 0 | 0 | $\frac{5\sqrt{22}i}{528}$ | 0 | $-\frac{\sqrt{22}}{33}$ | 0 | 0 | $-\frac{5\sqrt{22}i}{528}$ | $-\frac{\sqrt{330}i}{240}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{240}$ |
| | | 0 | $-\frac{\sqrt{330}i}{165}$ | 0 | 0 | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | $-\frac{\sqrt{22}}{66}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{110}$ |
| | | $-\frac{\sqrt{330}i}{165}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{33}$ | $\frac{\sqrt{22}}{66}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{110}$ | 0 |
| 654 | symmetry | $\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---|--------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{G}_6^{(1,-1;a)}(B,1)$ | 0 | $-\frac{\sqrt{33}i}{44}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{88}$ | 0 | 0 | $\frac{\sqrt{33}i}{44}$ | 0 | 0 | $-\frac{\sqrt{33}}{88}$ |
| | | $-\frac{\sqrt{33}i}{44}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{88}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}i}{44}$ | $\frac{\sqrt{33}}{88}$ | 0 |
| | | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | $-\frac{\sqrt{165}}{264}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ |
| | | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | $\frac{\sqrt{165}}{264}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | $\frac{\sqrt{11}i}{22}$ | 0 | $-\frac{\sqrt{11}}{44}$ | $-\frac{\sqrt{11}i}{44}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{132}$ | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | $\frac{\sqrt{11}i}{22}$ | 0 | $\frac{\sqrt{11}}{44}$ | 0 | 0 | $\frac{\sqrt{11}i}{44}$ |
| | | $-\frac{\sqrt{11}i}{22}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | $\frac{\sqrt{11}}{22}$ | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}}{22}$ | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ |
| | | $-\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | $-\frac{\sqrt{11}i}{22}$ | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 |
| 655 | symmetry | $-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_6^{(1,-1;a)}(B,2)$ | 0 | 0 | 0 | $\frac{\sqrt{55}}{88}$ | 0 | $-\frac{\sqrt{55}i}{88}$ | 0 | 0 | 0 | $-\frac{\sqrt{33}}{88}$ | 0 | $-\frac{\sqrt{33}i}{88}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{55}}{88}$ | 0 | $-\frac{\sqrt{55}i}{88}$ | 0 | 0 | 0 | $\frac{\sqrt{33}}{88}$ | 0 | $-\frac{\sqrt{33}i}{88}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | $-\frac{\sqrt{165}}{264}$ | 0 | $-\frac{\sqrt{165}i}{264}$ | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | 0 | $\frac{3\sqrt{11}i}{88}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}i}{22}$ | $\frac{\sqrt{165}}{264}$ | 0 | $-\frac{\sqrt{165}i}{264}$ | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | $\frac{3\sqrt{11}i}{88}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}}{22}$ | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}i}{22}$ |
| | | $\frac{\sqrt{11}}{22}$ | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}i}{44}$ | 0 | 0 | $\frac{\sqrt{11}i}{22}$ | 0 |
| | | 0 | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $\frac{\sqrt{11}}{22}$ |
| | | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}i}{44}$ | $-\frac{\sqrt{11}}{22}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | $\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | $-\frac{\sqrt{11}}{44}$ | $\frac{\sqrt{11}i}{22}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | $\frac{\sqrt{11}}{44}$ | 0 | 0 | $-\frac{\sqrt{11}i}{22}$ |
| 656 | symmetry | $\frac{\sqrt{462}yz(y^2-3z^2)(3y^2-z^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix |
|-----|--------------------------------|--|
| | $\mathbb{G}_6^{(1,-1;a)}(B,3)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & 0 & \frac{\sqrt{30}}{32} & 0 & 0 & \frac{3\sqrt{2}i}{32} & 0 & 0 & \frac{3\sqrt{2}}{32} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}i}{32} & -\frac{\sqrt{30}}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}i}{32} & -\frac{3\sqrt{2}}{32} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{10}}{32} & 0 & 0 & \frac{\sqrt{6}i}{32} & 0 & 0 & \frac{\sqrt{6}}{32} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{32} & -\frac{\sqrt{10}}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{32} & -\frac{\sqrt{6}}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{16} & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & \frac{\sqrt{6}i}{16} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & 0 & -\frac{\sqrt{6}i}{16} \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 657 | symmetry | $\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & \frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & \frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 & 0 \end{bmatrix}$ |
| 658 | symmetry | $\frac{\sqrt{210}yz(16x^4-16x^2y^2-16x^2z^2+y^4+2y^2z^2+z^4)}{16}$ |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|---------------------------------|-----------|--|----------------------------|---------------------------|---------------------------|------------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-------------------------------|------------------------------|---|-----------------------------|
| $\mathbb{G}_6^{(1,-1;a)}(B, 5)$ | | 0 | $-\frac{\sqrt{110}i}{110}$ | 0 | 0 | $\frac{\sqrt{66}i}{352}$ | 0 | 0 | $\frac{5\sqrt{66}}{1056}$ | 0 | 0 | $\frac{13\sqrt{110}i}{1760}$ | 0 | 0 | $-\frac{\sqrt{110}}{160}$ |
| | | $-\frac{\sqrt{110}i}{110}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{352}$ | $-\frac{5\sqrt{66}}{1056}$ | 0 | 0 | 0 | $-\frac{13\sqrt{110}i}{1760}$ | $\frac{\sqrt{110}}{160}$ | 0 | |
| | | 0 | $\frac{\sqrt{330}i}{110}$ | 0 | 0 | $-\frac{13\sqrt{22}i}{1056}$ | 0 | 0 | $-\frac{\sqrt{22}}{96}$ | 0 | 0 | $-\frac{7\sqrt{330}i}{1056}$ | 0 | 0 | $\frac{37\sqrt{330}}{5280}$ |
| | | $\frac{\sqrt{330}i}{110}$ | 0 | 0 | 0 | 0 | $\frac{13\sqrt{22}i}{1056}$ | $\frac{\sqrt{22}}{96}$ | 0 | 0 | 0 | $\frac{7\sqrt{330}i}{1056}$ | $-\frac{37\sqrt{330}}{5280}$ | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{22}i}{33}$ | 0 | $\frac{5\sqrt{22}}{528}$ | $\frac{5\sqrt{22}i}{528}$ | 0 | 0 | 0 | $\frac{\sqrt{330}}{240}$ | $-\frac{\sqrt{330}i}{240}$ | 0 | |
| | | 0 | 0 | $\frac{\sqrt{22}i}{33}$ | 0 | $-\frac{5\sqrt{22}}{528}$ | 0 | 0 | $-\frac{5\sqrt{22}i}{528}$ | 0 | 0 | $-\frac{\sqrt{330}}{240}$ | 0 | 0 | $\frac{\sqrt{330}i}{240}$ |
| | | $-\frac{\sqrt{330}i}{165}$ | 0 | 0 | $\frac{\sqrt{22}}{33}$ | 0 | $-\frac{\sqrt{22}i}{66}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{110}$ | 0 | 0 | |
| | | 0 | $\frac{\sqrt{330}i}{165}$ | $-\frac{\sqrt{22}}{33}$ | 0 | $-\frac{\sqrt{22}i}{66}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{110}$ | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{330}}{165}$ | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{66}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}i}{110}$ |
| | | $\frac{\sqrt{330}}{165}$ | 0 | 0 | $-\frac{\sqrt{22}i}{33}$ | 0 | 0 | $-\frac{\sqrt{22}i}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}i}{110}$ | 0 | |
| 659 | symmetry | $\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$ | | | | | | | | | | | | | |
| $\mathbb{G}_6^{(1,-1;a)}(B, 6)$ | | $\frac{\sqrt{110}i}{55}$ | 0 | 0 | $-\frac{\sqrt{66}}{132}$ | 0 | $-\frac{\sqrt{66}i}{132}$ | 0 | 0 | 0 | $-\frac{3\sqrt{110}}{220}$ | 0 | $\frac{3\sqrt{110}i}{220}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{110}i}{55}$ | $\frac{\sqrt{66}}{132}$ | 0 | $-\frac{\sqrt{66}i}{132}$ | 0 | 0 | 0 | $\frac{3\sqrt{110}}{220}$ | 0 | $\frac{3\sqrt{110}i}{220}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{22}}{528}$ | 0 | $-\frac{\sqrt{22}i}{528}$ | 0 | 0 | 0 | $-\frac{\sqrt{330}}{2640}$ | 0 | $-\frac{\sqrt{330}i}{2640}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{22}}{528}$ | 0 | $-\frac{\sqrt{22}i}{528}$ | 0 | 0 | 0 | $\frac{\sqrt{330}}{2640}$ | 0 | $-\frac{\sqrt{330}i}{2640}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{330}}{165}$ | $-\frac{\sqrt{22}i}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}i}{33}$ | $-\frac{\sqrt{330}i}{110}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{330}}{165}$ | 0 | 0 | $\frac{\sqrt{22}i}{66}$ | 0 | 0 | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | $\frac{\sqrt{330}i}{110}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{330}i}{165}$ | 0 | 0 | $-\frac{\sqrt{22}i}{66}$ | 0 | 0 | $\frac{\sqrt{22}}{33}$ | 0 | 0 | $\frac{\sqrt{330}i}{110}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{330}i}{165}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}i}{66}$ | $-\frac{\sqrt{22}}{33}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{110}$ | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{22}i}{528}$ | 0 | $\frac{5\sqrt{22}}{528}$ | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | $\frac{\sqrt{330}i}{240}$ | 0 | $-\frac{\sqrt{330}}{240}$ | 0 | 0 |
| | | 0 | 0 | $\frac{5\sqrt{22}i}{528}$ | 0 | $-\frac{5\sqrt{22}}{528}$ | 0 | 0 | $-\frac{\sqrt{22}i}{33}$ | $\frac{\sqrt{330}i}{240}$ | 0 | $\frac{\sqrt{330}}{240}$ | 0 | 0 | 0 |
| 660 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------------|---|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|---------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---------------------------|
| | $\mathbb{G}_2^{(1,0;a)}(A, 1)$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | $\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | $\frac{\sqrt{105}}{56}$ | 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 | $-\frac{\sqrt{7}}{14}$ | 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 | $\frac{\sqrt{7}i}{14}$ | 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 | 0 | 0 | 0 | 0 | 0 | 0 |
| 661 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_2^{(1,0;a)}(A, 2)$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{168}$ | $\frac{\sqrt{105}i}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{105}i}{42}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{168}$ | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}i}{56}$ | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 662 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|-------------------------------|---------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---------------------------|--------------------------|--------------------------|----------------------------|---------------------------|----------------------------|--------------------------|---------------------------|--|
| | $\mathbb{G}_2^{(1,0;a)}(A,3)$ | 0 | $-\frac{\sqrt{105}}{84}$ | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | |
| | | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | |
| | | 0 | $-\frac{\sqrt{35}}{28}$ | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | |
| | | $\frac{\sqrt{35}}{28}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | |
| 663 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |
| | $\mathbb{G}_2^{(1,0;a)}(B,1)$ | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | |
| | | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | $-\frac{\sqrt{105}}{84}$ | 0 | |
| | | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | |
| | | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | |
| 664 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|---------------------------|--------------------------|--------------------------|---------------------------|---------------------------|-------------------------|--------------------------|---------------------------|--------------------------|----------------------------|----------------------------|-------------------------|-------------------------|
| | $\mathbb{G}_2^{(1,0;a)}(B, 2)$ | $\frac{\sqrt{105}i}{42}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{42}$ | $-\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| 665 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(1,0;a)}(A, 1)$ | 0 | 0 | 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 | $\frac{\sqrt{5}i}{20}$ | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{60}$ | 0 | $\frac{\sqrt{15}}{60}$ | $-\frac{\sqrt{15}i}{30}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{60}$ | 0 | $-\frac{\sqrt{15}}{60}$ | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | |
| | | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ |
| | | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | $-\frac{i}{8}$ | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | $\frac{\sqrt{15}}{40}$ | 0 | |
| | | 0 | $\frac{\sqrt{15}}{30}$ | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ |
| | | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 |
| | | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | $\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{15}i}{30}$ | $-\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 |
| 666 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|-------------------------|----------------------------|----------------------------|----------------------------|---------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|---------------------------|---------------------------|--------------------------|--------------------------|
| | $\mathbb{G}_4^{(1,0;a)}(A, 2)$ | 0 | 0 | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | $\frac{3\sqrt{105}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{280}$ | 0 | $-\frac{\sqrt{7}}{280}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | $-\frac{3\sqrt{105}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{280}$ | 0 | $\frac{\sqrt{7}}{280}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | $-\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | $\frac{5\sqrt{21}}{168}$ | $\frac{\sqrt{21}i}{30}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}i}{30}$ |
| | | 0 | $\frac{\sqrt{21}i}{60}$ | 0 | 0 | $-\frac{\sqrt{35}i}{40}$ | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{\sqrt{21}i}{40}$ | 0 | 0 | $-\frac{\sqrt{21}}{40}$ |
| | | $\frac{\sqrt{21}i}{60}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{40}$ | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{40}$ | $\frac{\sqrt{21}}{40}$ | 0 |
| | | 0 | $\frac{\sqrt{21}}{60}$ | $-\frac{\sqrt{35}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | $\frac{\sqrt{21}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{40}$ |
| | | $-\frac{\sqrt{21}}{60}$ | 0 | 0 | $\frac{\sqrt{35}i}{40}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{\sqrt{21}i}{40}$ | 0 | 0 | $\frac{\sqrt{21}i}{40}$ | 0 |
| | | $-\frac{\sqrt{21}i}{30}$ | 0 | 0 | $\frac{\sqrt{35}}{140}$ | 0 | $\frac{\sqrt{35}i}{140}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}i}{30}$ | $-\frac{\sqrt{35}}{140}$ | 0 | $\frac{\sqrt{35}i}{140}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 667 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(1,0;a)}(A, 3)$ | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | $-\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 | $-\frac{9\sqrt{21}i}{280}$ | 0 | $-\frac{9\sqrt{21}}{280}$ | $-\frac{\sqrt{21}i}{35}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 | $-\frac{9\sqrt{21}i}{280}$ | 0 | $\frac{9\sqrt{21}}{280}$ | 0 | 0 | $\frac{\sqrt{21}i}{35}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{280}$ | 0 | $\frac{\sqrt{105}}{280}$ | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | $-\frac{\sqrt{7}i}{280}$ | 0 | $\frac{\sqrt{7}}{280}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}i}{280}$ | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | $-\frac{\sqrt{7}i}{280}$ | 0 | $-\frac{\sqrt{7}}{280}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{20}$ | 0 | 0 | $-\frac{\sqrt{105}i}{280}$ | 0 | 0 | $\frac{3\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{7}i}{40}$ | 0 | 0 | $-\frac{\sqrt{7}}{40}$ |
| | | $-\frac{\sqrt{7}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{280}$ | $-\frac{3\sqrt{105}}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{40}$ | $\frac{\sqrt{7}}{40}$ | 0 |
| | | 0 | $\frac{\sqrt{7}}{20}$ | $\frac{\sqrt{105}i}{280}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}i}{280}$ | $-\frac{\sqrt{7}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{40}$ |
| | | $-\frac{\sqrt{7}}{20}$ | 0 | 0 | $-\frac{\sqrt{105}i}{280}$ | 0 | 0 | 0 | $-\frac{3\sqrt{105}i}{280}$ | 0 | 0 | $\frac{\sqrt{7}i}{40}$ | 0 | 0 | $-\frac{\sqrt{7}i}{40}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{20}$ | 0 | $\frac{\sqrt{7}i}{20}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{20}$ | 0 | $\frac{\sqrt{7}i}{20}$ | 0 | 0 | 0 |
| 668 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|--------------------------------|---------------------------------------|-------------------------|----------------------------|---------------------------|----------------------------|-----------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|-------------------------|------------------------|-------------------------|-------------------------|--|
| | $\mathbb{G}_4^{(1,0;a)}(A, 4)$ | 0 | $-\frac{\sqrt{3}}{10}$ | $-\frac{3\sqrt{5}i}{80}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{80}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ | |
| | | $\frac{\sqrt{3}}{10}$ | 0 | 0 | $\frac{3\sqrt{5}i}{80}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{80}$ | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ | 0 | |
| | | 0 | $\frac{1}{10}$ | $-\frac{\sqrt{15}i}{80}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | $-\frac{7i}{80}$ | 0 | 0 | 0 | 0 | $-\frac{i}{40}$ | |
| | | $-\frac{1}{10}$ | 0 | 0 | $\frac{\sqrt{15}i}{80}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{7i}{80}$ | 0 | 0 | $-\frac{i}{40}$ | 0 | |
| | | $-\frac{i}{40}$ | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3}{20}$ | 0 | $-\frac{i}{40}$ | 0 | 0 | |
| | | 0 | $\frac{i}{40}$ | $\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3}{20}$ | 0 | $-\frac{i}{40}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{80}$ | 0 | 0 | $-\frac{\sqrt{15}i}{80}$ | 0 | 0 | $-\frac{i}{16}$ | 0 | $-\frac{1}{5}$ | $-\frac{i}{16}$ | 0 | |
| | | 0 | 0 | $\frac{\sqrt{15}i}{80}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{80}$ | $-\frac{i}{16}$ | 0 | $\frac{1}{5}$ | 0 | 0 | $\frac{i}{16}$ | |
| | | 0 | $\frac{i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{20}$ | 0 | 0 | $-\frac{i}{40}$ | 0 | 0 | $-\frac{3}{20}$ | |
| | | $\frac{i}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{20}$ | 0 | 0 | 0 | 0 | $\frac{i}{40}$ | $\frac{3}{20}$ | 0 | |
| 669 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(1,0;a)}(A, 5)$ | 0 | $-\frac{\sqrt{21}}{70}$ | $-\frac{3\sqrt{35}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{17\sqrt{21}i}{560}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | |
| | | $\frac{\sqrt{21}}{70}$ | 0 | 0 | $\frac{3\sqrt{35}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{21}i}{560}$ | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | |
| | | 0 | $-\frac{3\sqrt{7}}{70}$ | $-\frac{\sqrt{105}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | $-\frac{23\sqrt{7}i}{560}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{40}$ | |
| | | $\frac{3\sqrt{7}}{70}$ | 0 | 0 | $\frac{\sqrt{105}i}{112}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{23\sqrt{7}i}{560}$ | 0 | 0 | $-\frac{\sqrt{7}i}{40}$ | 0 | |
| | | $\frac{\sqrt{7}i}{40}$ | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{140}$ | 0 | $\frac{\sqrt{7}i}{20}$ | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{7}i}{40}$ | $-\frac{\sqrt{105}}{140}$ | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{140}$ | 0 | $\frac{\sqrt{7}i}{20}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{560}$ | 0 | $-\frac{\sqrt{105}}{70}$ | $\frac{\sqrt{105}i}{560}$ | 0 | 0 | $\frac{\sqrt{7}i}{80}$ | 0 | 0 | $-\frac{\sqrt{7}i}{80}$ | 0 | |
| | | 0 | 0 | $\frac{\sqrt{105}i}{560}$ | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{105}i}{560}$ | $\frac{\sqrt{7}i}{80}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{80}$ | |
| | | 0 | $\frac{\sqrt{7}i}{40}$ | 0 | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | 0 | $-\frac{\sqrt{7}i}{20}$ | 0 | 0 | $-\frac{\sqrt{7}}{140}$ | |
| | | $\frac{\sqrt{7}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}i}{280}$ | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{20}$ | $\frac{\sqrt{7}}{140}$ | 0 | |
| 670 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|------------------------|-------------------------|-------------------------|-----------------------|------------------------|--|
| | $\mathbb{G}_4^{(1,0;a)}(B, 1)$ | 0 | $\frac{\sqrt{3}i}{10}$ | 0 | 0 | $\frac{3\sqrt{5}i}{80}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{80}$ | 0 | 0 | $-\frac{\sqrt{3}}{20}$ | |
| | | $\frac{\sqrt{3}i}{10}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}i}{80}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{80}$ | $\frac{\sqrt{3}}{20}$ | 0 | |
| | | 0 | $\frac{i}{10}$ | 0 | 0 | $-\frac{\sqrt{15}i}{80}$ | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{7i}{80}$ | 0 | 0 | $\frac{1}{40}$ | |
| | | $\frac{i}{10}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{80}$ | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | $-\frac{7i}{80}$ | $-\frac{1}{40}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{80}$ | $\frac{\sqrt{15}i}{80}$ | 0 | 0 | $-\frac{i}{5}$ | 0 | $-\frac{1}{16}$ | $-\frac{i}{16}$ | 0 | |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{80}$ | 0 | 0 | $-\frac{\sqrt{15}i}{80}$ | $-\frac{i}{5}$ | 0 | $\frac{1}{16}$ | 0 | 0 | $\frac{i}{16}$ | |
| | | $\frac{i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | $-\frac{1}{40}$ | 0 | $-\frac{3i}{20}$ | 0 | 0 | |
| | | 0 | $-\frac{i}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | $\frac{1}{40}$ | 0 | $-\frac{3i}{20}$ | 0 | 0 | 0 | |
| | | 0 | $-\frac{1}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | $-\frac{i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{3i}{20}$ | |
| | | $\frac{1}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | $\frac{i}{40}$ | 0 | 0 | $-\frac{3i}{20}$ | 0 | |
| 671 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(1,0;a)}(B, 2)$ | 0 | 0 | 0 | $-\frac{3\sqrt{5}}{80}$ | 0 | $\frac{3\sqrt{5}i}{80}$ | 0 | 0 | 0 | $\frac{3\sqrt{3}}{80}$ | 0 | $\frac{3\sqrt{3}i}{80}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{3\sqrt{5}}{80}$ | 0 | $\frac{3\sqrt{5}i}{80}$ | 0 | 0 | 0 | $-\frac{3\sqrt{3}}{80}$ | 0 | $\frac{3\sqrt{3}i}{80}$ | 0 | 0 | 0 | |
| | | $-\frac{i}{5}$ | 0 | 0 | $-\frac{\sqrt{15}}{80}$ | 0 | $-\frac{\sqrt{15}i}{80}$ | 0 | 0 | 0 | $-\frac{1}{16}$ | 0 | $\frac{i}{16}$ | 0 | 0 | |
| | | 0 | $\frac{i}{5}$ | $\frac{\sqrt{15}}{80}$ | 0 | $-\frac{\sqrt{15}i}{80}$ | 0 | 0 | 0 | $\frac{1}{16}$ | 0 | $\frac{i}{16}$ | 0 | 0 | 0 | |
| | | 0 | $\frac{1}{40}$ | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{i}{40}$ | |
| | | $-\frac{1}{40}$ | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3i}{20}$ | 0 | 0 | $-\frac{i}{40}$ | 0 | |
| | | 0 | $-\frac{i}{40}$ | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3i}{20}$ | 0 | 0 | $-\frac{1}{40}$ | |
| | | $-\frac{i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3i}{20}$ | $\frac{1}{40}$ | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{80}$ | 0 | $\frac{\sqrt{15}}{80}$ | 0 | 0 | 0 | $-\frac{i}{16}$ | 0 | $-\frac{1}{16}$ | $-\frac{i}{5}$ | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{80}$ | 0 | $-\frac{\sqrt{15}}{80}$ | 0 | 0 | 0 | $-\frac{i}{16}$ | 0 | $\frac{1}{16}$ | 0 | 0 | $\frac{i}{5}$ | |
| 672 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|-------------------------------|---------------------------------------|--------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|-----------------------------|----------------------------|---------------------------|-------------------------|-------------------------|
| | $\mathbb{G}_4^{(1,0;a)}(B,3)$ | 0 | $-\frac{\sqrt{21}i}{70}$ | 0 | 0 | $-\frac{3\sqrt{35}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{21}i}{560}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | |
| | | $-\frac{\sqrt{21}i}{70}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{112}$ | 0 | 0 | 0 | 0 | $\frac{17\sqrt{21}i}{560}$ | $\frac{\sqrt{21}}{28}$ | 0 | |
| | | 0 | $\frac{3\sqrt{7}i}{70}$ | 0 | 0 | $\frac{\sqrt{105}i}{112}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{23\sqrt{7}i}{560}$ | 0 | 0 | $-\frac{\sqrt{7}}{40}$ |
| | | $\frac{3\sqrt{7}i}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $\frac{23\sqrt{7}i}{560}$ | $\frac{\sqrt{7}}{40}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | $\frac{\sqrt{105}}{560}$ | $\frac{\sqrt{105}i}{560}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{80}$ | $\frac{\sqrt{7}i}{80}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | $-\frac{\sqrt{105}}{560}$ | 0 | 0 | $-\frac{\sqrt{105}i}{560}$ | 0 | 0 | $\frac{\sqrt{7}}{80}$ | 0 | 0 | $-\frac{\sqrt{7}i}{80}$ |
| | | $\frac{\sqrt{7}i}{40}$ | 0 | 0 | $\frac{3\sqrt{105}}{280}$ | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{20}$ | 0 | $-\frac{\sqrt{7}i}{140}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{40}$ | $-\frac{3\sqrt{105}}{280}$ | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{20}$ | 0 | $-\frac{\sqrt{7}i}{140}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{40}$ | $\frac{3\sqrt{105}i}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | $\frac{\sqrt{7}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{140}$ |
| | | $-\frac{\sqrt{7}}{40}$ | 0 | 0 | $-\frac{3\sqrt{105}i}{280}$ | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | $-\frac{\sqrt{7}i}{20}$ | 0 | 0 | $\frac{\sqrt{7}i}{140}$ | 0 |
| 673 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(1,0;a)}(B,4)$ | $\frac{\sqrt{21}i}{35}$ | 0 | 0 | $\frac{3\sqrt{35}}{112}$ | 0 | $\frac{3\sqrt{35}i}{112}$ | 0 | 0 | 0 | $-\frac{3\sqrt{21}}{560}$ | 0 | $\frac{3\sqrt{21}i}{560}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{35}$ | $-\frac{3\sqrt{35}}{112}$ | 0 | $\frac{3\sqrt{35}i}{112}$ | 0 | 0 | 0 | $\frac{3\sqrt{21}}{560}$ | 0 | $\frac{3\sqrt{21}i}{560}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{112}$ | 0 | $-\frac{\sqrt{105}i}{112}$ | 0 | 0 | 0 | $\frac{37\sqrt{7}}{560}$ | 0 | $\frac{37\sqrt{7}i}{560}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | $-\frac{\sqrt{105}i}{112}$ | 0 | 0 | 0 | $-\frac{37\sqrt{7}}{560}$ | 0 | $\frac{37\sqrt{7}i}{560}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{40}$ | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{105}i}{280}$ | $-\frac{\sqrt{7}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{20}$ |
| | | $-\frac{\sqrt{7}}{40}$ | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | 0 | $\frac{\sqrt{7}i}{140}$ | 0 | 0 | $-\frac{\sqrt{7}i}{20}$ | 0 |
| | | 0 | $\frac{\sqrt{7}i}{40}$ | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | $\frac{3\sqrt{105}}{280}$ | 0 | 0 | $\frac{\sqrt{7}i}{140}$ | 0 | 0 | $\frac{\sqrt{7}}{20}$ |
| | | $\frac{\sqrt{7}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | $-\frac{3\sqrt{105}}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{140}$ | $-\frac{\sqrt{7}}{20}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{560}$ | 0 | $\frac{\sqrt{105}}{560}$ | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | $-\frac{\sqrt{7}i}{80}$ | 0 | $\frac{\sqrt{7}}{80}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}i}{560}$ | 0 | $-\frac{\sqrt{105}}{560}$ | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | $-\frac{\sqrt{7}i}{80}$ | 0 | $-\frac{\sqrt{7}}{80}$ | 0 | 0 | 0 |
| 674 | symmetry | 1 | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|--------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|
| | $\mathbb{G}_0^{(1,1;a)}(A)$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | $-\frac{\sqrt{105}}{140}$ | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | $\frac{\sqrt{105}}{140}$ | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | $-\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{140}$ | 0 | $-\frac{3\sqrt{35}}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | $-\frac{\sqrt{21}}{84}$ | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{35}i}{140}$ | 0 | $\frac{3\sqrt{35}}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ |
| | | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | $\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | $\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ |
| | | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{35}}{70}$ | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 |
| 675 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | | |
| | $\mathbb{G}_2^{(1,1;a)}(A, 1)$ | 0 | 0 | 0 | $-\frac{3\sqrt{35}i}{280}$ | 0 | $-\frac{3\sqrt{35}}{280}$ | $\frac{\sqrt{35}i}{35}$ | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | $\frac{\sqrt{21}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{35}i}{280}$ | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | 0 | $-\frac{\sqrt{35}i}{35}$ | $-\frac{\sqrt{21}i}{56}$ | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{11\sqrt{105}i}{840}$ | 0 | $\frac{11\sqrt{105}}{840}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | $-\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | 0 | $-\frac{11\sqrt{105}i}{840}$ | 0 | $-\frac{11\sqrt{105}}{840}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ |
| | | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $-\frac{\sqrt{105}i}{280}$ | 0 | 0 | $\frac{\sqrt{105}}{210}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ |
| | | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{280}$ | $-\frac{\sqrt{105}}{210}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | $\frac{\sqrt{7}}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{7}}{28}$ | $-\frac{\sqrt{105}i}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{210}$ | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ |
| | | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | $\frac{\sqrt{105}i}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{210}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{840}$ | 0 | $-\frac{\sqrt{105}i}{840}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{14}$ | $\frac{\sqrt{105}}{840}$ | 0 | $-\frac{\sqrt{105}i}{840}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| 676 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------|--------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|-------------------------|---------------------------|----------------------------|---------------------------|-------------------------|--------------------------|
| | $\mathbb{G}_2^{(1,1;a)}(A, 2)$ | 0 | 0 | 0 | $-\frac{11\sqrt{105}i}{840}$ | 0 | $\frac{11\sqrt{105}}{840}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{11\sqrt{105}i}{840}$ | 0 | $-\frac{11\sqrt{105}}{840}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{13\sqrt{35}i}{840}$ | 0 | $\frac{13\sqrt{35}}{840}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{13\sqrt{35}i}{840}$ | 0 | $-\frac{13\sqrt{35}}{840}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}i}{56}$ | 0 | $\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | $-\frac{\sqrt{35}i}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{420}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ |
| | | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{168}$ | $-\frac{\sqrt{35}}{420}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | $-\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | $\frac{\sqrt{21}}{28}$ | $\frac{\sqrt{35}i}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{420}$ | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ |
| | | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | $-\frac{\sqrt{35}i}{168}$ | 0 | 0 | $-\frac{\sqrt{35}i}{420}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}}{120}$ | 0 | $-\frac{\sqrt{35}i}{120}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}}{120}$ | 0 | $-\frac{\sqrt{35}i}{120}$ | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 |
| 677 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |
| | $\mathbb{G}_2^{(1,1;a)}(A, 3)$ | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{105}$ | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | $-\frac{\sqrt{105}i}{105}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{11\sqrt{35}i}{420}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | 0 | $\frac{11\sqrt{35}i}{420}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{420}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{420}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{105}$ | 0 | $-\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{35}i}{105}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{105}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{105}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ |
| | | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{420}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{420}$ | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 |
| 678 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | |
|-----|--------------------------------|--|--------------------------|---------------------------|--------------------------|----------------------------|-----------------------------|---------------------------|---------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|
| | $\mathbb{G}_2^{(1,1;a)}(B, 1)$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | $-\frac{\sqrt{105}}{105}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | $\frac{\sqrt{105}}{105}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{11\sqrt{35}i}{420}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | $\frac{\sqrt{21}}{42}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{35}i}{420}$ | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | $-\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{105}$ | $\frac{\sqrt{35}i}{105}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{105}$ | 0 | 0 | $-\frac{\sqrt{35}i}{105}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{42}$ |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{420}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{35}}{420}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{35}i}{420}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{420}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 |
| 679 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | |
| | $\mathbb{G}_2^{(1,1;a)}(B, 2)$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{60}$ | 0 | $\frac{\sqrt{105}i}{60}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{60}$ | 0 | $\frac{\sqrt{105}i}{60}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{420}$ | 0 | $\frac{\sqrt{35}i}{420}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}}{420}$ | 0 | $\frac{\sqrt{35}i}{420}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{420}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ |
| | | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{420}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ |
| | | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{420}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{35}}{420}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{105}$ | 0 | $\frac{\sqrt{35}}{105}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{105}$ | 0 | $-\frac{\sqrt{35}}{105}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 |
| 680 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|----------------------------|--------------------------------|--------------------------------|-------------------------------|------------------------------|----------------------------|-----------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------|
| | $\mathbb{G}_4^{(1,1;a)}(A, 1)$ | 0 | 0 | 0 | $-\frac{5\sqrt{22}i}{264}$ | 0 | $-\frac{5\sqrt{22}}{264}$ | $\frac{5\sqrt{22}i}{132}$ | 0 | 0 | $-\frac{7\sqrt{330}i}{1320}$ | 0 | $\frac{7\sqrt{330}}{1320}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{22}i}{264}$ | 0 | $\frac{5\sqrt{22}}{264}$ | 0 | 0 | $-\frac{5\sqrt{22}i}{132}$ | $-\frac{7\sqrt{330}i}{1320}$ | 0 | $-\frac{7\sqrt{330}}{1320}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{66}i}{264}$ | 0 | $-\frac{5\sqrt{66}}{264}$ | 0 | 0 | 0 | $-\frac{7\sqrt{110}i}{1320}$ | 0 | $-\frac{7\sqrt{110}}{1320}$ | $\frac{7\sqrt{110}i}{660}$ | 0 |
| | | 0 | 0 | $\frac{5\sqrt{66}i}{264}$ | 0 | $\frac{5\sqrt{66}}{264}$ | 0 | 0 | 0 | $-\frac{7\sqrt{110}i}{1320}$ | 0 | $\frac{7\sqrt{110}}{1320}$ | 0 | 0 | $-\frac{7\sqrt{110}i}{660}$ |
| | | 0 | $-\frac{\sqrt{110}i}{330}$ | 0 | 0 | $\frac{\sqrt{66}i}{66}$ | 0 | 0 | $\frac{\sqrt{66}}{66}$ | 0 | 0 | $-\frac{\sqrt{110}i}{165}$ | 0 | 0 | $\frac{\sqrt{110}}{165}$ |
| | | $-\frac{\sqrt{110}i}{330}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{66}$ | $-\frac{\sqrt{66}}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{165}$ | $-\frac{\sqrt{110}}{165}$ | 0 |
| | | 0 | $-\frac{\sqrt{110}}{330}$ | $\frac{\sqrt{66}i}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}i}{66}$ | $\frac{\sqrt{110}i}{165}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{165}$ |
| | | $\frac{\sqrt{110}}{330}$ | 0 | 0 | $-\frac{\sqrt{66}i}{66}$ | 0 | 0 | $\frac{\sqrt{66}i}{66}$ | 0 | 0 | $-\frac{\sqrt{110}i}{165}$ | 0 | 0 | $-\frac{\sqrt{110}i}{165}$ | 0 |
| | | $-\frac{\sqrt{110}i}{330}$ | 0 | 0 | $\frac{\sqrt{66}}{66}$ | 0 | $\frac{\sqrt{66}i}{66}$ | 0 | 0 | 0 | $-\frac{\sqrt{110}}{165}$ | 0 | $\frac{\sqrt{110}i}{165}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{110}i}{330}$ | $-\frac{\sqrt{66}}{66}$ | 0 | $\frac{\sqrt{66}i}{66}$ | 0 | 0 | 0 | $\frac{\sqrt{110}}{165}$ | 0 | $\frac{\sqrt{110}i}{165}$ | 0 | 0 | 0 |
| 681 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(1,1;a)}(A, 2)$ | 0 | 0 | 0 | $-\frac{19\sqrt{770}i}{9240}$ | 0 | $-\frac{19\sqrt{770}}{9240}$ | $\frac{5\sqrt{770}i}{924}$ | 0 | 0 | $-\frac{41\sqrt{462}i}{9240}$ | 0 | $\frac{41\sqrt{462}}{9240}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{19\sqrt{770}i}{9240}$ | 0 | $\frac{19\sqrt{770}}{9240}$ | 0 | 0 | $-\frac{5\sqrt{770}i}{924}$ | $-\frac{41\sqrt{462}i}{9240}$ | 0 | $-\frac{41\sqrt{462}}{9240}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{23\sqrt{2310}i}{9240}$ | 0 | $\frac{23\sqrt{2310}}{9240}$ | 0 | 0 | 0 | $\frac{17\sqrt{154}i}{1848}$ | 0 | $\frac{17\sqrt{154}}{1848}$ | $-\frac{19\sqrt{154}i}{4620}$ | 0 |
| | | 0 | 0 | $-\frac{23\sqrt{2310}i}{9240}$ | 0 | $-\frac{23\sqrt{2310}}{9240}$ | 0 | 0 | 0 | $\frac{17\sqrt{154}i}{1848}$ | 0 | $-\frac{17\sqrt{154}}{1848}$ | 0 | 0 | $\frac{19\sqrt{154}i}{4620}$ |
| | | 0 | $-\frac{\sqrt{154}i}{210}$ | 0 | 0 | $\frac{\sqrt{2310}i}{4620}$ | 0 | 0 | $\frac{\sqrt{2310}}{462}$ | 0 | 0 | $-\frac{47\sqrt{154}i}{4620}$ | 0 | 0 | $\frac{2\sqrt{154}}{1155}$ |
| | | $-\frac{\sqrt{154}i}{210}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2310}i}{4620}$ | $-\frac{\sqrt{2310}}{462}$ | 0 | 0 | 0 | 0 | $\frac{47\sqrt{154}i}{4620}$ | $-\frac{2\sqrt{154}}{1155}$ | 0 |
| | | 0 | $-\frac{\sqrt{154}}{210}$ | $\frac{\sqrt{2310}i}{4620}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}i}{462}$ | $\frac{47\sqrt{154}i}{4620}$ | 0 | 0 | 0 | 0 | $-\frac{2\sqrt{154}i}{1155}$ |
| | | $\frac{\sqrt{154}}{210}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{4620}$ | 0 | 0 | $\frac{\sqrt{2310}i}{462}$ | 0 | 0 | $-\frac{47\sqrt{154}i}{4620}$ | 0 | 0 | $-\frac{2\sqrt{154}i}{1155}$ | 0 |
| | | $\frac{\sqrt{154}i}{105}$ | 0 | 0 | $-\frac{\sqrt{2310}}{420}$ | 0 | $-\frac{\sqrt{2310}i}{420}$ | 0 | 0 | 0 | $\frac{\sqrt{154}}{84}$ | 0 | $-\frac{\sqrt{154}i}{84}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{154}i}{105}$ | $\frac{\sqrt{2310}}{420}$ | 0 | $-\frac{\sqrt{2310}i}{420}$ | 0 | 0 | 0 | $-\frac{\sqrt{154}}{84}$ | 0 | $-\frac{\sqrt{154}i}{84}$ | 0 | 0 | 0 |
| 682 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---------------------------------------|---------------------------|--------------------------------|--------------------------------|-------------------------------|------------------------------|----------------------------|----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|
| | $\mathbb{G}_4^{(1,1;a)}(A, 3)$ | 0 | 0 | 0 | $-\frac{23\sqrt{2310}i}{9240}$ | 0 | $\frac{23\sqrt{2310}}{9240}$ | 0 | 0 | 0 | $-\frac{\sqrt{154}i}{3080}$ | 0 | $-\frac{\sqrt{154}}{3080}$ | $-\frac{3\sqrt{154}i}{220}$ | 0 |
| | | 0 | 0 | $-\frac{23\sqrt{2310}i}{9240}$ | 0 | $-\frac{23\sqrt{2310}}{9240}$ | 0 | 0 | 0 | $-\frac{\sqrt{154}i}{3080}$ | 0 | $\frac{\sqrt{154}}{3080}$ | 0 | 0 | $\frac{3\sqrt{154}i}{220}$ |
| | | 0 | 0 | 0 | $\frac{9\sqrt{770}i}{3080}$ | 0 | $\frac{9\sqrt{770}}{3080}$ | $-\frac{\sqrt{770}i}{220}$ | 0 | 0 | $\frac{41\sqrt{462}i}{9240}$ | 0 | $-\frac{41\sqrt{462}}{9240}$ | 0 | 0 |
| | | 0 | 0 | $\frac{9\sqrt{770}i}{3080}$ | 0 | $-\frac{9\sqrt{770}}{3080}$ | 0 | 0 | $\frac{\sqrt{770}i}{220}$ | $\frac{41\sqrt{462}i}{9240}$ | 0 | $\frac{41\sqrt{462}}{9240}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{462}i}{210}$ | 0 | 0 | $-\frac{\sqrt{770}i}{220}$ | 0 | 0 | $-\frac{\sqrt{770}}{385}$ | 0 | 0 | $\frac{\sqrt{462}i}{220}$ | 0 | 0 | $-\frac{17\sqrt{462}}{2310}$ |
| | | $\frac{\sqrt{462}i}{210}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}i}{220}$ | $\frac{\sqrt{770}}{385}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}i}{220}$ | $\frac{17\sqrt{462}}{2310}$ | 0 |
| | | 0 | $-\frac{\sqrt{462}}{210}$ | $\frac{\sqrt{770}i}{220}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}i}{385}$ | $\frac{\sqrt{462}i}{220}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{462}i}{2310}$ |
| | | $\frac{\sqrt{462}}{210}$ | 0 | 0 | $-\frac{\sqrt{770}i}{220}$ | 0 | 0 | $\frac{\sqrt{770}i}{385}$ | 0 | 0 | $-\frac{\sqrt{462}i}{220}$ | 0 | 0 | $-\frac{17\sqrt{462}i}{2310}$ | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{770}}{1540}$ | 0 | $-\frac{3\sqrt{770}i}{1540}$ | 0 | 0 | 0 | $\frac{13\sqrt{462}}{4620}$ | 0 | $\frac{13\sqrt{462}i}{4620}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{770}}{1540}$ | 0 | $-\frac{3\sqrt{770}i}{1540}$ | 0 | 0 | 0 | $-\frac{13\sqrt{462}}{4620}$ | 0 | $\frac{13\sqrt{462}i}{4620}$ | 0 | 0 | 0 |
| 683 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{G}_4^{(1,1;a)}(A, 4)$ | 0 | $\frac{9\sqrt{22}}{440}$ | $-\frac{\sqrt{330}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | $-\frac{13\sqrt{22}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{22}i}{110}$ |
| | | $-\frac{9\sqrt{22}}{440}$ | 0 | 0 | $\frac{\sqrt{330}i}{120}$ | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | $\frac{13\sqrt{22}i}{440}$ | 0 | 0 | $\frac{3\sqrt{22}i}{110}$ | 0 |
| | | 0 | $-\frac{3\sqrt{66}}{440}$ | $\frac{3\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{110}$ | $\frac{\sqrt{66}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{66}i}{660}$ |
| | | $\frac{3\sqrt{66}}{440}$ | 0 | 0 | $-\frac{3\sqrt{110}i}{440}$ | 0 | 0 | $\frac{\sqrt{110}i}{110}$ | 0 | 0 | $-\frac{\sqrt{66}i}{120}$ | 0 | 0 | $-\frac{7\sqrt{66}i}{660}$ | 0 |
| | | $-\frac{\sqrt{66}i}{330}$ | 0 | 0 | $-\frac{3\sqrt{110}}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{66}}{440}$ | 0 | $-\frac{\sqrt{66}i}{330}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{66}i}{330}$ | $\frac{3\sqrt{110}}{440}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{66}}{440}$ | 0 | $-\frac{\sqrt{66}i}{330}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{55}$ | 0 | 0 | $\frac{\sqrt{110}i}{55}$ | 0 | 0 | $-\frac{\sqrt{66}i}{66}$ | 0 | $\frac{3\sqrt{66}}{220}$ | $-\frac{\sqrt{66}i}{66}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{110}i}{55}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{55}$ | $-\frac{\sqrt{66}i}{66}$ | 0 | $-\frac{3\sqrt{66}}{220}$ | 0 | 0 | $\frac{\sqrt{66}i}{66}$ |
| | | 0 | $\frac{\sqrt{66}i}{330}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{110}}{440}$ | 0 | 0 | $-\frac{\sqrt{66}i}{330}$ | 0 | 0 | $-\frac{3\sqrt{66}}{440}$ |
| | | $\frac{\sqrt{66}i}{330}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{110}}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}i}{330}$ | $\frac{3\sqrt{66}}{440}$ | 0 |
| 684 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|-------------------------------|------------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|-------------------------------|-----------------------------|----------------------------|-------------------------------|-------------------------------|
| 684 | $\mathbb{G}_4^{(1,1;a)}(A, 5)$ | 0 | $-\frac{3\sqrt{154}}{440}$ | $-\frac{\sqrt{2310}i}{1848}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}i}{924}$ | $\frac{29\sqrt{154}i}{3080}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{3\sqrt{154}}{440}$ | 0 | 0 | $\frac{\sqrt{2310}i}{1848}$ | 0 | 0 | $\frac{\sqrt{2310}i}{924}$ | 0 | 0 | $-\frac{29\sqrt{154}i}{3080}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{462}}{440}$ | $\frac{\sqrt{770}i}{616}$ | 0 | 0 | 0 | 0 | 0 | $\frac{29\sqrt{462}i}{9240}$ | 0 | 0 | 0 | 0 | $-\frac{29\sqrt{462}i}{4620}$ |
| | | $\frac{3\sqrt{462}}{440}$ | 0 | 0 | $-\frac{\sqrt{770}i}{616}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{29\sqrt{462}i}{9240}$ | 0 | 0 | $-\frac{29\sqrt{462}i}{4620}$ | 0 |
| | | $\frac{17\sqrt{462}i}{2310}$ | 0 | 0 | $-\frac{\sqrt{770}}{440}$ | 0 | $-\frac{\sqrt{770}i}{385}$ | 0 | 0 | 0 | $\frac{3\sqrt{462}}{440}$ | 0 | $-\frac{\sqrt{462}i}{210}$ | 0 | 0 |
| | | 0 | $-\frac{17\sqrt{462}i}{2310}$ | $\frac{\sqrt{770}}{440}$ | 0 | $-\frac{\sqrt{770}i}{385}$ | 0 | 0 | 0 | $-\frac{3\sqrt{462}}{440}$ | 0 | $-\frac{\sqrt{462}i}{210}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{770}i}{385}$ | 0 | $\frac{\sqrt{770}}{220}$ | $-\frac{\sqrt{770}i}{385}$ | 0 | 0 | $\frac{\sqrt{462}i}{210}$ | 0 | 0 | $-\frac{\sqrt{462}i}{210}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{770}i}{385}$ | 0 | $-\frac{\sqrt{770}}{220}$ | 0 | 0 | $\frac{\sqrt{770}i}{385}$ | $\frac{\sqrt{462}i}{210}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}i}{210}$ |
| | | 0 | $\frac{17\sqrt{462}i}{2310}$ | 0 | 0 | $-\frac{\sqrt{770}i}{385}$ | 0 | 0 | $-\frac{\sqrt{770}}{440}$ | 0 | 0 | $\frac{\sqrt{462}i}{210}$ | 0 | 0 | $-\frac{3\sqrt{462}}{440}$ |
| | | $\frac{17\sqrt{462}i}{2310}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}i}{385}$ | $\frac{\sqrt{770}}{440}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}i}{210}$ | $\frac{3\sqrt{462}}{440}$ | 0 |
| 685 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| 685 | $\mathbb{G}_4^{(1,1;a)}(B, 1)$ | 0 | $-\frac{9\sqrt{22}i}{440}$ | 0 | 0 | $\frac{\sqrt{330}i}{120}$ | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | $-\frac{13\sqrt{22}i}{440}$ | 0 | 0 | $\frac{3\sqrt{22}}{110}$ |
| | | $-\frac{9\sqrt{22}i}{440}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{120}$ | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | $\frac{13\sqrt{22}i}{440}$ | $-\frac{3\sqrt{22}}{110}$ | 0 |
| | | 0 | $-\frac{3\sqrt{66}i}{440}$ | 0 | 0 | $\frac{3\sqrt{110}i}{440}$ | 0 | 0 | $\frac{\sqrt{110}}{110}$ | 0 | 0 | $-\frac{\sqrt{66}i}{120}$ | 0 | 0 | $\frac{7\sqrt{66}}{660}$ |
| | | $-\frac{3\sqrt{66}i}{440}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{110}i}{440}$ | $-\frac{\sqrt{110}}{110}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}i}{120}$ | $-\frac{7\sqrt{66}}{660}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}}{55}$ | $-\frac{\sqrt{110}i}{55}$ | 0 | 0 | $\frac{3\sqrt{66}i}{220}$ | 0 | $-\frac{\sqrt{66}}{66}$ | $-\frac{\sqrt{66}i}{66}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}}{55}$ | 0 | 0 | $\frac{\sqrt{110}i}{55}$ | $\frac{3\sqrt{66}i}{220}$ | 0 | $\frac{\sqrt{66}}{66}$ | 0 | 0 | $\frac{\sqrt{66}i}{66}$ |
| | | $\frac{\sqrt{66}i}{330}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{110}i}{440}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}}{330}$ | 0 | $-\frac{3\sqrt{66}i}{440}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{66}i}{330}$ | 0 | 0 | $\frac{3\sqrt{110}i}{440}$ | 0 | 0 | 0 | $\frac{\sqrt{66}}{330}$ | 0 | $-\frac{3\sqrt{66}i}{440}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{66}}{330}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{110}i}{440}$ | $-\frac{\sqrt{66}i}{330}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{66}i}{440}$ |
| | | $\frac{\sqrt{66}}{330}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{110}i}{440}$ | 0 | 0 | $\frac{\sqrt{66}i}{330}$ | 0 | 0 | $-\frac{3\sqrt{66}i}{440}$ | 0 |
| 686 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---------------------------------------|-------------------------------|----------------------------|-----------------------------|------------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------|
| $\mathbb{G}_4^{(1,1;a)}(B, 2)$ | | 0 | 0 | 0 | $-\frac{\sqrt{330}}{1320}$ | 0 | $\frac{\sqrt{330}i}{1320}$ | 0 | 0 | 0 | $\frac{\sqrt{22}}{440}$ | 0 | $\frac{\sqrt{22}i}{440}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{330}}{1320}$ | 0 | $\frac{\sqrt{330}i}{1320}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}}{440}$ | 0 | $\frac{\sqrt{22}i}{440}$ | 0 | 0 | 0 |
| | | $\frac{3\sqrt{66}i}{220}$ | 0 | 0 | $-\frac{7\sqrt{110}}{440}$ | 0 | $-\frac{7\sqrt{110}i}{440}$ | 0 | 0 | 0 | $\frac{5\sqrt{66}}{264}$ | 0 | $-\frac{5\sqrt{66}i}{264}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{66}i}{220}$ | $\frac{7\sqrt{110}}{440}$ | 0 | $-\frac{7\sqrt{110}i}{440}$ | 0 | 0 | 0 | $-\frac{5\sqrt{66}}{264}$ | 0 | $-\frac{5\sqrt{66}i}{264}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{66}}{330}$ | $\frac{3\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{66}i}{440}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{330}$ |
| | | $-\frac{\sqrt{66}}{330}$ | 0 | 0 | $-\frac{3\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{66}i}{440}$ | 0 | 0 | $-\frac{\sqrt{66}i}{330}$ | 0 |
| | | 0 | $-\frac{\sqrt{66}i}{330}$ | 0 | 0 | $-\frac{3\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{66}i}{440}$ | 0 | 0 | $-\frac{\sqrt{66}}{330}$ |
| | | $-\frac{\sqrt{66}i}{330}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{66}i}{440}$ | $\frac{\sqrt{66}}{330}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{110}i}{55}$ | 0 | $-\frac{\sqrt{110}}{55}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{66}$ | 0 | $-\frac{\sqrt{66}}{66}$ | $\frac{3\sqrt{66}i}{220}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{110}i}{55}$ | 0 | $\frac{\sqrt{110}}{55}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{66}$ | 0 | $\frac{\sqrt{66}}{66}$ | 0 | 0 | $-\frac{3\sqrt{66}i}{220}$ |
| 687 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | |
| $\mathbb{G}_4^{(1,1;a)}(B, 3)$ | | 0 | $-\frac{3\sqrt{154}i}{440}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{1848}$ | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | $-\frac{29\sqrt{154}i}{3080}$ | 0 | 0 | 0 |
| | | $-\frac{3\sqrt{154}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}i}{1848}$ | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | 0 | $\frac{29\sqrt{154}i}{3080}$ | 0 | 0 |
| | | 0 | $\frac{3\sqrt{462}i}{440}$ | 0 | 0 | $-\frac{\sqrt{770}i}{616}$ | 0 | 0 | 0 | 0 | 0 | $\frac{29\sqrt{462}i}{9240}$ | 0 | 0 | $-\frac{29\sqrt{462}}{4620}$ |
| | | $\frac{3\sqrt{462}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}i}{616}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{29\sqrt{462}i}{9240}$ | $\frac{29\sqrt{462}}{4620}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{770}i}{220}$ | 0 | $-\frac{\sqrt{770}}{385}$ | $-\frac{\sqrt{770}i}{385}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}}{210}$ | $\frac{\sqrt{462}i}{210}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{770}i}{220}$ | 0 | $\frac{\sqrt{770}}{385}$ | 0 | 0 | $\frac{\sqrt{770}i}{385}$ | 0 | 0 | $\frac{\sqrt{462}}{210}$ | 0 | 0 | $-\frac{\sqrt{462}i}{210}$ |
| | | $\frac{17\sqrt{462}i}{2310}$ | 0 | 0 | $-\frac{\sqrt{770}}{385}$ | 0 | $-\frac{\sqrt{770}i}{440}$ | 0 | 0 | 0 | $\frac{\sqrt{462}}{210}$ | 0 | $-\frac{3\sqrt{462}i}{440}$ | 0 | 0 |
| | | 0 | $-\frac{17\sqrt{462}i}{2310}$ | $\frac{\sqrt{770}}{385}$ | 0 | $-\frac{\sqrt{770}i}{440}$ | 0 | 0 | 0 | $-\frac{\sqrt{462}}{210}$ | 0 | $-\frac{3\sqrt{462}i}{440}$ | 0 | 0 | 0 |
| | | 0 | $\frac{17\sqrt{462}}{2310}$ | $-\frac{\sqrt{770}i}{385}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{770}i}{440}$ | $-\frac{\sqrt{462}i}{210}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{462}i}{440}$ |
| | | $-\frac{17\sqrt{462}}{2310}$ | 0 | 0 | $\frac{\sqrt{770}i}{385}$ | 0 | 0 | $-\frac{\sqrt{770}i}{440}$ | 0 | 0 | $\frac{\sqrt{462}i}{210}$ | 0 | 0 | $\frac{3\sqrt{462}i}{440}$ | 0 |
| 688 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|------------------------------|------------------------------|----------------------------|-----------------------------|------------------------------|------------------------------|----------------------------|-----------------------------|------------------------------|-----------------------------|-------------------------------|-------------------------------|---------------------------|---------------------------|
| $\mathbb{G}_4^{(1,1;a)}(B,4)$ | | $\frac{3\sqrt{154}i}{220}$ | 0 | 0 | $-\frac{\sqrt{2310}}{1848}$ | 0 | $-\frac{\sqrt{2310}i}{1848}$ | 0 | 0 | 0 | $\frac{29\sqrt{154}}{3080}$ | 0 | $-\frac{29\sqrt{154}i}{3080}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{154}i}{220}$ | $\frac{\sqrt{2310}}{1848}$ | 0 | $-\frac{\sqrt{2310}i}{1848}$ | 0 | 0 | 0 | $-\frac{29\sqrt{154}}{3080}$ | 0 | $-\frac{29\sqrt{154}i}{3080}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{770}}{616}$ | 0 | $-\frac{\sqrt{770}i}{616}$ | 0 | 0 | 0 | $\frac{29\sqrt{462}}{9240}$ | 0 | $\frac{29\sqrt{462}i}{9240}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{770}}{616}$ | 0 | $-\frac{\sqrt{770}i}{616}$ | 0 | 0 | 0 | $-\frac{29\sqrt{462}}{9240}$ | 0 | $\frac{29\sqrt{462}i}{9240}$ | 0 | 0 | 0 |
| | | 0 | $\frac{17\sqrt{462}}{2310}$ | $-\frac{\sqrt{770}i}{440}$ | 0 | 0 | 0 | $-\frac{\sqrt{770}i}{385}$ | $-\frac{3\sqrt{462}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}i}{210}$ | |
| | | $-\frac{17\sqrt{462}}{2310}$ | 0 | 0 | $\frac{\sqrt{770}i}{440}$ | 0 | 0 | $-\frac{\sqrt{770}i}{385}$ | 0 | 0 | $\frac{3\sqrt{462}i}{440}$ | 0 | 0 | $\frac{\sqrt{462}i}{210}$ | 0 |
| | | 0 | $\frac{17\sqrt{462}i}{2310}$ | 0 | 0 | $-\frac{\sqrt{770}i}{440}$ | 0 | 0 | $-\frac{\sqrt{770}}{385}$ | 0 | 0 | $\frac{3\sqrt{462}i}{440}$ | 0 | 0 | $-\frac{\sqrt{462}}{210}$ |
| | | $\frac{17\sqrt{462}i}{2310}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}i}{440}$ | $\frac{\sqrt{770}}{385}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{462}i}{440}$ | $\frac{\sqrt{462}}{210}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{770}i}{385}$ | 0 | $-\frac{\sqrt{770}}{385}$ | $\frac{\sqrt{770}i}{220}$ | 0 | 0 | $-\frac{\sqrt{462}i}{210}$ | 0 | $\frac{\sqrt{462}}{210}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{770}i}{385}$ | 0 | $\frac{\sqrt{770}}{385}$ | 0 | 0 | $-\frac{\sqrt{770}i}{220}$ | $-\frac{\sqrt{462}i}{210}$ | 0 | $-\frac{\sqrt{462}}{210}$ | 0 | 0 | 0 |
| 689 | symmetry | y | | | | | | | | | | | | | |
| $\mathbb{T}_1^{(a)}(A)$ | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ |
| | | $\frac{\sqrt{7}i}{14}$ | 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 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 |
| 690 | symmetry | x | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|------------------------|------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------------|------------------------|
| | $\mathbb{T}_1^{(a)}(B, 1)$ | 0 | 0 | $-\frac{3\sqrt{35}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{35}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 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 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 |
| 691 | symmetry | z | | | | | | | | | | | | | |
| | $\mathbb{T}_1^{(a)}(B, 2)$ | 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 | $\frac{3\sqrt{35}i}{70}$ | 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 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 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 |
| 692 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix |
|-----|----------------------------|---|
| | $\mathbb{T}_3^{(a)}(A, 1)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 693 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ $\begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{30} & 0 & 0 & 0 & 0 & 0 & -\frac{i}{4} & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{12} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} \\ -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 \end{bmatrix}$ |
| 694 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|--------------------------------|------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|-------------------------|-------------------------|------------------------|------------------------|
| | $\mathbb{T}_3^{(a)}(A, 3)$ | 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 | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{8}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 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 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{8}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{8}$ | 0 | 0 | 0 | 0 |
| 695 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(a)}(B, 1)$ | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{5}i}{10}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{5}i}{10}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 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 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 |
| 696 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|----------------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|---|-------------------------|------------------------|------------------------|------------------------|------------------------|
| | $\mathbb{T}_3^{(a)}(B, 2)$ | 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 | 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 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 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 |
| 697 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(a)}(B, 3)$ | 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 |
| | | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 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 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{8}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{8}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{8}$ | 0 | 0 |
| 698 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix |
|-----|----------------------------|--|
| | $\mathbb{T}_3^{(a)}(B, 4)$ | $ \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 & 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 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{24} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{8} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{24} & 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 & 0 & 0 & 0 & 0 \end{bmatrix} $ |
| 699 | symmetry | $ \frac{3\sqrt{35}xyz(x-y)(x+y)}{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 \\ \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{2}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}i}{40} & 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} \end{bmatrix} $ |
| 700 | symmetry | $ \frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2} $ |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|--|--------------------------|-------------------------|-------------------------|---------------------------|---------------------------|-------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| | $\mathbb{T}_5^{(a)}(A, 2)$ | $-\frac{\sqrt{30}i}{20}$ | 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 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}i}{40}$ | 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 |
| 701 | symmetry | $\frac{y(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(a)}(A, 3)$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{168}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{168}$ | 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 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 | 0 |
| 702 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------|----------------------------|---|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--|--|---|---|---|---|-----------------------|---|---|---|---|---|--------------------------|---|---|---|---|---|---|---|---|-----------------------|---|---|---|---|---|--------------------------|---|---|---|---|---|---|-------------------------|---|---|---|---|---|---------------------------|---|---|---|---|---|---|---|---|-------------------------|---|---|---|---|---|---------------------------|---|---|---|---|---|---|---|---|-------------------------|---|---|---|---|---|--------------------------|---|---|---|---|---|---|---|---|-------------------------|---|---|---|---|---|--------------------------|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------------|---|---|---|---|---|--------------------------|---|---|---|---|---|---|---|---|------------------------|---|---|---|---|---|--------------------------|---|---|---|---|
| | $\mathbb{T}_5^{(a)}(A, 4)$ | <table><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{3\sqrt{10}i}{40}$</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{3\sqrt{10}i}{40}$</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{30}i}{40}$</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{30}i}{40}$</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{2}i}{8}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{30}i}{40}$</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{2}i}{8}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{30}i}{40}$</td></tr><tr><td>$-\frac{\sqrt{30}i}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>$-\frac{\sqrt{30}i}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>$\frac{\sqrt{2}i}{8}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{30}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{2}i}{8}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{30}i}{40}$</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table> | | | | | | | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | $-\frac{\sqrt{30}i}{20}$ | 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 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}i}{40}$ | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| $-\frac{\sqrt{30}i}{20}$ | 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 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 703 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ <table><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{2}i}{8}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{30}i}{40}$</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{2}i}{8}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{30}i}{40}$</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{6}i}{24}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{3\sqrt{10}i}{40}$</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{6}i}{24}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{3\sqrt{10}i}{40}$</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{6}i}{12}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{10}i}{20}$</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{6}i}{12}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{10}i}{20}$</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>$\frac{\sqrt{6}i}{12}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{10}i}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>$\frac{\sqrt{6}i}{12}$</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>$-\frac{\sqrt{10}i}{20}$</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table> | | | | | | | | | | | | | | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 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 | $\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}i}{40}$ | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | $\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 0 | $\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 704 | symmetry | $\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | |
|-----|----------------------------|--|-------------------------|---------------------------|---------------------------|-------------------------|-------------------------|--------------------------|--------------------------|---------------------------|---------------------------|----------------------------|----------------------------|----------------------------|
| | $\mathbb{T}_5^{(a)}(B, 1)$ | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{42}i}{84}$ | 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 | $\frac{\sqrt{70}i}{56}$ | 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 | $-\frac{5\sqrt{42}i}{168}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{168}$ | 0 | 0 |
| 705 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(a)}(B, 2)$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{42}$ | 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 | 0 | 0 | $\frac{\sqrt{42}i}{84}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{84}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 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 | $-\frac{5\sqrt{42}i}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 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 | $\frac{5\sqrt{42}i}{168}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{42}i}{84}$ | 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 |
| 706 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|---|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| | $\mathbb{T}_5^{(a)}(B, 3)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 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 | $\frac{\sqrt{2}i}{8}$ | 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 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 |
| 707 | symmetry | $\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(a)}(B, 4)$ | 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 | $\frac{\sqrt{30}i}{20}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{40}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 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 |
| 708 | symmetry | $\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|--|---|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{T}_5^{(a)}(B, 5)$ | 0 | 0 | $-\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{10}i}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 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 | $-\frac{\sqrt{10}i}{20}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 |
| 709 | symmetry | $-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(a)}(B, 6)$ | 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 | $\frac{\sqrt{6}i}{12}$ | 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 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{20}$ | 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 |
| 710 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|-----------------------------------|---------------------------|----------------------------|---------------------------|---------------------------|--------------------------|---------------------------|----------------------------|---------------------------|---------------------------|----------------------------|---------------------------|-------------------------|--------------------------|
| | $\mathbb{T}_3^{(1,-1;a)}(A, 1)$ | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | $\frac{\sqrt{210}i}{168}$ | $\frac{\sqrt{210}}{84}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | $-\frac{\sqrt{210}i}{168}$ | 0 | 0 | $-\frac{\sqrt{210}}{84}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | $\frac{\sqrt{42}i}{168}$ | $\frac{\sqrt{42}}{84}$ | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | $\frac{\sqrt{70}}{56}$ | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{42}$ | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 711 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(1,-1;a)}(A, 2)$ | 0 | $-\frac{3\sqrt{14}i}{56}$ | $\frac{\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | $\frac{3\sqrt{14}i}{56}$ | 0 | 0 | $-\frac{\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{42}i}{56}$ | $\frac{\sqrt{70}}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{140}$ | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | $-\frac{\sqrt{70}}{280}$ | 0 | 0 | $-\frac{\sqrt{70}}{140}$ | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{280}$ | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{28}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | $-\frac{\sqrt{42}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{70}$ | $\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 |
| 712 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--------------------------------|----------------------------|--------------------------|---------------------------|---------------------------|--------------------------|---------------------------|---------------------------|---------------------------|--------------------------|------------------------|-------------------------|--------------------------|--------------------------|
| | $\mathbb{T}_3^{(1,-1;a)}(A, 3)$ | 0 | $-\frac{\sqrt{210i}}{168}$ | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{84}$ |
| | | $\frac{\sqrt{210i}}{168}$ | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | $-\frac{\sqrt{210}}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{70i}}{56}$ | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{70i}}{56}$ | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42i}}{168}$ | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{70i}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42i}}{168}$ | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{70i}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | $\frac{\sqrt{42i}}{84}$ | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | $-\frac{\sqrt{42i}}{84}$ | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{42i}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70i}}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | $\frac{\sqrt{42i}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70i}}{56}$ | 0 |
| 713 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(1,-1;a)}(B, 1)$ | 0 | $-\frac{3\sqrt{14}}{56}$ | 0 | 0 | $-\frac{\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | $\frac{\sqrt{14i}}{28}$ |
| | | $-\frac{3\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | $-\frac{\sqrt{14i}}{28}$ | 0 |
| | | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | $\frac{\sqrt{70}}{280}$ | 0 | 0 | $\frac{\sqrt{70i}}{140}$ | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{280}$ | $-\frac{\sqrt{70i}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70i}}{70}$ | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{70i}}{70}$ | 0 | 0 | $\frac{\sqrt{70}}{70}$ | $-\frac{\sqrt{42}}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70i}}{70}$ | 0 | $\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70i}}{70}$ | 0 | $\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 |
| 714 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|----------------------------------|--------------------------|---------------------------|----------------------------|---------------------------|---------------------------|-------------------------|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|---------------------------|------------------------|
| | $\mathbb{T}_3^{(1,-1;a)}(B, 2)$ | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{280}$ | 0 | $-\frac{\sqrt{210}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{210}i}{280}$ | 0 | $-\frac{\sqrt{210}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{42}}{28}$ | 0 | 0 | $-\frac{\sqrt{70}i}{280}$ | 0 | $\frac{\sqrt{70}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{42}}{28}$ | $\frac{\sqrt{70}i}{280}$ | 0 | $\frac{\sqrt{70}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | $-\frac{\sqrt{70}i}{70}$ | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{280}$ | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{70}$ | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}}{70}$ | 0 | $-\frac{\sqrt{70}i}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{28}$ |
| 715 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(1,-1;a)}(B, 3)$ | 0 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ | |
| | | $\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | $\frac{\sqrt{210}i}{84}$ | 0 | |
| | | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}i}{84}$ | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | $\frac{\sqrt{42}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | $\frac{\sqrt{42}i}{42}$ | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 |
| 716 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|---|-------------------------|--------------------------|---------------------------|--------------------------|--------------------------|-------------------------|--------------------------|---------------------------|----------------------------|---------------------------|---------------------------|-----------------|----------------|
| | $\mathbb{T}_3^{(1,-1;a)}(B, 4)$ | $-\frac{\sqrt{210}}{84}$ | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{168}$ | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{210}}{84}$ | $\frac{\sqrt{14}i}{56}$ | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{210}i}{168}$ | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{42}}{42}$ | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | $\frac{\sqrt{42}i}{42}$ | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | $\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| 717 | symmetry | $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(1,-1;a)}(A, 1)$ | 0 | 0 | 0 | $\frac{3\sqrt{5}}{40}$ | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | $-\frac{3\sqrt{3}}{40}$ | 0 | $-\frac{3\sqrt{3}i}{40}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{5}}{40}$ | 0 | $\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | $-\frac{3\sqrt{3}}{40}$ | 0 | $\frac{3\sqrt{3}i}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | $-\frac{1}{10}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{1}{10}$ |
| | | 0 | $-\frac{1}{20}$ | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3}{40}$ | 0 | 0 | $\frac{i}{20}$ |
| | | $-\frac{1}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3}{40}$ | $-\frac{i}{20}$ | 0 |
| | | 0 | $\frac{i}{20}$ | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3}{40}$ | 0 | 0 | 0 | 0 | $\frac{1}{20}$ |
| | | $-\frac{i}{20}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3}{40}$ | 0 | 0 | $\frac{1}{20}$ | 0 |
| | | $\frac{1}{10}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | $\frac{1}{8}$ | 0 | 0 |
| | | 0 | $-\frac{1}{10}$ | $-\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | $\frac{1}{8}$ | 0 | 0 | 0 |
| 718 | symmetry | $\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|--------------------------|----------------------------|---------------------------|--------------------------|-------------------------|---------------------------|----------------------------|----------------------------|----------------------------|--------------------------|--------------------------|---------------------------|----------------------------|
| | $\mathbb{T}_5^{(1,-1;a)}(A, 2)$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $\frac{1}{40}$ | 0 | $-\frac{i}{40}$ | $-\frac{1}{5}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | $\frac{1}{40}$ | 0 | $\frac{i}{40}$ | 0 | 0 | $\frac{1}{5}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{5}}{40}$ | 0 | $-\frac{\sqrt{5}i}{40}$ | $\frac{\sqrt{5}}{10}$ | 0 | 0 | $\frac{3\sqrt{3}}{40}$ | 0 | $\frac{3\sqrt{3}i}{40}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{5}}{40}$ | 0 | $\frac{\sqrt{5}i}{40}$ | 0 | 0 | $-\frac{\sqrt{5}}{10}$ | $\frac{3\sqrt{3}}{40}$ | 0 | $-\frac{3\sqrt{3}i}{40}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{3}}{20}$ | 0 | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | $-\frac{7\sqrt{3}}{120}$ | 0 | 0 | $-\frac{\sqrt{3}i}{15}$ |
| | | $\frac{\sqrt{3}}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{40}$ | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{7\sqrt{3}}{120}$ | $\frac{\sqrt{3}i}{15}$ | 0 |
| | | 0 | $\frac{\sqrt{3}i}{20}$ | $\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{20}$ | $-\frac{7\sqrt{3}}{120}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{15}$ |
| | | $-\frac{\sqrt{3}i}{20}$ | 0 | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{7\sqrt{3}}{120}$ | 0 | 0 | $\frac{\sqrt{3}}{15}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{5}i}{40}$ | 0 | $\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | $\frac{\sqrt{3}i}{120}$ | 0 | $-\frac{\sqrt{3}}{120}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | $\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{120}$ | 0 | $-\frac{\sqrt{3}}{120}$ | 0 | 0 | 0 |
| 719 | symmetry | $\frac{y(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(1,-1;a)}(A, 3)$ | 0 | $\frac{\sqrt{105}i}{84}$ | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{210}$ |
| | | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{105}}{280}$ | 0 | 0 | $\frac{\sqrt{105}}{210}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{84}$ | $\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | $-\frac{\sqrt{35}}{840}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{60}$ |
| | | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{840}$ | 0 | 0 | $-\frac{\sqrt{35}}{60}$ | 0 |
| | | $-\frac{\sqrt{35}}{60}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $-\frac{5\sqrt{35}i}{168}$ | 0 | $\frac{\sqrt{35}}{60}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{60}$ | $-\frac{5\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $\frac{5\sqrt{35}i}{168}$ | 0 | $\frac{\sqrt{35}}{60}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{56}$ | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | $-\frac{\sqrt{35}}{120}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{120}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{56}$ | $-\frac{\sqrt{35}}{120}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{120}$ |
| | | 0 | $\frac{\sqrt{35}}{60}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{60}$ | 0 | 0 | $-\frac{5\sqrt{35}i}{168}$ |
| | | $\frac{\sqrt{35}}{60}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{60}$ | $\frac{5\sqrt{35}i}{168}$ | 0 |
| 720 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | $\mathbb{T}_5^{(1,-1;a)}(A, 4)$ | $ \begin{bmatrix} 0 & -\frac{\sqrt{3}i}{20} & -\frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{10} \\ \frac{\sqrt{3}i}{20} & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{40} & 0 & 0 & -\frac{\sqrt{3}}{10} & 0 \\ 0 & \frac{i}{20} & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & -\frac{7}{40} & 0 & 0 & 0 & 0 & -\frac{1}{20} \\ -\frac{i}{20} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & \frac{7}{40} & 0 & 0 & -\frac{1}{20} & 0 \\ -\frac{1}{20} & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{3i}{40} & 0 & -\frac{1}{20} & 0 & 0 \\ 0 & \frac{1}{20} & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{3i}{40} & 0 & -\frac{1}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{10} & -\frac{1}{8} & 0 \\ 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & -\frac{1}{8} & 0 & \frac{i}{10} & 0 & 0 & \frac{1}{8} \\ 0 & \frac{1}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & -\frac{1}{20} & 0 & 0 & -\frac{3i}{40} \\ \frac{1}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & \frac{1}{20} & \frac{3i}{40} & 0 \end{bmatrix} $ | | | | | | | | | | | | | |
| 721 | symmetry | $ \frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4} $ | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(1,-1;a)}(A, 5)$ | $ \begin{bmatrix} 0 & -\frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{1}{10} & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{1}{10} & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{30} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{15} \\ \frac{\sqrt{3}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{30} & 0 & 0 & -\frac{\sqrt{3}}{15} & 0 \\ \frac{\sqrt{3}}{15} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & \frac{\sqrt{3}i}{60} & 0 & \frac{\sqrt{3}}{20} & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{15} & -\frac{\sqrt{5}i}{20} & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & 0 & -\frac{\sqrt{3}i}{60} & 0 & \frac{\sqrt{3}}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & -\frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{20} & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & \frac{\sqrt{3}}{20} & 0 \\ 0 & 0 & \frac{\sqrt{5}}{20} & 0 & \frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{20} & -\frac{\sqrt{3}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{20} \\ 0 & \frac{\sqrt{3}}{15} & 0 & 0 & \frac{\sqrt{5}}{20} & 0 & 0 & \frac{\sqrt{5}i}{20} & 0 & 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & -\frac{\sqrt{3}i}{60} \\ \frac{\sqrt{3}}{15} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{20} & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{20} & \frac{\sqrt{3}i}{60} & 0 \end{bmatrix} $ | | | | | | | | | | | | | |
| 722 | symmetry | $ \frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8} $ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|---------------------------|----------------------------|
| | $\mathbb{T}_5^{(1,-1;a)}(B, 1)$ | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{105}i}{210}$ |
| | | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{105}}{280}$ | $\frac{\sqrt{105}i}{210}$ | 0 |
| | | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{840}$ | 0 | 0 | $-\frac{\sqrt{35}i}{60}$ |
| | | $\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{840}$ | $\frac{\sqrt{35}i}{60}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | $\frac{\sqrt{21}}{56}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{120}$ | $-\frac{\sqrt{35}}{120}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | $\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{120}$ | 0 | 0 | $\frac{\sqrt{35}}{120}$ |
| | | $\frac{\sqrt{35}}{60}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{60}$ | 0 | $\frac{5\sqrt{35}}{168}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}}{60}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{60}$ | 0 | $\frac{5\sqrt{35}}{168}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}i}{60}$ | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | $\frac{\sqrt{35}}{60}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{35}}{168}$ |
| | | $-\frac{\sqrt{35}i}{60}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}}{60}$ | 0 | 0 | $\frac{5\sqrt{35}}{168}$ | 0 |
| 723 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(1,-1;a)}(B, 2)$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $-\frac{13\sqrt{35}i}{840}$ | 0 | $-\frac{13\sqrt{35}}{840}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $\frac{13\sqrt{35}i}{840}$ | 0 | $-\frac{13\sqrt{35}}{840}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{60}$ | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | $\frac{5\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{60}$ |
| | | $\frac{\sqrt{35}i}{60}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{5\sqrt{35}}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{60}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}}{60}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{5\sqrt{35}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}i}{60}$ |
| | | $-\frac{\sqrt{35}}{60}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{35}}{168}$ | $\frac{\sqrt{35}i}{60}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{120}$ | 0 | $\frac{\sqrt{35}i}{120}$ | $\frac{\sqrt{35}}{42}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{120}$ | 0 | $-\frac{\sqrt{35}i}{120}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ |
| 724 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix |
|-----|---------------------------------|--|
| | $\mathbb{T}_5^{(1,-1;a)}(B, 3)$ | $ \begin{bmatrix} 0 & -\frac{\sqrt{3}}{20} & 0 & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{40} & 0 & 0 & \frac{\sqrt{3}i}{10} \\ -\frac{\sqrt{3}}{20} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{40} & -\frac{\sqrt{3}i}{10} & 0 \\ 0 & -\frac{1}{20} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & -\frac{\sqrt{15}i}{20} & 0 & 0 & \frac{7}{40} & 0 & 0 & -\frac{i}{20} \\ -\frac{1}{20} & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 & 0 & -\frac{7}{40} & \frac{i}{20} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{40} & \frac{\sqrt{15}}{40} & 0 & 0 & \frac{1}{10} & 0 & \frac{i}{8} & -\frac{1}{8} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & -\frac{\sqrt{15}}{40} & \frac{1}{10} & 0 & -\frac{i}{8} & 0 & 0 & \frac{1}{8} \\ \frac{1}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & \frac{i}{20} & 0 & \frac{3}{40} & 0 & 0 \\ 0 & -\frac{1}{20} & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & -\frac{i}{20} & 0 & \frac{3}{40} & 0 & 0 & 0 \\ 0 & \frac{i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & -\frac{1}{20} & 0 & 0 & 0 & 0 & \frac{3}{40} \\ -\frac{i}{20} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & \frac{1}{20} & 0 & 0 & \frac{3}{40} & 0 \end{bmatrix} $ |
| 725 | symmetry | $ \frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8} $ $ \begin{bmatrix} 0 & 0 & 0 & \frac{3\sqrt{5}i}{40} & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{40} & 0 & \frac{3\sqrt{3}}{40} & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & \frac{3\sqrt{5}}{40} & 0 & 0 & 0 & \frac{3\sqrt{3}i}{40} & 0 & \frac{3\sqrt{3}}{40} & 0 & 0 & 0 \\ \frac{1}{10} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & \frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 \\ 0 & -\frac{1}{10} & -\frac{\sqrt{15}i}{40} & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & -\frac{i}{8} & 0 & \frac{1}{8} & 0 & 0 & 0 \\ 0 & -\frac{i}{20} & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{3}{40} & 0 & 0 & 0 & 0 & -\frac{1}{20} \\ \frac{i}{20} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{3}{40} & 0 & 0 & -\frac{1}{20} & 0 \\ 0 & -\frac{1}{20} & 0 & 0 & \frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & \frac{3}{40} & 0 & 0 & \frac{i}{20} \\ -\frac{1}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & 0 & 0 & 0 & 0 & -\frac{3}{40} & -\frac{i}{20} & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & -\frac{1}{8} & 0 & \frac{i}{8} & \frac{1}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{15}}{40} & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & 0 & -\frac{1}{8} & 0 & -\frac{i}{8} & 0 & 0 & -\frac{1}{10} \end{bmatrix} $ |
| 726 | symmetry | $ \frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4} $ |

continued ...

Table 9

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

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-------------------------|--------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|----------------------------|--------------------------|-------------------------|-------------------------|--------------------------|-------------------------|--------------------------|
| | $\mathbb{T}_1^{(1,0;a)}(A)$ | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{140}$ | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{70}}{280}$ | 0 | 0 | $-\frac{3\sqrt{70}}{140}$ | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 |
| 729 | symmetry | x | | | | | | | | | | | | | |
| | $\mathbb{T}_1^{(1,0;a)}(B, 1)$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{280}$ | 0 | 0 | $-\frac{3\sqrt{70}i}{140}$ | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | $\frac{3\sqrt{70}i}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | $\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}i}{28}$ | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 |
| 730 | symmetry | z | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------------|-------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|----------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|
| | $\mathbb{T}_1^{(1,0;a)}(B, 2)$ | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{70}i}{280}$ | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{210}i}{280}$ | 0 | $-\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{210}i}{280}$ | 0 | $-\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 |
| 731 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(1,0;a)}(A, 1)$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{1}{12}$ | 0 | $-\frac{i}{12}$ | $-\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{1}{12}$ | 0 | $\frac{i}{12}$ | 0 | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{1}{24}$ | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ |
| | | 0 | 0 | 0 | 0 | $\frac{1}{24}$ | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| | | 0 | 0 | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | $-\frac{1}{24}$ | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ |
| | | 0 | 0 | 0 | $-\frac{1}{24}$ | 0 | 0 | $-\frac{1}{24}$ | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 |
| | | 0 | 0 | 0 | $\frac{i}{24}$ | 0 | $\frac{1}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{i}{24}$ | 0 | $\frac{1}{24}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 |
| 732 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|-------------------------|------------------------|----------------|----------------|-------------------------|
| | $\mathbb{T}_3^{(1,0;a)}(A, 2)$ | 0 | 0 | $\frac{7\sqrt{5}}{80}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{20}$ | $-\frac{\sqrt{3}}{16}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{7\sqrt{5}}{80}$ | 0 | 0 | $\frac{\sqrt{5}}{20}$ | 0 | 0 | $\frac{\sqrt{3}}{16}$ | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}}{240}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | $-\frac{1}{16}$ | 0 | 0 | 0 | $-\frac{1}{8}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}}{240}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{1}{16}$ | 0 | 0 | $-\frac{1}{8}$ |
| | | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 |
| | | 0 | $-\frac{1}{8}$ | 0 | 0 | $-\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}}{240}$ | 0 | 0 | $-\frac{\sqrt{15}}{240}$ | 0 | 0 | $-\frac{3}{16}$ | 0 | 0 | $-\frac{3}{16}$ |
| | | 0 | 0 | $\frac{\sqrt{15}}{240}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{240}$ | $-\frac{3}{16}$ | 0 | 0 | 0 | $\frac{3}{16}$ |
| | | 0 | $-\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 |
| | | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 |
| 733 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(1,0;a)}(A, 3)$ | 0 | 0 | $\frac{\sqrt{3}}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | $-\frac{\sqrt{5}}{16}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{3}}{16}$ | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | $\frac{\sqrt{5}}{16}$ | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{5}{48}$ | 0 | 0 | 0 | 0 | $\frac{1}{24}$ | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ |
| | | 0 | 0 | 0 | $\frac{5}{48}$ | 0 | 0 | $\frac{1}{24}$ | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 | $\frac{\sqrt{15}}{24}$ |
| | | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{i}{6}$ | 0 | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}}{24}$ | $\frac{i}{6}$ | 0 | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{1}{48}$ | 0 | $-\frac{i}{6}$ | $\frac{1}{48}$ | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 | $-\frac{\sqrt{15}}{48}$ |
| | | 0 | 0 | $\frac{1}{48}$ | 0 | $\frac{i}{6}$ | 0 | 0 | $-\frac{1}{48}$ | $\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{48}$ |
| | | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{1}{24}$ | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{1}{24}$ | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| 734 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|-------------------------------|----------------------------------|----------------|----------------------------|-----------------------------|---------------------------|---------------------------|--------------------------|--------------------------|------------------------|-------------------------|------------------------|-----------------------|-----------------|----------------|--|
| | $\mathbb{T}_3^{(1,0;a)}(B,1)$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{5}}{80}$ | 0 | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | $-\frac{\sqrt{3}}{16}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{7\sqrt{5}}{80}$ | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{16}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{240}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{1}{16}$ | 0 | 0 | $-\frac{i}{8}$ | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{240}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{1}{16}$ | $\frac{i}{8}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{240}$ | $\frac{\sqrt{15}}{240}$ | 0 | 0 | 0 | 0 | $\frac{3i}{16}$ | $-\frac{3}{16}$ | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{240}$ | 0 | 0 | $-\frac{\sqrt{15}}{240}$ | 0 | 0 | $-\frac{3i}{16}$ | 0 | 0 | $\frac{3}{16}$ | |
| | | $-\frac{1}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | |
| | | 0 | $\frac{1}{8}$ | $\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | $-\frac{i}{8}$ | $-\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | |
| | | $\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | |
| 735 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(1,0;a)}(B,2)$ | 0 | 0 | 0 | $-\frac{3\sqrt{5}i}{80}$ | 0 | $-\frac{3\sqrt{5}}{80}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{16}$ | 0 | $\frac{\sqrt{3}}{16}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{3\sqrt{5}i}{80}$ | 0 | $-\frac{3\sqrt{5}}{80}$ | 0 | 0 | 0 | $\frac{\sqrt{3}i}{16}$ | 0 | $\frac{\sqrt{3}}{16}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{11\sqrt{15}i}{240}$ | 0 | $\frac{11\sqrt{15}}{240}$ | 0 | 0 | 0 | $-\frac{i}{16}$ | 0 | $-\frac{1}{16}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{11\sqrt{15}i}{240}$ | 0 | $\frac{11\sqrt{15}}{240}$ | 0 | 0 | 0 | $\frac{i}{16}$ | 0 | $-\frac{1}{16}$ | 0 | 0 | 0 | |
| | | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | |
| | | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | |
| | | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | |
| | | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}}{240}$ | 0 | $-\frac{\sqrt{15}i}{240}$ | 0 | 0 | 0 | $-\frac{3}{16}$ | 0 | $\frac{3i}{16}$ | 0 | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{15}}{240}$ | 0 | $\frac{\sqrt{15}i}{240}$ | 0 | 0 | 0 | $-\frac{3}{16}$ | 0 | $-\frac{3i}{16}$ | 0 | 0 | 0 | |
| 736 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-------------------------------------|--------------------------|------------------------|-------------------------|-----------------------|------------------------|-------------------------|------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|
| | $\mathbb{T}_3^{(1,0;a)}(B, 3)$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{16}$ | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $\frac{\sqrt{5}}{16}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{16}$ | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{16}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{5}{48}$ | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{5}{48}$ | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{48}$ | $\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | 0 | 0 | $\frac{1}{6}$ | 0 | $-\frac{i}{48}$ | $\frac{1}{48}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | $\frac{\sqrt{15}}{48}$ | 0 |
| | | 0 | 0 | $\frac{1}{6}$ | 0 | $\frac{i}{48}$ | 0 | 0 | $-\frac{1}{48}$ | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | $-\frac{\sqrt{15}}{48}$ |
| | | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{i}{24}$ | 0 | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}}{24}$ | $\frac{i}{24}$ | 0 | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{1}{24}$ | 0 | 0 | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 737 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(1,0;a)}(B, 4)$ | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{48}$ | 0 | $\frac{\sqrt{3}}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{5}i}{16}$ | 0 | $\frac{\sqrt{5}}{16}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{3}i}{48}$ | 0 | $\frac{\sqrt{3}}{48}$ | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{16}$ | 0 | $\frac{\sqrt{5}}{16}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{7i}{48}$ | 0 | $\frac{7}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{7i}{48}$ | 0 | $\frac{7}{48}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{1}{6}$ | 0 | 0 | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{1}{6}$ | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{1}{6}$ | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{1}{48}$ | 0 | $-\frac{i}{48}$ | $\frac{1}{6}$ | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 |
| | | 0 | 0 | $\frac{1}{48}$ | 0 | $\frac{i}{48}$ | 0 | 0 | $-\frac{1}{6}$ | $-\frac{\sqrt{15}}{48}$ | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 |
| 738 | symmetry | $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|-------------------------|--------------------------|--------------------------|--------------------------|---------------------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|-------------------------|------------------------|-------------------------|
| | $\mathbb{T}_5^{(1,0;a)}(A, 1)$ | 0 | 0 | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | $\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{40}$ | 0 | $\frac{\sqrt{3}i}{40}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{40}$ | 0 | $-\frac{\sqrt{3}i}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | $\frac{1}{5}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 | $-\frac{1}{5}$ |
| | | 0 | $\frac{1}{10}$ | 0 | 0 | $\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{10}$ | 0 | 0 | $-\frac{i}{10}$ |
| | | $\frac{1}{10}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{10}$ | $\frac{i}{10}$ | 0 |
| | | 0 | $-\frac{i}{10}$ | $\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | $-\frac{1}{10}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{10}$ |
| | | $\frac{i}{10}$ | 0 | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{10}$ | 0 | 0 | $-\frac{1}{10}$ | 0 |
| | | $-\frac{1}{5}$ | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{1}{5}$ | $-\frac{\sqrt{15}i}{30}$ | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 739 | symmetry | $\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(1,0;a)}(A, 2)$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $-\frac{7}{40}$ | 0 | $\frac{7i}{40}$ | $-\frac{1}{10}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $-\frac{7}{40}$ | 0 | $-\frac{7i}{40}$ | 0 | 0 | $\frac{1}{10}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}}{120}$ | 0 | $\frac{\sqrt{5}i}{120}$ | $-\frac{\sqrt{5}}{30}$ | 0 | 0 | $-\frac{\sqrt{3}}{40}$ | 0 | $-\frac{\sqrt{3}i}{40}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}}{120}$ | 0 | $-\frac{\sqrt{5}i}{120}$ | 0 | 0 | $\frac{\sqrt{5}}{30}$ | $-\frac{\sqrt{3}}{40}$ | 0 | $\frac{\sqrt{3}i}{40}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{3}}{10}$ | 0 | 0 | $-\frac{\sqrt{5}}{30}$ | 0 | 0 | $\frac{\sqrt{5}i}{15}$ | 0 | 0 | $\frac{\sqrt{3}}{30}$ | 0 | 0 | $-\frac{\sqrt{3}i}{30}$ |
| | | $-\frac{\sqrt{3}}{10}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{30}$ | $-\frac{\sqrt{5}i}{15}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{30}$ | $\frac{\sqrt{3}i}{30}$ | 0 |
| | | 0 | $-\frac{\sqrt{3}i}{10}$ | $\frac{\sqrt{5}}{30}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{15}$ | $\frac{\sqrt{3}}{30}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{30}$ |
| | | $\frac{\sqrt{3}i}{10}$ | 0 | 0 | $-\frac{\sqrt{5}}{30}$ | 0 | 0 | 0 | $\frac{\sqrt{5}}{15}$ | 0 | 0 | $-\frac{\sqrt{3}}{30}$ | 0 | 0 | $\frac{\sqrt{3}}{30}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | $\frac{\sqrt{5}}{30}$ | 0 | 0 | 0 | $\frac{\sqrt{3}i}{15}$ | 0 | $-\frac{\sqrt{3}}{15}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | $\frac{\sqrt{5}}{30}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{15}$ | 0 | $-\frac{\sqrt{3}}{15}$ | 0 | 0 | 0 |
| 740 | symmetry | $\frac{y(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---|------------------------|---------------------------|----------------------------|-------------------------|-------------------------|--------------------------|--------------------------|----------------------------|---------------------------|------------------------|-------------------------|----------------------------|----------------------------|
| | $\mathbb{T}_5^{(1,0;a)}(A, 3)$ | 0 | 0 | $\frac{\sqrt{7}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | $-\frac{3\sqrt{105}}{560}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{80}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | 0 | $\frac{3\sqrt{105}}{560}$ | 0 | 0 | $-\frac{\sqrt{105}}{80}$ | 0 |
| | | 0 | 0 | $\frac{11\sqrt{21}}{336}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{48}$ | $-\frac{17\sqrt{35}}{560}$ | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{35}}{560}$ |
| | | 0 | 0 | 0 | $-\frac{11\sqrt{21}}{336}$ | 0 | 0 | $-\frac{\sqrt{21}}{48}$ | 0 | 0 | $\frac{17\sqrt{35}}{560}$ | 0 | 0 | $-\frac{13\sqrt{35}}{560}$ | 0 |
| | | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | 0 | $\frac{3\sqrt{35}}{280}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | $\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}}{280}$ |
| | | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 |
| 741 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(1,0;a)}(A, 4)$ | 0 | $\frac{\sqrt{3}i}{10}$ | $-\frac{3\sqrt{5}}{80}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{16}$ | $\frac{\sqrt{3}}{80}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{80}$ |
| | | $-\frac{\sqrt{3}i}{10}$ | 0 | 0 | $\frac{3\sqrt{5}}{80}$ | 0 | 0 | $-\frac{\sqrt{5}}{16}$ | 0 | 0 | $-\frac{\sqrt{3}}{80}$ | 0 | 0 | $\frac{\sqrt{3}}{80}$ | 0 |
| | | 0 | $-\frac{i}{10}$ | $\frac{7\sqrt{15}}{240}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{240}$ | $\frac{3}{80}$ | 0 | 0 | 0 | 0 | $\frac{3}{80}$ |
| | | $\frac{i}{10}$ | 0 | 0 | $-\frac{7\sqrt{15}}{240}$ | 0 | 0 | $\frac{\sqrt{15}}{240}$ | 0 | 0 | $-\frac{3}{80}$ | 0 | 0 | $\frac{3}{80}$ | 0 |
| | | $\frac{1}{10}$ | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{10}$ | 0 | $\frac{1}{10}$ | 0 | 0 |
| | | 0 | $-\frac{1}{10}$ | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{10}$ | 0 | $\frac{1}{10}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | $\frac{\sqrt{15}}{120}$ | 0 | 0 | $-\frac{1}{8}$ | 0 | $\frac{i}{5}$ | $-\frac{1}{8}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | $-\frac{1}{8}$ | 0 | $-\frac{i}{5}$ | 0 | 0 | $\frac{1}{8}$ |
| | | 0 | $-\frac{1}{10}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | $\frac{1}{10}$ | 0 | 0 | $-\frac{i}{10}$ |
| | | $-\frac{1}{10}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | $-\frac{1}{10}$ | $\frac{i}{10}$ | 0 |
| 742 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|--------------------------------|--|-------------------------|-------------------------|--------------------------|---------------------------|----------------------------|--------------------------|---------------------------|-------------------------|--------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|--|
| | $\mathbb{T}_5^{(1,0;a)}(A, 5)$ | 0 | $-\frac{i}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | $\frac{1}{20}$ | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | |
| | | $\frac{i}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{1}{20}$ | 0 | 0 | $\frac{1}{8}$ | 0 | |
| | | 0 | $-\frac{\sqrt{3}i}{20}$ | $\frac{\sqrt{5}}{12}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{24}$ | $-\frac{\sqrt{3}}{15}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{120}$ | |
| | | $\frac{\sqrt{3}i}{20}$ | 0 | 0 | $-\frac{\sqrt{5}}{12}$ | 0 | 0 | $\frac{\sqrt{5}}{24}$ | 0 | 0 | $\frac{\sqrt{3}}{15}$ | 0 | 0 | $\frac{\sqrt{3}}{120}$ | 0 | |
| | | $\frac{\sqrt{3}}{30}$ | 0 | 0 | $-\frac{\sqrt{5}i}{60}$ | 0 | $\frac{\sqrt{5}}{15}$ | 0 | 0 | 0 | $\frac{\sqrt{3}i}{20}$ | 0 | $-\frac{\sqrt{3}}{10}$ | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{3}}{30}$ | $\frac{\sqrt{5}i}{60}$ | 0 | $\frac{\sqrt{5}}{15}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ | 0 | $-\frac{\sqrt{3}}{10}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}}{60}$ | 0 | $\frac{\sqrt{5}i}{30}$ | $-\frac{\sqrt{5}}{60}$ | 0 | 0 | $\frac{\sqrt{3}}{60}$ | 0 | 0 | $-\frac{\sqrt{3}}{60}$ | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{5}}{60}$ | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | $\frac{\sqrt{5}}{60}$ | $\frac{\sqrt{3}}{60}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{60}$ | |
| | | 0 | $\frac{\sqrt{3}}{30}$ | 0 | 0 | $\frac{\sqrt{5}}{15}$ | 0 | 0 | $-\frac{\sqrt{5}i}{60}$ | 0 | 0 | $\frac{\sqrt{3}}{10}$ | 0 | 0 | $-\frac{\sqrt{3}i}{20}$ | |
| | | $\frac{\sqrt{3}}{30}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{15}$ | $\frac{\sqrt{5}i}{60}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{10}$ | $\frac{\sqrt{3}i}{20}$ | 0 | |
| 743 | symmetry | $\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(1,0;a)}(B, 1)$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | 0 | $-\frac{3\sqrt{105}}{560}$ | 0 | 0 | $\frac{\sqrt{105}i}{80}$ | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{112}$ | $\frac{5\sqrt{7}i}{112}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{105}}{560}$ | $-\frac{\sqrt{105}i}{80}$ | 0 | |
| | | 0 | 0 | 0 | 0 | $\frac{11\sqrt{21}}{336}$ | 0 | 0 | $\frac{\sqrt{21}i}{48}$ | 0 | 0 | $\frac{17\sqrt{35}}{560}$ | 0 | 0 | $-\frac{13\sqrt{35}i}{560}$ | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{21}}{336}$ | $-\frac{\sqrt{21}i}{48}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{35}}{560}$ | $\frac{13\sqrt{35}i}{560}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}i}{280}$ | $\frac{3\sqrt{35}}{280}$ | 0 | |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | 0 | $-\frac{3\sqrt{35}}{280}$ | |
| | | $\frac{\sqrt{35}}{70}$ | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{35}}{70}$ | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | $\frac{\sqrt{35}i}{70}$ | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | 0 | |
| | | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | |
| 744 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----------------------------|-------------------------|--------------------------|
| | $\mathbb{T}_5^{(1,0;a)}(B, 2)$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{140}$ | 0 | $\frac{\sqrt{35}}{140}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{140}$ | 0 | $\frac{\sqrt{35}}{140}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{70}$ |
| | | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{70}$ |
| | | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | $-\frac{3\sqrt{35}i}{280}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 |
| 745 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(1,0;a)}(B, 3)$ | 0 | $\frac{\sqrt{3}}{10}$ | 0 | 0 | $\frac{3\sqrt{5}}{80}$ | 0 | 0 | $-\frac{\sqrt{5}i}{16}$ | 0 | 0 | $\frac{\sqrt{3}}{80}$ | 0 | 0 | $-\frac{\sqrt{3}i}{80}$ |
| | | $\frac{\sqrt{3}}{10}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}}{80}$ | $\frac{\sqrt{5}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{80}$ | $\frac{\sqrt{3}i}{80}$ | 0 |
| | | 0 | $\frac{1}{10}$ | 0 | 0 | $\frac{7\sqrt{15}}{240}$ | 0 | 0 | $-\frac{\sqrt{15}i}{240}$ | 0 | 0 | $-\frac{3}{80}$ | 0 | 0 | $\frac{3i}{80}$ |
| | | $\frac{1}{10}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{15}}{240}$ | $\frac{\sqrt{15}i}{240}$ | 0 | 0 | 0 | 0 | $\frac{3}{80}$ | $-\frac{3i}{80}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | $-\frac{1}{5}$ | 0 | $\frac{i}{8}$ | $-\frac{1}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | $\frac{\sqrt{15}}{120}$ | $-\frac{1}{5}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | $\frac{1}{8}$ |
| | | $-\frac{1}{10}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | $-\frac{i}{10}$ | 0 | $\frac{1}{10}$ | 0 | 0 |
| | | 0 | $\frac{1}{10}$ | 0 | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | $\frac{i}{10}$ | 0 | $\frac{1}{10}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{i}{10}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{30}$ | $\frac{1}{10}$ | 0 | 0 | 0 | 0 | $\frac{1}{10}$ |
| | | $\frac{i}{10}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{30}$ | 0 | 0 | $-\frac{1}{10}$ | 0 | 0 | $\frac{1}{10}$ | 0 |
| 746 | symmetry | $\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|-------------------------|--------------------------|-------------------------|---------------------------|--------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|------------------------|-------------------------|--------------------------|
| | $\mathbb{T}_5^{(1,0;a)}(B, 4)$ | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{40}$ | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | $\frac{\sqrt{3}i}{40}$ | 0 | $-\frac{\sqrt{3}}{40}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{5}i}{40}$ | 0 | $-\frac{\sqrt{5}}{40}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{40}$ | 0 | $-\frac{\sqrt{3}}{40}$ | 0 | 0 | 0 |
| | | $-\frac{1}{5}$ | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{1}{5}$ | $-\frac{\sqrt{15}i}{30}$ | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{i}{10}$ | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{10}$ | 0 | 0 | 0 | 0 | $\frac{1}{10}$ |
| | | $-\frac{i}{10}$ | 0 | 0 | $\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{10}$ | 0 | 0 | $\frac{1}{10}$ | 0 |
| | | 0 | $\frac{1}{10}$ | 0 | 0 | $\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{10}$ | 0 | 0 | $-\frac{i}{10}$ |
| | | $\frac{1}{10}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{10}$ | $\frac{i}{10}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}}{120}$ | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | $\frac{i}{8}$ | $-\frac{1}{5}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}}{120}$ | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | $\frac{1}{5}$ |
| 747 | symmetry | $\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_5^{(1,0;a)}(B, 5)$ | 0 | $\frac{1}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{1}{20}$ | 0 | 0 | $\frac{i}{8}$ |
| | | $\frac{1}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{1}{20}$ | $-\frac{i}{8}$ | 0 |
| | | 0 | $-\frac{\sqrt{3}}{20}$ | 0 | 0 | $-\frac{\sqrt{5}}{12}$ | 0 | 0 | $\frac{\sqrt{5}i}{24}$ | 0 | 0 | $-\frac{\sqrt{3}}{15}$ | 0 | 0 | $-\frac{\sqrt{3}i}{120}$ |
| | | $-\frac{\sqrt{3}}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{12}$ | $-\frac{\sqrt{5}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{15}$ | $\frac{\sqrt{3}i}{120}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}}{30}$ | 0 | $\frac{\sqrt{5}i}{60}$ | $-\frac{\sqrt{5}}{60}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{60}$ | $\frac{\sqrt{3}}{60}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}}{30}$ | 0 | $-\frac{\sqrt{5}i}{60}$ | 0 | 0 | $\frac{\sqrt{5}}{60}$ | 0 | 0 | $-\frac{\sqrt{3}i}{60}$ | 0 | 0 | $-\frac{\sqrt{3}}{60}$ |
| | | $\frac{\sqrt{3}}{30}$ | 0 | 0 | $-\frac{\sqrt{5}i}{15}$ | 0 | $\frac{\sqrt{5}}{60}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{10}$ | 0 | $\frac{\sqrt{3}}{20}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{3}}{30}$ | $\frac{\sqrt{5}i}{15}$ | 0 | $\frac{\sqrt{5}}{60}$ | 0 | 0 | 0 | $\frac{\sqrt{3}i}{10}$ | 0 | $\frac{\sqrt{3}}{20}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{3}i}{30}$ | $\frac{\sqrt{5}}{15}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{60}$ | $-\frac{\sqrt{3}}{10}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{20}$ |
| | | $\frac{\sqrt{3}i}{30}$ | 0 | 0 | $-\frac{\sqrt{5}}{15}$ | 0 | 0 | $\frac{\sqrt{5}}{60}$ | 0 | 0 | $\frac{\sqrt{3}}{10}$ | 0 | 0 | $-\frac{\sqrt{3}}{20}$ | 0 |
| 748 | symmetry | $-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-------------------------|--------------------------|----------------------------|---------------------------|--------------------------|--------------------------|---------------------------|----------------------------|--------------------------|---------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | $\mathbb{T}_5^{(1,0;a)}(B, 6)$ | $-\frac{1}{10}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $\frac{3i}{40}$ | 0 | $\frac{3}{40}$ | 0 | 0 |
| | | 0 | $\frac{1}{10}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $-\frac{3i}{40}$ | 0 | $\frac{3}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{24}$ | 0 | $-\frac{\sqrt{5}}{24}$ | 0 | 0 | 0 | $-\frac{7\sqrt{3}i}{120}$ | 0 | $\frac{7\sqrt{3}}{120}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{5}i}{24}$ | 0 | $-\frac{\sqrt{5}}{24}$ | 0 | 0 | 0 | $\frac{7\sqrt{3}i}{120}$ | 0 | $\frac{7\sqrt{3}}{120}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{3}i}{30}$ | $\frac{\sqrt{5}}{60}$ | 0 | 0 | 0 | $\frac{\sqrt{5}}{15}$ | $\frac{\sqrt{3}}{20}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{10}$ | |
| | | $\frac{\sqrt{3}i}{30}$ | 0 | 0 | $-\frac{\sqrt{5}}{60}$ | 0 | 0 | $\frac{\sqrt{5}}{15}$ | 0 | 0 | $-\frac{\sqrt{3}}{20}$ | 0 | 0 | $\frac{\sqrt{3}}{10}$ | 0 |
| | | 0 | $\frac{\sqrt{3}}{30}$ | 0 | 0 | $\frac{\sqrt{5}}{60}$ | 0 | 0 | $-\frac{\sqrt{5}i}{15}$ | 0 | 0 | $-\frac{\sqrt{3}}{20}$ | 0 | 0 | $\frac{\sqrt{3}i}{10}$ |
| | | $\frac{\sqrt{3}}{30}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{60}$ | $\frac{\sqrt{5}i}{15}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{20}$ | $-\frac{\sqrt{3}i}{10}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}}{60}$ | 0 | $\frac{\sqrt{5}i}{60}$ | $-\frac{\sqrt{5}}{30}$ | 0 | 0 | $-\frac{\sqrt{3}}{60}$ | 0 | $-\frac{\sqrt{3}i}{60}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}}{60}$ | 0 | $-\frac{\sqrt{5}i}{60}$ | 0 | 0 | $\frac{\sqrt{5}}{30}$ | $-\frac{\sqrt{3}}{60}$ | 0 | $\frac{\sqrt{3}i}{60}$ | 0 | 0 | 0 |
| 749 | symmetry | y | | | | | | | | | | | | | |
| | $\mathbb{T}_1^{(1,1;a)}(A)$ | 0 | $-\frac{\sqrt{21}i}{28}$ | $-\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ |
| | | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{56}$ | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{7}i}{28}$ | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{140}$ | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{\sqrt{105}}{280}$ | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 |
| 750 | symmetry | x | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-------------------------|-------------------------|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|--|
| | $\mathbb{T}_1^{(1,1;a)}(B, 1)$ | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | |
| | | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{56}$ | $\frac{\sqrt{21}i}{28}$ | 0 | |
| | | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | |
| | | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{280}$ | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | $\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | $\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | |
| 751 | symmetry | z | | | | | | | | | | | | | |
| | $\mathbb{T}_1^{(1,1;a)}(B, 2)$ | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | |
| | | 0 | 0 | $-\frac{3\sqrt{35}i}{280}$ | 0 | $\frac{3\sqrt{35}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | |
| | | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{280}$ | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | |
| | | 0 | $-\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{105}i}{280}$ | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{70}$ | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{140}$ | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | |
| | | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | |
| 752 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|-------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|----------------------------|---------------------------|---------------------------|---------------------------|----------------------------|
| | $\mathbb{T}_3^{(1,1;a)}(A, 1)$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | $\frac{\sqrt{35}i}{70}$ | $\frac{\sqrt{35}}{35}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | $-\frac{\sqrt{35}}{35}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | $\frac{\sqrt{105}}{70}$ | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{120}$ | 0 | 0 | $-\frac{\sqrt{105}i}{120}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{120}$ | $\frac{\sqrt{105}i}{120}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | $\frac{\sqrt{105}}{120}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{120}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{120}$ | 0 | 0 | $\frac{\sqrt{105}}{120}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{120}$ | 0 | $\frac{\sqrt{105}}{120}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{120}$ | 0 | $\frac{\sqrt{105}}{120}$ | 0 | 0 | 0 |
| 753 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(1,1;a)}(A, 2)$ | 0 | $\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{21}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ |
| | | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{21}}{112}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{42}$ | $-\frac{\sqrt{105}}{336}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | $\frac{\sqrt{7}}{336}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{24}$ |
| | | $\frac{\sqrt{7}i}{42}$ | 0 | 0 | $\frac{\sqrt{105}}{336}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{7}}{336}$ | 0 | 0 | $\frac{\sqrt{7}}{24}$ | 0 |
| | | $\frac{\sqrt{7}}{24}$ | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | $-\frac{5\sqrt{7}i}{84}$ | 0 | $-\frac{\sqrt{7}}{24}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}}{24}$ | $-\frac{\sqrt{105}i}{84}$ | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | $\frac{5\sqrt{7}i}{84}$ | 0 | $-\frac{\sqrt{7}}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | $\frac{\sqrt{105}}{112}$ | 0 | 0 | $\frac{\sqrt{7}}{48}$ | 0 | $-\frac{\sqrt{7}i}{21}$ | $\frac{\sqrt{7}}{48}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | $\frac{\sqrt{7}}{48}$ | 0 | $\frac{\sqrt{7}i}{21}$ | 0 | 0 | $-\frac{\sqrt{7}}{48}$ |
| | | 0 | $-\frac{\sqrt{7}}{24}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{7}}{24}$ | 0 | 0 | $-\frac{5\sqrt{7}i}{84}$ |
| | | $-\frac{\sqrt{7}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{24}$ | $\frac{5\sqrt{7}i}{84}$ | 0 |
| 754 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|----------------------------|--|
| | $\mathbb{T}_3^{(1,1;a)}(A, 3)$ | 0 | $-\frac{\sqrt{35}i}{70}$ | $-\frac{3\sqrt{21}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{560}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{35}}{140}$ | |
| | | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | $\frac{3\sqrt{21}}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{560}$ | 0 | 0 | $\frac{3\sqrt{35}}{140}$ | 0 | |
| | | 0 | $-\frac{\sqrt{105}i}{70}$ | $-\frac{3\sqrt{7}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | $-\frac{5\sqrt{105}}{336}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{120}$ | |
| | | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | $\frac{3\sqrt{7}}{112}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{5\sqrt{105}}{336}$ | 0 | 0 | $\frac{\sqrt{105}}{120}$ | |
| | | $-\frac{\sqrt{105}}{120}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{420}$ | 0 | 0 | 0 | |
| | | 0 | $\frac{\sqrt{105}}{120}$ | $-\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{420}$ | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | $-\frac{5\sqrt{7}}{112}$ | 0 | 0 | $\frac{\sqrt{105}}{80}$ | 0 | 0 | $-\frac{\sqrt{105}}{80}$ | |
| | | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{5\sqrt{7}}{112}$ | $\frac{\sqrt{105}}{80}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{80}$ | |
| | | 0 | $-\frac{\sqrt{105}}{120}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{420}$ | |
| | | $-\frac{\sqrt{105}}{120}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{420}$ | 0 | |
| 755 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(1,1;a)}(B, 1)$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{112}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{21}}{112}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | |
| | | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{21}}{112}$ | $-\frac{\sqrt{21}i}{84}$ | 0 | |
| | | 0 | $\frac{\sqrt{7}}{42}$ | 0 | 0 | $-\frac{\sqrt{105}}{336}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{7}}{336}$ | 0 | $\frac{\sqrt{7}i}{24}$ | |
| | | $\frac{\sqrt{7}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{336}$ | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{336}$ | $-\frac{\sqrt{7}i}{24}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | $\frac{\sqrt{7}}{21}$ | 0 | $-\frac{\sqrt{7}i}{48}$ | $\frac{\sqrt{7}}{48}$ | |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{112}$ | 0 | 0 | $\frac{\sqrt{105}}{112}$ | $\frac{\sqrt{7}}{21}$ | 0 | $\frac{\sqrt{7}i}{48}$ | 0 | $-\frac{\sqrt{7}}{48}$ | |
| | | $-\frac{\sqrt{7}}{24}$ | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{24}$ | 0 | $\frac{5\sqrt{7}}{84}$ | 0 | |
| | | 0 | $\frac{\sqrt{7}}{24}$ | $\frac{\sqrt{105}i}{84}$ | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{24}$ | 0 | $\frac{5\sqrt{7}}{84}$ | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{7}i}{24}$ | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | $-\frac{\sqrt{7}}{24}$ | 0 | 0 | 0 | $\frac{5\sqrt{7}}{84}$ | |
| | | $\frac{\sqrt{7}i}{24}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{\sqrt{7}}{24}$ | 0 | 0 | $\frac{5\sqrt{7}}{84}$ | |
| 756 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|----------------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|---------------------------|--------------------------|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|----------------------------|
| | $\mathbb{T}_3^{(1,1;a)}(B, 2)$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{112}$ | 0 | $\frac{\sqrt{35}}{112}$ | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{336}$ | 0 | $-\frac{5\sqrt{21}}{336}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}i}{112}$ | 0 | $\frac{\sqrt{35}}{112}$ | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{336}$ | 0 | $-\frac{5\sqrt{21}}{336}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{7}}{21}$ | 0 | 0 | $\frac{\sqrt{105}i}{336}$ | 0 | $-\frac{\sqrt{105}}{336}$ | 0 | 0 | 0 | $\frac{13\sqrt{7}i}{336}$ | 0 | $\frac{13\sqrt{7}}{336}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{21}$ | $-\frac{\sqrt{105}i}{336}$ | 0 | $-\frac{\sqrt{105}}{336}$ | 0 | 0 | 0 | $-\frac{13\sqrt{7}i}{336}$ | 0 | $\frac{13\sqrt{7}}{336}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{24}$ | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | $\frac{5\sqrt{7}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{24}$ |
| | | $-\frac{\sqrt{7}i}{24}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{5\sqrt{7}}{84}$ | 0 | 0 | $-\frac{\sqrt{7}}{24}$ | 0 |
| | | 0 | $\frac{\sqrt{7}}{24}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{5\sqrt{7}}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{24}$ |
| | | $\frac{\sqrt{7}}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{84}$ | $-\frac{\sqrt{7}i}{24}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{112}$ | 0 | $\frac{\sqrt{105}i}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{48}$ | 0 | $-\frac{\sqrt{7}i}{48}$ | $\frac{\sqrt{7}}{21}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}}{112}$ | 0 | $-\frac{\sqrt{105}i}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{48}$ | 0 | $\frac{\sqrt{7}i}{48}$ | 0 | 0 | $-\frac{\sqrt{7}}{21}$ |
| 757 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{T}_3^{(1,1;a)}(B, 3)$ | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 | $-\frac{3\sqrt{21}}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{560}$ | 0 | 0 | $\frac{3\sqrt{35}i}{140}$ | |
| | | $\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{21}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{560}$ | $-\frac{3\sqrt{35}i}{140}$ | 0 | |
| | | 0 | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | $\frac{3\sqrt{7}}{112}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ | 0 | 0 | $-\frac{\sqrt{105}i}{120}$ |
| | | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{112}$ | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{5\sqrt{105}}{336}$ | $\frac{\sqrt{105}i}{120}$ | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | $\frac{5\sqrt{7}i}{112}$ | $-\frac{5\sqrt{7}}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{80}$ | $\frac{\sqrt{105}}{80}$ | 0 | |
| | | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | 0 | $\frac{5\sqrt{7}}{112}$ | 0 | 0 | $-\frac{\sqrt{105}i}{80}$ | 0 | 0 | $-\frac{\sqrt{105}}{80}$ |
| | | $-\frac{\sqrt{105}}{120}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{420}$ | 0 | 0 | |
| | | 0 | $\frac{\sqrt{105}}{120}$ | $-\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{420}$ | 0 | 0 | 0 | |
| | | 0 | $\frac{\sqrt{105}i}{120}$ | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{420}$ | |
| | | $-\frac{\sqrt{105}i}{120}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{420}$ | 0 | |
| 758 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|---------------------------|---------------------------|----------------------------|---------------------------|--------------------------|-------------------------|--------------------------|------------------------------|-------------------------------|-----------------------------|-----------------------------|-------------------------|---|
| | $\mathbb{T}_3^{(1,1;a)}(B, 4)$ | $-\frac{\sqrt{35}}{35}$ | 0 | 0 | $-\frac{3\sqrt{21}i}{112}$ | 0 | $\frac{3\sqrt{21}}{112}$ | 0 | 0 | 0 | $\frac{13\sqrt{35}i}{560}$ | 0 | $\frac{13\sqrt{35}}{560}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{35}$ | $\frac{3\sqrt{21}i}{112}$ | 0 | $\frac{3\sqrt{21}}{112}$ | 0 | 0 | 0 | $-\frac{13\sqrt{35}i}{560}$ | 0 | $\frac{13\sqrt{35}}{560}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{112}$ | 0 | $-\frac{3\sqrt{7}}{112}$ | 0 | 0 | 0 | $-\frac{11\sqrt{105}i}{1680}$ | 0 | $\frac{11\sqrt{105}}{1680}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}i}{112}$ | 0 | $-\frac{3\sqrt{7}}{112}$ | 0 | 0 | 0 | $\frac{11\sqrt{105}i}{1680}$ | 0 | $\frac{11\sqrt{105}}{1680}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}i}{120}$ | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | $\frac{\sqrt{105}}{420}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{105}i}{120}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{420}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{120}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{420}$ | 0 | 0 |
| | | $-\frac{\sqrt{105}}{120}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{420}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | $\frac{5\sqrt{7}i}{112}$ | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{80}$ | 0 | $-\frac{\sqrt{105}i}{80}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{105}}{80}$ | 0 | $\frac{\sqrt{105}i}{80}$ | 0 | 0 | 0 |
| 759 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | | |
| | $\mathbb{M}_2^{(a)}(A, 1)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{70}i}{28}$ | 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 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{28}$ | 0 |
| 760 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---|---|---|
| | $\mathbb{M}_2^{(a)}(A, 2)$ | $\frac{\sqrt{70}i}{28}$ | 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 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{56}$ | 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 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 761 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |
| | $\mathbb{M}_2^{(a)}(A, 3)$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 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 | 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 |
| 762 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix |
|-----|----------------------------|--|
| | $\mathbb{M}_2^{(a)}(B, 1)$ | $ \begin{bmatrix} 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{42}i}{56} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{70}i}{56} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}i}{56} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{14}i}{56} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{210}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 & 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 \end{bmatrix} $ |
| 763 | symmetry | $ \begin{matrix} \sqrt{3}xy \\ \begin{bmatrix} 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 & -\frac{\sqrt{70}i}{28} \\ 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}{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 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} \end{matrix} $ |
| 764 | symmetry | $ \frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6} $ |

continued ...

Table 9

| No. | multipole | matrix |
|-----|----------------------------|--|
| | $\mathbb{M}_4^{(a)}(A, 1)$ | $ \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 & 0 & 0 & 0 & 0 & 0 \\ 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 & 0 & -\frac{\sqrt{3}i}{6} & 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 & 0 & -\frac{\sqrt{3}i}{6} & 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 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix} $ |
| 765 | symmetry | $ -\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12} $ |
| | $\mathbb{M}_4^{(a)}(A, 2)$ | $ \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 \\ \frac{\sqrt{105}i}{35} & 0 & 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 & 0 & 0 & 0 \\ 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{7}i}{28} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{105}i}{420} & 0 & 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 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{105}i}{210} & 0 \end{bmatrix} $ |
| 766 | symmetry | $ \frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4} $ |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|--|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|---------------------------|---------------------------|---|---|---|
| | $\mathbb{M}_4^{(a)}(A, 3)$ | $-\frac{\sqrt{105}i}{35}$ | 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 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{140}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{140}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{140}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{140}$ | 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 |
| 767 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(a)}(A, 4)$ | $\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}i}{20} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}i}{40} \\ -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}i}{8} & 0 & 0 & 0 & 0 & 0 & -\frac{3\sqrt{5}i}{40} & 0 & 0 & 0 & 0 \end{bmatrix}$ | | | | | | | | | | | | | |
| 768 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|----------------------------|-----------------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---|
| | $\mathbb{M}_4^{(a)}(A, 5)$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{70}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{35}i}{70}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{40}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{40}$ | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{40}$ | 0 | 0 | 0 | 0 | 0 |
| 769 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(a)}(B, 1)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 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 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | 0 | | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | 0 | | |
| | | $-\frac{\sqrt{5}i}{10}$ | 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 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}i}{40}$ | 0 | 0 | | |
| 770 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|---------------------------------------|-------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{M}_4^{(a)}(B, 2)$ | 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 | $\frac{\sqrt{5}i}{10}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{10}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{5}i}{40}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{5}i}{40}$ | 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 |
| 771 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(a)}(B, 3)$ | 0 | 0 | $-\frac{3\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 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 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{40}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{40}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{40}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{40}$ | 0 | 0 | 0 |
| 772 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|------------------------------------|-------------------------|---------------------------|---------------------------|---------------------------|----------------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|
| | $\mathbb{M}_4^{(a)}(B, 4)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105i}}{35}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105i}}{35}$ | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21i}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21i}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21i}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35i}}{40}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21i}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35i}}{40}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{21i}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35i}}{40}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{21i}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35i}}{40}$ | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 773 | symmetry | $-\frac{x^2}{2}-\frac{y^2}{2}+z^2$ | | | | | | | | | | | | | |
| | $\mathbb{M}_2^{(1,-1;a)}(A, 1)$ | 0 | 0 | 0 | $\frac{\sqrt{210}}{280}$ | 0 | $-\frac{\sqrt{210i}}{280}$ | $\frac{\sqrt{210}}{70}$ | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | $\frac{\sqrt{14i}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{210}}{280}$ | 0 | $\frac{\sqrt{210i}}{280}$ | 0 | 0 | $-\frac{\sqrt{210}}{70}$ | $\frac{\sqrt{14}}{56}$ | 0 | $-\frac{\sqrt{14i}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | $-\frac{3\sqrt{70i}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | $-\frac{\sqrt{42i}}{168}$ | $\frac{\sqrt{42}}{42}$ | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | $\frac{3\sqrt{70i}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | $\frac{\sqrt{42i}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{42}$ |
| | | 0 | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | $-\frac{\sqrt{70i}}{140}$ | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{42i}}{84}$ |
| | | $-\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{70}$ | $\frac{\sqrt{70i}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | $\frac{\sqrt{42i}}{84}$ | 0 |
| | | 0 | $\frac{\sqrt{42i}}{84}$ | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{140}$ | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{84}$ |
| | | $-\frac{\sqrt{42i}}{84}$ | 0 | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{70}}{140}$ | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{84}$ |
| | | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{70i}}{140}$ | 0 | $\frac{\sqrt{70}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{42i}}{84}$ | 0 | $\frac{\sqrt{42}}{84}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{42}}{42}$ | $\frac{\sqrt{70i}}{140}$ | 0 | $\frac{\sqrt{70}}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{42i}}{84}$ | 0 | $\frac{\sqrt{42}}{84}$ | 0 | 0 | 0 |
| 774 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--------------------------|-------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|---------------------------|----------------------------|-------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|
| | $\mathbb{M}_2^{(1,-1;a)}(A, 2)$ | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | $\frac{3\sqrt{70}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{210}}{280}$ | 0 | $-\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{210}}{280}$ | 0 | $\frac{3\sqrt{210}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ |
| | | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 |
| 775 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |
| | $\mathbb{M}_2^{(1,-1;a)}(A, 3)$ | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{70}}{280}$ | 0 | 0 | $\frac{3\sqrt{70}}{140}$ | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 |
| 776 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|--------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|
| | $\mathbb{M}_2^{(1,-1;a)}(B,1)$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | $-\frac{3\sqrt{70}i}{140}$ | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{280}$ | $\frac{3\sqrt{70}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{56}$ | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $\frac{\sqrt{14}}{28}$ |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}}{28}$ | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}i}{28}$ | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | $\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 |
| 777 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | |
| | $\mathbb{M}_2^{(1,-1;a)}(B,2)$ | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{280}$ | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{70}i}{280}$ | 0 | $-\frac{3\sqrt{70}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{210}i}{280}$ | 0 | $-\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{210}i}{280}$ | 0 | $-\frac{3\sqrt{210}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ |
| | | $\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{28}$ |
| | | $\frac{\sqrt{14}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | $\frac{\sqrt{210}i}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}}{28}$ | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}i}{140}$ | 0 | $-\frac{\sqrt{210}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{28}$ | 0 | $-\frac{\sqrt{14}i}{28}$ | 0 | 0 | 0 |
| 778 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|--------------------------|---------------------------|--------------------------|---------------------------|----------------------------|---------------------------|--------------------------|---------------------------|---------------------------|---------------------------|----------------------------|---------------------------|----------------------------|
| | $\mathbb{M}_4^{(1,-1;a)}(A, 1)$ | 0 | 0 | 0 | $-\frac{\sqrt{5}}{30}$ | 0 | $\frac{\sqrt{5}i}{30}$ | $\frac{\sqrt{5}}{15}$ | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}}{30}$ | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | $-\frac{\sqrt{5}}{15}$ | $\frac{\sqrt{3}}{12}$ | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}}{30}$ | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | $\frac{1}{12}$ | 0 | $-\frac{i}{12}$ | $-\frac{1}{6}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}}{30}$ | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | $\frac{1}{12}$ | 0 | $\frac{i}{12}$ | 0 | 0 | $\frac{1}{6}$ |
| | | 0 | $-\frac{1}{6}$ | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | $\frac{1}{24}$ | 0 | 0 | $\frac{i}{24}$ |
| | | $-\frac{1}{6}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{120}$ | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{1}{24}$ | $-\frac{i}{24}$ | 0 |
| | | 0 | $\frac{i}{6}$ | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | $-\frac{1}{24}$ | 0 | 0 | 0 | 0 | $\frac{1}{24}$ |
| | | $-\frac{i}{6}$ | 0 | 0 | $\frac{\sqrt{15}}{120}$ | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | $\frac{1}{24}$ | 0 | 0 | $\frac{1}{24}$ | 0 |
| | | $-\frac{1}{6}$ | 0 | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | $-\frac{i}{24}$ | 0 | $-\frac{1}{24}$ | 0 | 0 |
| | | 0 | $\frac{1}{6}$ | $-\frac{\sqrt{15}i}{120}$ | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | $\frac{i}{24}$ | 0 | $-\frac{1}{24}$ | 0 | 0 | 0 |
| 779 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,-1;a)}(A, 2)$ | 0 | 0 | 0 | $\frac{11\sqrt{7}}{168}$ | 0 | $-\frac{11\sqrt{7}i}{168}$ | $\frac{\sqrt{7}}{21}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{11\sqrt{7}}{168}$ | 0 | $\frac{11\sqrt{7}i}{168}$ | 0 | 0 | $-\frac{\sqrt{7}}{21}$ | $-\frac{\sqrt{105}}{168}$ | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | $\frac{\sqrt{35}i}{168}$ | $-\frac{\sqrt{35}}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | $-\frac{\sqrt{35}i}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ |
| | | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | $-\frac{5\sqrt{35}i}{168}$ |
| | | $\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{168}$ | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | $\frac{5\sqrt{35}i}{168}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{84}$ | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{35}}{168}$ |
| | | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | $-\frac{5\sqrt{35}}{168}$ | 0 |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{21}i}{84}$ | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 |
| 780 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|---------------------------------------|---------------------------|-------------------------|-------------------------|---------------------------|--------------------------|------------------------|---------------------------|--------------------------|--------------------------|----------------------------|---------------------------|----------------------------|---------------------------|
| | $\mathbb{M}_4^{(1,-1;a)}(A, 3)$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | $\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ |
| | | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | $-\frac{\sqrt{105}i}{168}$ | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{84}$ | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ |
| | | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 |
| 781 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,-1;a)}(A, 4)$ | 0 | 0 | $-\frac{\sqrt{3}}{48}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{12}$ | $-\frac{\sqrt{5}}{16}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{3}}{48}$ | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 0 | 0 | $\frac{\sqrt{5}}{16}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{3}{16}$ | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ |
| | | 0 | 0 | 0 | $\frac{3}{16}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 |
| | | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{1}{16}$ | 0 | 0 | $\frac{1}{16}$ | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 |
| | | 0 | 0 | $-\frac{1}{16}$ | 0 | 0 | 0 | 0 | $-\frac{1}{16}$ | $\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{48}$ |
| | | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 |
| 782 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | |
|-----|---------------------------------|-----------------------------------|---------------------------|---------------------------|----------------------------|-------------------------|------------------------|-------------------------|-------------------------|---------------------------|---------------------------|--------------------------|--------------------------|----------------------------|
| | $\mathbb{M}_4^{(1,-1;a)}(A, 5)$ | 0 | 0 | $\frac{11\sqrt{21}}{336}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | $-\frac{\sqrt{35}}{112}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{11\sqrt{21}}{336}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{112}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}}{112}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | $-\frac{\sqrt{105}}{336}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{336}$ | 0 | 0 | $\frac{\sqrt{105}}{168}$ |
| | | $\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{168}$ | $-\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | $\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{7}}{112}$ | 0 | 0 | $\frac{5\sqrt{105}}{336}$ | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ |
| | | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}}{112}$ | $\frac{5\sqrt{105}}{336}$ | 0 | 0 | 0 | $\frac{5\sqrt{105}}{336}$ |
| | | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 |
| | | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 |
| 783 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,-1;a)}(B, 1)$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{48}$ | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $-\frac{\sqrt{5}}{16}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{48}$ | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{16}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3}{16}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | $-\frac{\sqrt{15}i}{24}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{48}$ | $\frac{\sqrt{15}i}{24}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{16}$ | $-\frac{1}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | $\frac{\sqrt{15}}{48}$ |
| | | 0 | 0 | 0 | 0 | $\frac{i}{16}$ | 0 | 0 | $\frac{1}{16}$ | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | $-\frac{\sqrt{15}}{48}$ |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 |
| 784 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|---------------------------------|---------------------------------------|----------------------------|--------------------------|-------------------------|---------------------------|----------------------------|--------------------------|-------------------------|---------------------------|--------------------------|-----------------------------|----------------------------|---------------------------|----------------------------|--|
| | $\mathbb{M}_4^{(1,-1;a)}(B, 2)$ | 0 | 0 | 0 | $\frac{5\sqrt{3}i}{48}$ | 0 | $\frac{5\sqrt{3}}{48}$ | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{16}$ | 0 | $\frac{\sqrt{5}}{16}$ | 0 | 0 | |
| | | 0 | 0 | $-\frac{5\sqrt{3}i}{48}$ | 0 | $\frac{5\sqrt{3}}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{5}i}{16}$ | 0 | $\frac{\sqrt{5}}{16}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{i}{16}$ | 0 | $\frac{1}{16}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{i}{16}$ | 0 | $\frac{1}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | $-\frac{\sqrt{15}}{48}$ | 0 | 0 | 0 | |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | |
| | | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | |
| | | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | |
| | | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | |
| | | 0 | 0 | 0 | $\frac{1}{16}$ | 0 | $\frac{i}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | $-\frac{\sqrt{15}i}{48}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{1}{16}$ | 0 | $-\frac{i}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{48}$ | 0 | $\frac{\sqrt{15}i}{48}$ | 0 | 0 | 0 | |
| 785 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,-1;a)}(B, 3)$ | 0 | 0 | 0 | 0 | $\frac{11\sqrt{21}}{336}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{112}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{21}}{336}$ | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{112}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{336}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{112}$ | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{336}$ | $\frac{\sqrt{105}i}{168}$ | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | $\frac{\sqrt{7}i}{112}$ | $-\frac{\sqrt{7}}{112}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{105}i}{336}$ | $\frac{5\sqrt{105}}{336}$ | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | $\frac{\sqrt{7}}{112}$ | 0 | 0 | $-\frac{5\sqrt{105}i}{336}$ | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ | |
| | | $\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{105}}{168}$ | $\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{105}i}{168}$ | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | 0 | |
| | | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | |
| 786 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---|----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | $\mathbb{M}_4^{(1,-1;a)}(B,4)$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{48}$ | 0 | $-\frac{\sqrt{21}}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{112}$ | 0 | $\frac{\sqrt{35}}{112}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{48}$ | 0 | $-\frac{\sqrt{21}}{48}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{112}$ | 0 | $\frac{\sqrt{35}}{112}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{7}i}{112}$ | 0 | $\frac{5\sqrt{7}}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{336}$ | 0 | $-\frac{\sqrt{105}}{336}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | $\frac{5\sqrt{7}}{112}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{336}$ | 0 | $-\frac{\sqrt{105}}{336}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{168}$ | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ |
| | | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 |
| | | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ |
| | | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | $\frac{\sqrt{7}i}{112}$ | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{5\sqrt{105}}{336}$ | 0 | $-\frac{5\sqrt{105}i}{336}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}}{112}$ | 0 | $-\frac{\sqrt{7}i}{112}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | $-\frac{5\sqrt{105}}{336}$ | 0 | $\frac{5\sqrt{105}i}{336}$ | 0 | 0 | 0 |
| 787 | symmetry | $\frac{\sqrt{2}(2x^6-15x^4y^2-15x^4z^2-15x^2y^4+180x^2y^2z^2-15x^2z^4+2y^6-15y^4z^2-15y^2z^4+2z^6)}{8}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_6^{(1,-1;a)}(A,1)$ | 0 | 0 | 0 | $-\frac{\sqrt{770}}{616}$ | 0 | $\frac{\sqrt{770}i}{616}$ | $\frac{\sqrt{770}}{308}$ | 0 | 0 | $\frac{3\sqrt{462}}{616}$ | 0 | $\frac{3\sqrt{462}i}{616}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{770}}{616}$ | 0 | $-\frac{\sqrt{770}i}{616}$ | 0 | 0 | $-\frac{\sqrt{770}}{308}$ | $\frac{3\sqrt{462}}{616}$ | 0 | $-\frac{3\sqrt{462}i}{616}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{2310}}{616}$ | 0 | $\frac{\sqrt{2310}i}{616}$ | 0 | 0 | 0 | $\frac{3\sqrt{154}}{616}$ | 0 | $-\frac{3\sqrt{154}i}{616}$ | $-\frac{3\sqrt{154}}{308}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{2310}}{616}$ | 0 | $-\frac{\sqrt{2310}i}{616}$ | 0 | 0 | 0 | $\frac{3\sqrt{154}}{616}$ | 0 | $\frac{3\sqrt{154}i}{616}$ | 0 | 0 | $\frac{3\sqrt{154}}{308}$ |
| | | 0 | $\frac{\sqrt{154}}{77}$ | 0 | 0 | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | $\frac{\sqrt{2310}i}{924}$ | 0 | 0 | $-\frac{3\sqrt{154}}{308}$ | 0 | 0 | $-\frac{3\sqrt{154}i}{308}$ |
| | | $\frac{\sqrt{154}}{77}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | $-\frac{\sqrt{2310}i}{924}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{154}}{308}$ | $\frac{3\sqrt{154}i}{308}$ | 0 |
| | | 0 | $-\frac{\sqrt{154}i}{77}$ | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2310}}{924}$ | $\frac{3\sqrt{154}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{154}}{308}$ |
| | | $\frac{\sqrt{154}i}{77}$ | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | $-\frac{3\sqrt{154}}{308}$ | 0 | 0 | $-\frac{3\sqrt{154}i}{308}$ | 0 |
| | | $\frac{\sqrt{154}}{77}$ | 0 | 0 | $\frac{\sqrt{2310}i}{924}$ | 0 | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | $\frac{3\sqrt{154}i}{308}$ | 0 | $\frac{3\sqrt{154}}{308}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{154}}{77}$ | $-\frac{\sqrt{2310}i}{924}$ | 0 | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | $-\frac{3\sqrt{154}i}{308}$ | 0 | $\frac{3\sqrt{154}}{308}$ | 0 | 0 | 0 |
| 788 | symmetry | $-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|------------------------|--|---|---------------------------|---------------------------|---------------------------|----------------------------|----------------------------|---------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $M_6^{(1,-1;a)}(A, 2)$ | 0 | 0 | 0 | $\frac{\sqrt{6}}{24}$ | 0 | $\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{10}}{40}$ | 0 | $-\frac{\sqrt{10}i}{40}$ | $-\frac{\sqrt{10}}{20}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{6}}{24}$ | 0 | $-\frac{\sqrt{6}i}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{10}}{40}$ | 0 | $\frac{\sqrt{10}i}{40}$ | 0 | 0 | $\frac{\sqrt{10}}{20}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{2}}{24}$ | 0 | $-\frac{\sqrt{2}i}{24}$ | $-\frac{\sqrt{2}}{12}$ | 0 | 0 | $-\frac{\sqrt{30}}{40}$ | 0 | $-\frac{\sqrt{30}i}{40}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{2}}{24}$ | 0 | $\frac{\sqrt{2}i}{24}$ | 0 | 0 | $\frac{\sqrt{2}}{12}$ | $-\frac{\sqrt{30}}{40}$ | 0 | $\frac{\sqrt{30}i}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2}}{12}$ | 0 | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 | $\frac{\sqrt{30}}{60}$ | 0 | 0 | $-\frac{\sqrt{30}i}{60}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}}{12}$ | $\frac{\sqrt{2}i}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}}{60}$ | $\frac{\sqrt{30}i}{60}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{2}}{12}$ | 0 | 0 | 0 | $-\frac{\sqrt{2}}{12}$ | $\frac{\sqrt{30}}{60}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}}{60}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{2}}{12}$ | 0 | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 | $-\frac{\sqrt{30}}{60}$ | 0 | 0 | $\frac{\sqrt{30}}{60}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{2}i}{12}$ | 0 | $\frac{\sqrt{2}}{12}$ | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{60}$ | 0 | $\frac{\sqrt{30}}{60}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | $\frac{\sqrt{2}}{12}$ | 0 | 0 | 0 | $\frac{\sqrt{30}i}{60}$ | 0 | $\frac{\sqrt{30}}{60}$ | 0 | 0 | 0 |
| 789 | symmetry | $-\frac{\sqrt{14}(x^6-15x^4z^2+15x^2z^4+y^6-15y^4z^2+15y^2z^4-2z^6)}{8}$ | | | | | | | | | | | | | |
| | $M_6^{(1,-1;a)}(A, 3)$ | 0 | 0 | 0 | $\frac{\sqrt{110}}{88}$ | 0 | $-\frac{\sqrt{110}i}{88}$ | $\frac{\sqrt{110}}{44}$ | 0 | 0 | $\frac{\sqrt{66}}{88}$ | 0 | $\frac{\sqrt{66}i}{88}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{110}}{88}$ | 0 | $\frac{\sqrt{110}i}{88}$ | 0 | 0 | $-\frac{\sqrt{110}}{44}$ | $\frac{\sqrt{66}}{88}$ | 0 | $-\frac{\sqrt{66}i}{88}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{330}}{264}$ | 0 | $-\frac{\sqrt{330}i}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}}{88}$ | 0 | $\frac{\sqrt{22}i}{88}$ | $\frac{\sqrt{22}}{44}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{330}}{264}$ | 0 | $\frac{\sqrt{330}i}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}}{88}$ | 0 | $-\frac{\sqrt{22}i}{88}$ | 0 | 0 | $-\frac{\sqrt{22}}{44}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | $-\frac{\sqrt{22}}{44}$ | 0 | 0 | $\frac{\sqrt{22}i}{44}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}}{44}$ | $-\frac{\sqrt{22}i}{44}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | $\frac{\sqrt{22}}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}}{44}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | $-\frac{\sqrt{22}}{44}$ | 0 | 0 | $\frac{\sqrt{22}}{44}$ | 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 |
| 790 | symmetry | $\frac{\sqrt{42}(x-y)(x+y)(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|--------------------------|----------------------------|---------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|
| | $\mathbb{M}_6^{(1,-1;a)}(A,4)$ | 0 | 0 | 0 | $-\frac{\sqrt{330}}{264}$ | 0 | $-\frac{\sqrt{330}i}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}}{88}$ | 0 | $\frac{\sqrt{22}i}{88}$ | $\frac{\sqrt{22}}{44}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{330}}{264}$ | 0 | $\frac{\sqrt{330}i}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}}{88}$ | 0 | $-\frac{\sqrt{22}i}{88}$ | 0 | 0 | $-\frac{\sqrt{22}}{44}$ |
| | | 0 | 0 | 0 | $\frac{5\sqrt{110}}{264}$ | 0 | $-\frac{5\sqrt{110}i}{264}$ | $\frac{\sqrt{110}}{132}$ | 0 | 0 | $-\frac{\sqrt{66}}{88}$ | 0 | $-\frac{\sqrt{66}i}{88}$ | 0 | 0 |
| | | 0 | 0 | $\frac{5\sqrt{110}}{264}$ | 0 | $\frac{5\sqrt{110}i}{264}$ | 0 | 0 | $-\frac{\sqrt{110}}{132}$ | $-\frac{\sqrt{66}}{88}$ | 0 | $\frac{\sqrt{66}i}{88}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}}{132}$ | 0 | 0 | $\frac{\sqrt{110}i}{132}$ | 0 | 0 | $-\frac{\sqrt{66}}{132}$ | 0 | 0 | $\frac{\sqrt{66}i}{132}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}}{132}$ | $-\frac{\sqrt{110}i}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}}{132}$ | $-\frac{\sqrt{66}i}{132}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{110}}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}}{132}$ | $-\frac{\sqrt{66}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}}{132}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{110}}{132}$ | 0 | 0 | $\frac{\sqrt{110}}{132}$ | 0 | 0 | $\frac{\sqrt{66}}{132}$ | 0 | 0 | $-\frac{\sqrt{66}}{132}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{110}i}{66}$ | 0 | $\frac{\sqrt{110}}{66}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{66}$ | 0 | $\frac{\sqrt{66}}{66}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{110}i}{66}$ | 0 | $\frac{\sqrt{110}}{66}$ | 0 | 0 | 0 | $\frac{\sqrt{66}i}{66}$ | 0 | $\frac{\sqrt{66}}{66}$ | 0 | 0 | 0 |
| 791 | symmetry | $\frac{3\sqrt{7}xz(x-z)(x+z)(x^2-10y^2+z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_6^{(1,-1;a)}(A,5)$ | 0 | $-\frac{\sqrt{33}i}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{88}$ | $\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{88}$ | |
| | | $\frac{\sqrt{33}i}{44}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{88}$ | 0 | 0 | $-\frac{\sqrt{33}}{44}$ | 0 | 0 | $-\frac{\sqrt{33}}{88}$ | |
| | | 0 | $\frac{\sqrt{11}i}{44}$ | $\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{264}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ |
| | | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | $-\frac{\sqrt{165}}{264}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 |
| | | $\frac{\sqrt{11}}{22}$ | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}i}{44}$ | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}}{22}$ | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{165}}{132}$ | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | $-\frac{\sqrt{11}i}{22}$ | $-\frac{\sqrt{11}}{44}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{132}$ | $-\frac{\sqrt{11}}{44}$ | 0 | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | $\frac{\sqrt{11}}{44}$ |
| | | 0 | $-\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | $\frac{\sqrt{11}i}{44}$ |
| | | $-\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{22}$ | $-\frac{\sqrt{11}i}{44}$ | 0 |
| 792 | symmetry | $\frac{\sqrt{462}xz(x^2-3z^2)(3x^2-z^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|---------------------------------|--|---------------------------|----------------------------|-----------------------------|-------------------------|--------------------------|---------------------------|---------------------------|------------------------------|-----------------------------|---|---|-----------------------------|-----------------------------|
| | $\mathbb{M}_6^{(1,-1;a)}(A, 6)$ | 0 | 0 | $-\frac{\sqrt{30}}{32}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}}{32}$ | $-\frac{3\sqrt{2}}{32}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{2}}{32}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{30}}{32}$ | 0 | 0 | $\frac{\sqrt{30}}{32}$ | 0 | 0 | $\frac{3\sqrt{2}}{32}$ | 0 | 0 | $-\frac{3\sqrt{2}}{32}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{10}}{32}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{32}$ | $\frac{\sqrt{6}}{32}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}}{32}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{10}}{32}$ | 0 | 0 | $-\frac{\sqrt{10}}{32}$ | 0 | 0 | $-\frac{\sqrt{6}}{32}$ | 0 | 0 | $\frac{\sqrt{6}}{32}$ | 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 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{10}}{16}$ | 0 | 0 | $\frac{\sqrt{10}}{16}$ | 0 | 0 | $\frac{\sqrt{6}}{16}$ | 0 | 0 | $-\frac{\sqrt{6}}{16}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{10}}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{16}$ | $\frac{\sqrt{6}}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}}{16}$ |
| | | 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 |
| 793 | symmetry | $\frac{\sqrt{210}xz(x^4-16x^2y^2+2x^2z^2+16y^4-16y^2z^2+z^4)}{16}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_6^{(1,-1;a)}(A, 7)$ | 0 | $\frac{\sqrt{110}i}{110}$ | $\frac{\sqrt{66}}{352}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{66}}{1056}$ | $-\frac{13\sqrt{110}}{1760}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}}{160}$ |
| | | $-\frac{\sqrt{110}i}{110}$ | 0 | 0 | $-\frac{\sqrt{66}}{352}$ | 0 | 0 | $\frac{5\sqrt{66}}{1056}$ | 0 | 0 | $\frac{13\sqrt{110}}{1760}$ | 0 | 0 | $\frac{\sqrt{110}}{160}$ | 0 |
| | | 0 | $\frac{\sqrt{330}i}{110}$ | $\frac{13\sqrt{22}}{1056}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}}{96}$ | $-\frac{7\sqrt{330}}{1056}$ | 0 | 0 | 0 | 0 | $\frac{37\sqrt{330}}{5280}$ |
| | | $-\frac{\sqrt{330}i}{110}$ | 0 | 0 | $-\frac{13\sqrt{22}}{1056}$ | 0 | 0 | $\frac{\sqrt{22}}{96}$ | 0 | 0 | $\frac{7\sqrt{330}}{1056}$ | 0 | 0 | $\frac{37\sqrt{330}}{5280}$ | 0 |
| | | $-\frac{\sqrt{330}}{165}$ | 0 | 0 | $\frac{\sqrt{22}i}{66}$ | 0 | $\frac{\sqrt{22}}{33}$ | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{110}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{330}}{165}$ | $-\frac{\sqrt{22}i}{66}$ | 0 | $\frac{\sqrt{22}}{33}$ | 0 | 0 | 0 | $\frac{\sqrt{330}i}{110}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{22}}{528}$ | 0 | $-\frac{\sqrt{22}i}{33}$ | $\frac{5\sqrt{22}}{528}$ | 0 | 0 | $-\frac{\sqrt{330}}{240}$ | 0 | 0 | $\frac{\sqrt{330}}{240}$ | 0 |
| | | 0 | 0 | $\frac{5\sqrt{22}}{528}$ | 0 | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | $-\frac{5\sqrt{22}}{528}$ | $-\frac{\sqrt{330}}{240}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{240}$ |
| | | 0 | $-\frac{\sqrt{330}}{165}$ | 0 | 0 | $\frac{\sqrt{22}}{33}$ | 0 | 0 | $\frac{\sqrt{22}i}{66}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}i}{110}$ |
| | | $-\frac{\sqrt{330}}{165}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{22}}{33}$ | $-\frac{\sqrt{22}i}{66}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{110}$ | 0 |
| 794 | symmetry | $\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---|--------------------------|----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|---------------------------|--------------------------|
| | $\mathbb{M}_6^{(1,-1;a)}(B,1)$ | 0 | $-\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}i}{88}$ | 0 | 0 | $\frac{\sqrt{33}}{44}$ | 0 | 0 | $\frac{\sqrt{33}i}{88}$ |
| | | $-\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}i}{88}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{44}$ | $-\frac{\sqrt{33}i}{88}$ | 0 |
| | | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | $\frac{\sqrt{165}}{132}$ | 0 | 0 | $\frac{\sqrt{165}i}{264}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ |
| | | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | $-\frac{\sqrt{165}i}{264}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | $\frac{\sqrt{165}}{132}$ | 0 | 0 | $\frac{\sqrt{11}}{22}$ | 0 | $\frac{\sqrt{11}i}{44}$ | $-\frac{\sqrt{11}}{44}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | $\frac{\sqrt{11}}{22}$ | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $\frac{\sqrt{11}}{44}$ |
| | | $-\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{22}$ | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | $\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | $\frac{\sqrt{11}i}{22}$ | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}i}{22}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ |
| | | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | $-\frac{\sqrt{11}}{22}$ | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 |
| 795 | symmetry | $-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_6^{(1,-1;a)}(B,2)$ | 0 | 0 | 0 | $-\frac{\sqrt{55}i}{88}$ | 0 | $-\frac{\sqrt{55}}{88}$ | 0 | 0 | 0 | $\frac{\sqrt{33}i}{88}$ | 0 | $-\frac{\sqrt{33}}{88}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{55}i}{88}$ | 0 | $-\frac{\sqrt{55}}{88}$ | 0 | 0 | 0 | $-\frac{\sqrt{33}i}{88}$ | 0 | $-\frac{\sqrt{33}}{88}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{11}}{22}$ | 0 | 0 | $\frac{\sqrt{165}i}{264}$ | 0 | $-\frac{\sqrt{165}}{264}$ | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}}{22}$ | $-\frac{\sqrt{165}i}{264}$ | 0 | $-\frac{\sqrt{165}}{264}$ | 0 | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}i}{22}$ | $\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{22}$ |
| | | $-\frac{\sqrt{11}i}{22}$ | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{44}$ | 0 | 0 | $\frac{\sqrt{11}}{22}$ | 0 |
| | | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | $-\frac{\sqrt{11}i}{22}$ |
| | | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{44}$ | $\frac{\sqrt{11}i}{22}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | $\frac{\sqrt{11}i}{44}$ | $\frac{\sqrt{11}}{22}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{11}}{22}$ |
| 796 | symmetry | $\frac{\sqrt{462}yz(y^2-3z^2)(3y^2-z^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix |
|-----|---------------------------------|--|
| | $\mathbb{M}_6^{(1,-1;a)}(B, 3)$ | $ \begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{32} & 0 & 0 & -\frac{\sqrt{30}i}{32} & 0 & 0 & \frac{3\sqrt{2}}{32} & 0 & 0 & -\frac{3\sqrt{2}i}{32} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{32} & \frac{\sqrt{30}i}{32} & 0 & 0 & 0 & 0 & -\frac{3\sqrt{2}}{32} & \frac{3\sqrt{2}i}{32} & 0 \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{10}}{32} & 0 & 0 & -\frac{\sqrt{10}i}{32} & 0 & 0 & \frac{\sqrt{6}}{32} & 0 & 0 & -\frac{\sqrt{6}i}{32} \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{10}}{32} & \frac{\sqrt{10}i}{32} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{32} & \frac{\sqrt{6}i}{32} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{10}i}{16} & \frac{\sqrt{10}}{16} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & \frac{\sqrt{6}}{16} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 & -\frac{\sqrt{6}}{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 \end{bmatrix} $ |
| 797 | symmetry | $ \frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16} $ $ \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 & -\frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & \frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}i}{16} & 0 & -\frac{\sqrt{10}}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}i}{16} & 0 & -\frac{\sqrt{6}}{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{\sqrt{10}}{16} & 0 & -\frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & -\frac{\sqrt{6}i}{16} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{10}}{16} & 0 & \frac{\sqrt{10}i}{16} & 0 & 0 & 0 & -\frac{\sqrt{6}}{16} & 0 & \frac{\sqrt{6}i}{16} & 0 & 0 & 0 \end{bmatrix} $ |
| 798 | symmetry | $ \frac{\sqrt{210}yz(16x^4-16x^2y^2-16x^2z^2+y^4+2y^2z^2+z^4)}{16} $ |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|------------------------|--|---------------------------|---------------------------|---------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|---------------------------|----------------------------|------------------------------|------------------------------|---|-------------------------------|
| | $M_6^{(1,-1;a)}(B, 5)$ | 0 | $-\frac{\sqrt{110}}{110}$ | 0 | 0 | $\frac{\sqrt{66}}{352}$ | 0 | 0 | $-\frac{5\sqrt{66}i}{1056}$ | 0 | 0 | $\frac{13\sqrt{110}}{1760}$ | 0 | 0 | $\frac{\sqrt{110}i}{160}$ |
| | | $-\frac{\sqrt{110}}{110}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}}{352}$ | $\frac{5\sqrt{66}i}{1056}$ | 0 | 0 | 0 | $-\frac{13\sqrt{110}}{1760}$ | $-\frac{\sqrt{110}i}{160}$ | 0 | |
| | | 0 | $\frac{\sqrt{330}}{110}$ | 0 | 0 | $-\frac{13\sqrt{22}}{1056}$ | 0 | 0 | $\frac{\sqrt{22}i}{96}$ | 0 | 0 | $-\frac{7\sqrt{330}}{1056}$ | 0 | 0 | $-\frac{37\sqrt{330}i}{5280}$ |
| | | $\frac{\sqrt{330}}{110}$ | 0 | 0 | 0 | 0 | $\frac{13\sqrt{22}}{1056}$ | $-\frac{\sqrt{22}i}{96}$ | 0 | 0 | 0 | $\frac{7\sqrt{330}}{1056}$ | $\frac{37\sqrt{330}i}{5280}$ | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{22}}{33}$ | 0 | $-\frac{5\sqrt{22}i}{528}$ | $\frac{5\sqrt{22}}{528}$ | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{240}$ | $-\frac{\sqrt{330}}{240}$ | 0 | |
| | | 0 | 0 | $\frac{\sqrt{22}}{33}$ | 0 | $\frac{5\sqrt{22}i}{528}$ | 0 | 0 | $-\frac{5\sqrt{22}}{528}$ | 0 | 0 | $\frac{\sqrt{330}i}{240}$ | 0 | 0 | $\frac{\sqrt{330}}{240}$ |
| | | $-\frac{\sqrt{330}}{165}$ | 0 | 0 | $-\frac{\sqrt{22}i}{33}$ | 0 | $-\frac{\sqrt{22}}{66}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{110}$ | 0 | 0 | |
| | | 0 | $\frac{\sqrt{330}}{165}$ | $\frac{\sqrt{22}i}{33}$ | 0 | $-\frac{\sqrt{22}}{66}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{110}$ | 0 | 0 | 0 | |
| | | 0 | $\frac{\sqrt{330}i}{165}$ | $\frac{\sqrt{22}}{33}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{22}}{66}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{110}$ |
| | | $-\frac{\sqrt{330}i}{165}$ | 0 | 0 | $-\frac{\sqrt{22}}{33}$ | 0 | 0 | $-\frac{\sqrt{22}}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{110}$ | 0 | |
| 799 | symmetry | $\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$ | | | | | | | | | | | | | |
| | $M_6^{(1,-1;a)}(B, 6)$ | $\frac{\sqrt{110}}{55}$ | 0 | 0 | $\frac{\sqrt{66}i}{132}$ | 0 | $-\frac{\sqrt{66}}{132}$ | 0 | 0 | 0 | $\frac{3\sqrt{110}i}{220}$ | 0 | $\frac{3\sqrt{110}}{220}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{110}}{55}$ | $-\frac{\sqrt{66}i}{132}$ | 0 | $-\frac{\sqrt{66}}{132}$ | 0 | 0 | $-\frac{3\sqrt{110}i}{220}$ | 0 | $\frac{3\sqrt{110}}{220}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{528}$ | 0 | $-\frac{\sqrt{22}}{528}$ | 0 | 0 | 0 | $\frac{\sqrt{330}i}{2640}$ | 0 | $-\frac{\sqrt{330}}{2640}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{22}i}{528}$ | 0 | $-\frac{\sqrt{22}}{528}$ | 0 | 0 | $-\frac{\sqrt{330}i}{2640}$ | 0 | $-\frac{\sqrt{330}}{2640}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{330}i}{165}$ | $-\frac{\sqrt{22}}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}}{33}$ | $-\frac{\sqrt{330}}{110}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{330}i}{165}$ | 0 | 0 | $\frac{\sqrt{22}}{66}$ | 0 | 0 | $\frac{\sqrt{22}}{33}$ | 0 | 0 | $\frac{\sqrt{330}}{110}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{330}}{165}$ | 0 | 0 | $-\frac{\sqrt{22}}{66}$ | 0 | 0 | $-\frac{\sqrt{22}i}{33}$ | 0 | 0 | $\frac{\sqrt{330}}{110}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{330}}{165}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}}{66}$ | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{110}$ | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{22}}{528}$ | 0 | $-\frac{5\sqrt{22}i}{528}$ | $\frac{\sqrt{22}}{33}$ | 0 | 0 | $\frac{\sqrt{330}}{240}$ | 0 | $\frac{\sqrt{330}i}{240}$ | 0 | 0 |
| | | 0 | 0 | $\frac{5\sqrt{22}}{528}$ | 0 | $\frac{5\sqrt{22}i}{528}$ | 0 | 0 | $-\frac{\sqrt{22}}{33}$ | $\frac{\sqrt{330}}{240}$ | 0 | $-\frac{\sqrt{330}i}{240}$ | 0 | 0 | 0 |
| 800 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------------|---|--------------------------|--------------------------|---------------------------|--------------------------|-------------------------|--------------------------|---------------------------|---------------------------|----------------------------|---------------------------|--------------------------|-------------------------|
| | $\mathbb{M}_2^{(1,0;a)}(A, 1)$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | $\frac{\sqrt{105}i}{56}$ | 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 | $-\frac{\sqrt{7}i}{14}$ | 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 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 801 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_2^{(1,0;a)}(A, 2)$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | $\frac{\sqrt{105}i}{168}$ | $-\frac{\sqrt{105}}{42}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{105}}{42}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | $\frac{\sqrt{21}i}{168}$ | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 802 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
| | $\mathbb{M}_2^{(1,0;a)}(A, 3)$ | 0 | $-\frac{\sqrt{105}i}{84}$ | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ |
| | | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{28}$ | $\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 |
| 803 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |
| | $\mathbb{M}_2^{(1,0;a)}(B, 1)$ | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{\sqrt{105}i}{84}$ |
| | | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | $-\frac{\sqrt{105}i}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{168}$ | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 |
| 804 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|-------------------------|---------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|----------------------------|---------------------------|--------------------------|--------------------------|-------------------------|--------------------------|
| | $\mathbb{M}_2^{(1,0;a)}(B, 2)$ | $-\frac{\sqrt{105}}{42}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{42}$ | $-\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| 805 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,0;a)}(A, 1)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | $-\frac{\sqrt{5}i}{20}$ | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{20}$ | 0 | $\frac{\sqrt{5}i}{20}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{60}$ | 0 | $\frac{\sqrt{15}i}{60}$ | $\frac{\sqrt{15}}{30}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{60}$ | 0 | $-\frac{\sqrt{15}i}{60}$ | 0 | 0 | $-\frac{\sqrt{15}}{30}$ | |
| | | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ |
| | | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | $-\frac{i}{8}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | $\frac{\sqrt{15}i}{40}$ | 0 | |
| | | 0 | $\frac{\sqrt{15}i}{30}$ | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ |
| | | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $-\frac{1}{8}$ | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | |
| | | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | $\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | |
| | | 0 | $\frac{\sqrt{15}}{30}$ | $-\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 |
| 806 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|-------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|----------------------------|--------------------------|--------------------------|
| | $\mathbb{M}_4^{(1,0;a)}(A, 2)$ | 0 | 0 | 0 | $-\frac{3\sqrt{105}}{280}$ | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{280}$ | 0 | $-\frac{\sqrt{7}i}{280}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{105}}{280}$ | 0 | $-\frac{3\sqrt{105}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{280}$ | 0 | $\frac{\sqrt{7}i}{280}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{35}}{280}$ | 0 | $-\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | $\frac{5\sqrt{21}i}{168}$ | $-\frac{\sqrt{21}}{30}$ | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{35}}{280}$ | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{30}$ |
| | | 0 | $-\frac{\sqrt{21}}{60}$ | 0 | 0 | $\frac{\sqrt{35}}{40}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $\frac{\sqrt{21}}{40}$ | 0 | 0 | $-\frac{\sqrt{21}i}{40}$ |
| | | $-\frac{\sqrt{21}}{60}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{40}$ | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{40}$ | $\frac{\sqrt{21}i}{40}$ | 0 |
| | | 0 | $\frac{\sqrt{21}i}{60}$ | $\frac{\sqrt{35}}{40}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | $-\frac{\sqrt{21}}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{40}$ |
| | | $-\frac{\sqrt{21}i}{60}$ | 0 | 0 | $-\frac{\sqrt{35}}{40}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | $\frac{\sqrt{21}}{40}$ | 0 | 0 | $-\frac{\sqrt{21}i}{40}$ | 0 |
| | | $\frac{\sqrt{21}}{30}$ | 0 | 0 | $\frac{\sqrt{35}i}{140}$ | 0 | $-\frac{\sqrt{35}}{140}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{30}$ | $-\frac{\sqrt{35}i}{140}$ | 0 | $-\frac{\sqrt{35}}{140}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 807 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,0;a)}(A, 3)$ | 0 | 0 | 0 | $-\frac{3\sqrt{35}}{280}$ | 0 | $-\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 | $\frac{9\sqrt{21}}{280}$ | 0 | $-\frac{9\sqrt{21}i}{280}$ | $\frac{\sqrt{21}}{35}$ | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{35}}{280}$ | 0 | $\frac{3\sqrt{35}i}{280}$ | 0 | 0 | 0 | $\frac{9\sqrt{21}}{280}$ | 0 | $\frac{9\sqrt{21}i}{280}$ | 0 | 0 | $-\frac{\sqrt{21}}{35}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | $\frac{\sqrt{105}i}{280}$ | $-\frac{\sqrt{105}}{70}$ | 0 | 0 | $\frac{\sqrt{7}}{280}$ | 0 | $\frac{\sqrt{7}i}{280}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | $-\frac{\sqrt{105}i}{280}$ | 0 | 0 | $\frac{\sqrt{105}}{70}$ | $\frac{\sqrt{7}}{280}$ | 0 | $-\frac{\sqrt{7}i}{280}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{20}$ | 0 | 0 | $\frac{\sqrt{105}}{280}$ | 0 | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | 0 | $\frac{\sqrt{7}}{40}$ | 0 | 0 | $-\frac{\sqrt{7}i}{40}$ |
| | | $\frac{\sqrt{7}}{20}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | $-\frac{3\sqrt{105}i}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{40}$ | $\frac{\sqrt{7}i}{40}$ | 0 |
| | | 0 | $\frac{\sqrt{7}i}{20}$ | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{105}}{280}$ | $\frac{\sqrt{7}}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{40}$ |
| | | $-\frac{\sqrt{7}i}{20}$ | 0 | 0 | $\frac{\sqrt{105}}{280}$ | 0 | 0 | $\frac{3\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{7}}{40}$ | 0 | 0 | $\frac{\sqrt{7}}{40}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{20}$ | 0 | $-\frac{\sqrt{7}}{20}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{70}$ | 0 | $\frac{\sqrt{105}}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{20}$ | 0 | $-\frac{\sqrt{7}}{20}$ | 0 | 0 | 0 |
| 808 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|--------------------------------|---------------------------------------|--------------------------|----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|---------------------------|----------------------------|---------------------------|------------------------|------------------------|-------------------------|--------------------------|--|
| | $\mathbb{M}_4^{(1,0;a)}(A, 4)$ | 0 | $-\frac{\sqrt{3}i}{10}$ | $\frac{3\sqrt{5}}{80}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{80}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{20}$ | |
| | | $\frac{\sqrt{3}i}{10}$ | 0 | 0 | $-\frac{3\sqrt{5}}{80}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{80}$ | 0 | 0 | $\frac{\sqrt{3}}{20}$ | 0 | |
| | | 0 | $\frac{i}{10}$ | $\frac{\sqrt{15}}{80}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | $\frac{7}{80}$ | 0 | 0 | 0 | 0 | $\frac{1}{40}$ | |
| | | $-\frac{i}{10}$ | 0 | 0 | $-\frac{\sqrt{15}}{80}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $-\frac{7}{80}$ | 0 | 0 | $\frac{1}{40}$ | 0 | |
| | | $\frac{1}{40}$ | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3i}{20}$ | 0 | $\frac{1}{40}$ | 0 | 0 | |
| | | 0 | $-\frac{1}{40}$ | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3i}{20}$ | 0 | $\frac{1}{40}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}}{80}$ | 0 | 0 | $\frac{\sqrt{15}}{80}$ | 0 | 0 | $\frac{1}{16}$ | 0 | $-\frac{i}{5}$ | $\frac{1}{16}$ | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{15}}{80}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{80}$ | $\frac{1}{16}$ | 0 | $\frac{i}{5}$ | 0 | 0 | 0 | $-\frac{1}{16}$ | |
| | | 0 | $-\frac{1}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{20}$ | 0 | 0 | $\frac{1}{40}$ | 0 | 0 | 0 | $-\frac{3i}{20}$ | |
| | | $-\frac{1}{40}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{20}$ | 0 | 0 | 0 | 0 | $-\frac{1}{40}$ | $\frac{3i}{20}$ | 0 | |
| 809 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,0;a)}(A, 5)$ | 0 | $-\frac{\sqrt{21}i}{70}$ | $\frac{3\sqrt{35}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{21}}{560}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | |
| | | $\frac{\sqrt{21}i}{70}$ | 0 | 0 | $-\frac{3\sqrt{35}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{17\sqrt{21}}{560}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | |
| | | 0 | $-\frac{3\sqrt{7}i}{70}$ | $\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | $\frac{23\sqrt{7}}{560}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{40}$ | |
| | | $\frac{3\sqrt{7}i}{70}$ | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{23\sqrt{7}}{560}$ | 0 | 0 | $\frac{\sqrt{7}}{40}$ | 0 | |
| | | $-\frac{\sqrt{7}}{40}$ | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | $-\frac{3\sqrt{105}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{140}$ | 0 | $-\frac{\sqrt{7}}{20}$ | 0 | 0 | |
| | | 0 | $\frac{\sqrt{7}}{40}$ | $-\frac{\sqrt{105}i}{140}$ | 0 | $-\frac{3\sqrt{105}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{140}$ | 0 | $-\frac{\sqrt{7}}{20}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{560}$ | 0 | $-\frac{\sqrt{105}i}{70}$ | $-\frac{\sqrt{105}}{560}$ | 0 | 0 | $-\frac{\sqrt{7}}{80}$ | 0 | 0 | $\frac{\sqrt{7}}{80}$ | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{105}}{560}$ | 0 | $\frac{\sqrt{105}i}{70}$ | 0 | 0 | $\frac{\sqrt{105}}{560}$ | $-\frac{\sqrt{7}}{80}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{80}$ | |
| | | 0 | $-\frac{\sqrt{7}}{40}$ | 0 | 0 | $-\frac{3\sqrt{105}}{280}$ | 0 | 0 | $\frac{\sqrt{105}i}{140}$ | 0 | 0 | $\frac{\sqrt{7}}{20}$ | 0 | 0 | $-\frac{\sqrt{7}i}{140}$ | |
| | | $-\frac{\sqrt{7}}{40}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{105}}{280}$ | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{20}$ | $\frac{\sqrt{7}i}{140}$ | 0 | |
| 810 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|-------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | $\mathbb{M}_4^{(1,0;a)}(B,1)$ | $ \begin{bmatrix} 0 & -\frac{\sqrt{3}}{10} & 0 & 0 & -\frac{3\sqrt{5}}{80} & 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{80} & 0 & 0 & -\frac{\sqrt{3}i}{20} \\ -\frac{\sqrt{3}}{10} & 0 & 0 & 0 & 0 & \frac{3\sqrt{5}}{80} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{80} & \frac{\sqrt{3}i}{20} & 0 \\ 0 & -\frac{1}{10} & 0 & 0 & \frac{\sqrt{15}}{80} & 0 & 0 & \frac{\sqrt{15}i}{40} & 0 & 0 & -\frac{7}{80} & 0 & 0 & \frac{i}{40} \\ -\frac{1}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{80} & -\frac{\sqrt{15}i}{40} & 0 & 0 & 0 & 0 & \frac{7}{80} & -\frac{i}{40} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}i}{80} & -\frac{\sqrt{15}}{80} & 0 & 0 & \frac{1}{5} & 0 & -\frac{i}{16} & \frac{1}{16} & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{15}i}{80} & 0 & 0 & \frac{\sqrt{15}}{80} & \frac{1}{5} & 0 & \frac{i}{16} & 0 & 0 & -\frac{1}{16} \\ -\frac{1}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & -\frac{i}{40} & 0 & \frac{3}{20} & 0 & 0 \\ 0 & \frac{1}{40} & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & \frac{i}{40} & 0 & \frac{3}{20} & 0 & 0 & 0 \\ 0 & -\frac{i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & \frac{1}{40} & 0 & 0 & 0 & 0 & \frac{3}{20} \\ \frac{i}{40} & 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & -\frac{1}{40} & 0 & 0 & \frac{3}{20} & 0 \end{bmatrix} $ | | | | | | | | | | | | | | |
| 811 | symmetry | $ \frac{\sqrt{35}xy(x-y)(x+y)}{2} $ | | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,0;a)}(B,2)$ | $ \begin{bmatrix} 0 & 0 & 0 & -\frac{3\sqrt{5}i}{80} & 0 & -\frac{3\sqrt{5}}{80} & 0 & 0 & 0 & \frac{3\sqrt{3}i}{80} & 0 & -\frac{3\sqrt{3}}{80} & 0 & 0 \\ 0 & 0 & \frac{3\sqrt{5}i}{80} & 0 & -\frac{3\sqrt{5}}{80} & 0 & 0 & 0 & -\frac{3\sqrt{3}i}{80} & 0 & -\frac{3\sqrt{3}}{80} & 0 & 0 & 0 \\ \frac{1}{5} & 0 & 0 & -\frac{\sqrt{15}i}{80} & 0 & \frac{\sqrt{15}}{80} & 0 & 0 & 0 & -\frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 \\ 0 & -\frac{1}{5} & \frac{\sqrt{15}i}{80} & 0 & \frac{\sqrt{15}}{80} & 0 & 0 & 0 & \frac{i}{16} & 0 & -\frac{1}{16} & 0 & 0 & 0 \\ 0 & \frac{i}{40} & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{3}{20} & 0 & 0 & 0 & 0 & \frac{1}{40} \\ -\frac{i}{40} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{3}{20} & 0 & 0 & \frac{1}{40} & 0 \\ 0 & \frac{1}{40} & 0 & 0 & \frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & \frac{3}{20} & 0 & 0 & -\frac{i}{40} \\ \frac{1}{40} & 0 & 0 & 0 & 0 & -\frac{\sqrt{15}}{20} & 0 & 0 & 0 & 0 & 0 & -\frac{3}{20} & \frac{i}{40} & 0 \\ 0 & 0 & 0 & \frac{\sqrt{15}}{80} & 0 & \frac{\sqrt{15}i}{80} & 0 & 0 & 0 & \frac{1}{16} & 0 & -\frac{i}{16} & \frac{1}{5} & 0 \\ 0 & 0 & \frac{\sqrt{15}}{80} & 0 & -\frac{\sqrt{15}i}{80} & 0 & 0 & 0 & \frac{1}{16} & 0 & \frac{i}{16} & 0 & 0 & -\frac{1}{5} \end{bmatrix} $ | | | | | | | | | | | | | | |
| 812 | symmetry | $ \frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2} $ | | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---------------------------------------|-------------------------|-----------------------------|----------------------------|----------------------------|---------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|--------------------------|-------------------------|
| | $\mathbb{M}_4^{(1,0;a)}(B, 3)$ | 0 | $\frac{\sqrt{21}}{70}$ | 0 | 0 | $\frac{3\sqrt{35}}{112}$ | 0 | 0 | 0 | 0 | $\frac{17\sqrt{21}}{560}$ | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | |
| | | $\frac{\sqrt{21}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{35}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{21}}{560}$ | $\frac{\sqrt{21}i}{28}$ | 0 | |
| | | 0 | $-\frac{3\sqrt{7}}{70}$ | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{23\sqrt{7}}{560}$ | 0 | 0 | $-\frac{\sqrt{7}i}{40}$ |
| | | $-\frac{3\sqrt{7}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{112}$ | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | $-\frac{23\sqrt{7}}{560}$ | $\frac{\sqrt{7}i}{40}$ | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | $\frac{\sqrt{105}i}{560}$ | $-\frac{\sqrt{105}}{560}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{80}$ | $-\frac{\sqrt{7}}{80}$ | 0 | |
| | | 0 | 0 | $\frac{\sqrt{105}}{70}$ | 0 | $-\frac{\sqrt{105}i}{560}$ | 0 | 0 | $\frac{\sqrt{105}}{560}$ | 0 | 0 | $\frac{\sqrt{7}i}{80}$ | 0 | 0 | $\frac{\sqrt{7}}{80}$ |
| | | $-\frac{\sqrt{7}}{40}$ | 0 | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{20}$ | 0 | $\frac{\sqrt{7}}{140}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{40}$ | $-\frac{3\sqrt{105}i}{280}$ | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{20}$ | 0 | $\frac{\sqrt{7}}{140}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{40}$ | $-\frac{3\sqrt{105}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | $-\frac{\sqrt{7}}{20}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{140}$ |
| | | $-\frac{\sqrt{7}i}{40}$ | 0 | 0 | $\frac{3\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | $\frac{\sqrt{7}}{20}$ | 0 | 0 | $-\frac{\sqrt{7}}{140}$ | 0 |
| 813 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,0;a)}(B, 4)$ | $-\frac{\sqrt{21}}{35}$ | 0 | 0 | $\frac{3\sqrt{35}i}{112}$ | 0 | $-\frac{3\sqrt{35}}{112}$ | 0 | 0 | 0 | $-\frac{3\sqrt{21}i}{560}$ | 0 | $-\frac{3\sqrt{21}}{560}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}}{35}$ | $-\frac{3\sqrt{35}i}{112}$ | 0 | $-\frac{3\sqrt{35}}{112}$ | 0 | 0 | 0 | $\frac{3\sqrt{21}i}{560}$ | 0 | $-\frac{3\sqrt{21}}{560}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{112}$ | 0 | $\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | $\frac{37\sqrt{7}i}{560}$ | 0 | $-\frac{37\sqrt{7}}{560}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | 0 | $\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | $-\frac{37\sqrt{7}i}{560}$ | 0 | $-\frac{37\sqrt{7}}{560}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{40}$ | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{105}}{280}$ | $\frac{\sqrt{7}}{140}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{20}$ |
| | | $-\frac{\sqrt{7}i}{40}$ | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | 0 | $-\frac{3\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{7}}{140}$ | 0 | 0 | $\frac{\sqrt{7}}{20}$ | 0 |
| | | 0 | $-\frac{\sqrt{7}}{40}$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | $\frac{3\sqrt{105}i}{280}$ | 0 | 0 | $-\frac{\sqrt{7}}{140}$ | 0 | 0 | $\frac{\sqrt{7}i}{20}$ |
| | | $-\frac{\sqrt{7}}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{140}$ | $-\frac{3\sqrt{105}i}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{140}$ | $-\frac{\sqrt{7}i}{20}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{560}$ | 0 | $\frac{\sqrt{105}i}{560}$ | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $\frac{\sqrt{7}}{80}$ | 0 | $\frac{\sqrt{7}i}{80}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{560}$ | 0 | $-\frac{\sqrt{105}i}{560}$ | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | $\frac{\sqrt{7}}{80}$ | 0 | $-\frac{\sqrt{7}i}{80}$ | 0 | 0 | 0 |
| 814 | symmetry | 1 | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|--------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|---------------------------|----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|
| | $\mathbb{M}_0^{(1,1;a)}(A)$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | $\frac{\sqrt{105}i}{140}$ | $\frac{\sqrt{105}}{70}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | $-\frac{\sqrt{105}i}{140}$ | 0 | 0 | $-\frac{\sqrt{105}}{70}$ | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{35}}{140}$ | 0 | $\frac{3\sqrt{35}i}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | $\frac{\sqrt{21}i}{84}$ | $\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{35}}{140}$ | 0 | $-\frac{3\sqrt{35}i}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ |
| | | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ |
| | | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{70}$ | $-\frac{\sqrt{35}i}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{70}$ | 0 | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 |
| | | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{35}i}{70}$ | 0 | $-\frac{\sqrt{35}}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 |
| 815 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | | |
| | $\mathbb{M}_2^{(1,1;a)}(A, 1)$ | 0 | 0 | 0 | $-\frac{3\sqrt{35}}{280}$ | 0 | $\frac{3\sqrt{35}i}{280}$ | $\frac{\sqrt{35}}{35}$ | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{35}}{280}$ | 0 | $-\frac{3\sqrt{35}i}{280}$ | 0 | 0 | $-\frac{\sqrt{35}}{35}$ | $-\frac{\sqrt{21}}{56}$ | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{11\sqrt{105}}{840}$ | 0 | $-\frac{11\sqrt{105}i}{840}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | $-\frac{\sqrt{7}}{14}$ | 0 |
| | | 0 | 0 | $-\frac{11\sqrt{105}}{840}$ | 0 | $\frac{11\sqrt{105}i}{840}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ |
| | | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{105}i}{210}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ |
| | | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{280}$ | $\frac{\sqrt{105}i}{210}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | $-\frac{\sqrt{7}i}{28}$ | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{28}$ | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{210}$ | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ |
| | | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | $\frac{\sqrt{105}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{210}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ |
| | | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{840}$ | 0 | $-\frac{\sqrt{105}}{840}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{105}i}{840}$ | 0 | $-\frac{\sqrt{105}}{840}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 |
| 816 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-------------------------|--------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|-------------------------|--------------------------|
| | $\mathbb{M}_2^{(1,1;a)}(A, 2)$ | 0 | 0 | 0 | $-\frac{11\sqrt{105}}{840}$ | 0 | $-\frac{11\sqrt{105}i}{840}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{11\sqrt{105}}{840}$ | 0 | $\frac{11\sqrt{105}i}{840}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{13\sqrt{35}}{840}$ | 0 | $-\frac{13\sqrt{35}i}{840}$ | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{56}$ | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{13\sqrt{35}}{840}$ | 0 | $\frac{13\sqrt{35}i}{840}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{21}}{56}$ | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}i}{420}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ |
| | | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{168}$ | $\frac{\sqrt{35}i}{420}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{28}$ | $\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{420}$ | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ |
| | | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}}{420}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{120}$ | 0 | $-\frac{\sqrt{35}}{120}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{120}$ | 0 | $-\frac{\sqrt{35}}{120}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 |
| 817 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |
| | $\mathbb{M}_2^{(1,1;a)}(A, 3)$ | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{105}$ | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{140}$ | 0 | 0 | $-\frac{\sqrt{105}}{105}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{11\sqrt{35}}{420}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | 0 | 0 | $\frac{11\sqrt{35}}{420}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 |
| | | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{420}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{420}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}}{105}$ | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{35}}{105}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}}{105}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{105}$ | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ |
| | | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{420}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{420}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 |
| 818 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|-------------------------------|--|--------------------------|---------------------------|---------------------------|---------------------------|----------------------------|----------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | $\mathbb{M}_2^{(1,1;a)}(B,1)$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{140}$ | 0 | 0 | $\frac{\sqrt{105}i}{105}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{140}$ | $-\frac{\sqrt{105}i}{105}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{11\sqrt{35}}{420}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{35}}{420}$ | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{105}$ | $\frac{\sqrt{35}}{105}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{105}$ | 0 | 0 | $-\frac{\sqrt{35}}{105}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ |
| | | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{420}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{35}i}{420}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}}{420}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{420}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 |
| 819 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | |
| | $\mathbb{M}_2^{(1,1;a)}(B,2)$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{60}$ | 0 | $\frac{\sqrt{105}}{60}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}i}{60}$ | 0 | $\frac{\sqrt{105}}{60}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{420}$ | 0 | $\frac{\sqrt{35}}{420}$ | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}i}{420}$ | 0 | $\frac{\sqrt{35}}{420}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{420}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{420}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{420}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ |
| | | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{420}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}}{105}$ | 0 | $-\frac{\sqrt{35}i}{105}$ | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}}{105}$ | 0 | $\frac{\sqrt{35}i}{105}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 |
| 820 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|--|---------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|----------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|
| | $\mathbb{M}_4^{(1,1;a)}(A, 1)$ | 0 | 0 | 0 | $-\frac{5\sqrt{22}}{264}$ | 0 | $\frac{5\sqrt{22}i}{264}$ | $\frac{5\sqrt{22}}{132}$ | 0 | 0 | $-\frac{7\sqrt{330}}{1320}$ | 0 | $-\frac{7\sqrt{330}i}{1320}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{22}}{264}$ | 0 | $-\frac{5\sqrt{22}i}{264}$ | 0 | 0 | $-\frac{5\sqrt{22}}{132}$ | $-\frac{7\sqrt{330}}{1320}$ | 0 | $\frac{7\sqrt{330}i}{1320}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{66}}{264}$ | 0 | $\frac{5\sqrt{66}i}{264}$ | 0 | 0 | 0 | $-\frac{7\sqrt{110}}{1320}$ | 0 | $\frac{7\sqrt{110}i}{1320}$ | $\frac{7\sqrt{110}}{660}$ | 0 |
| | | 0 | 0 | $\frac{5\sqrt{66}}{264}$ | 0 | $-\frac{5\sqrt{66}i}{264}$ | 0 | 0 | 0 | $-\frac{7\sqrt{110}}{1320}$ | 0 | $-\frac{7\sqrt{110}i}{1320}$ | 0 | 0 | $-\frac{7\sqrt{110}}{660}$ |
| | | 0 | $-\frac{\sqrt{110}}{330}$ | 0 | 0 | $\frac{\sqrt{66}}{66}$ | 0 | 0 | $-\frac{\sqrt{66}i}{66}$ | 0 | 0 | $-\frac{\sqrt{110}}{165}$ | 0 | 0 | $-\frac{\sqrt{110}i}{165}$ |
| | | $-\frac{\sqrt{110}}{330}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}}{66}$ | $\frac{\sqrt{66}i}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}}{165}$ | $\frac{\sqrt{110}i}{165}$ | 0 |
| | | 0 | $\frac{\sqrt{110}i}{330}$ | $\frac{\sqrt{66}}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}}{66}$ | $\frac{\sqrt{110}}{165}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}}{165}$ |
| | | $-\frac{\sqrt{110}i}{330}$ | 0 | 0 | $-\frac{\sqrt{66}}{66}$ | 0 | 0 | $\frac{\sqrt{66}}{66}$ | 0 | 0 | $-\frac{\sqrt{110}}{165}$ | 0 | 0 | $-\frac{\sqrt{110}}{165}$ | 0 |
| | | $-\frac{\sqrt{110}}{330}$ | 0 | 0 | $-\frac{\sqrt{66}i}{66}$ | 0 | $\frac{\sqrt{66}}{66}$ | 0 | 0 | 0 | $\frac{\sqrt{110}i}{165}$ | 0 | $\frac{\sqrt{110}}{165}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{110}}{330}$ | $\frac{\sqrt{66}i}{66}$ | 0 | $\frac{\sqrt{66}}{66}$ | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{165}$ | 0 | $\frac{\sqrt{110}}{165}$ | 0 | 0 | 0 |
| 821 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,1;a)}(A, 2)$ | 0 | 0 | 0 | $-\frac{19\sqrt{770}}{9240}$ | 0 | $\frac{19\sqrt{770}i}{9240}$ | $\frac{5\sqrt{770}}{924}$ | 0 | 0 | $-\frac{41\sqrt{462}}{9240}$ | 0 | $-\frac{41\sqrt{462}i}{9240}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{19\sqrt{770}}{9240}$ | 0 | $-\frac{19\sqrt{770}i}{9240}$ | 0 | 0 | $-\frac{5\sqrt{770}}{924}$ | $-\frac{41\sqrt{462}}{9240}$ | 0 | $\frac{41\sqrt{462}i}{9240}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{23\sqrt{2310}}{9240}$ | 0 | $-\frac{23\sqrt{2310}i}{9240}$ | 0 | 0 | 0 | $\frac{17\sqrt{154}}{1848}$ | 0 | $-\frac{17\sqrt{154}i}{1848}$ | $-\frac{19\sqrt{154}}{4620}$ | 0 |
| | | 0 | 0 | $-\frac{23\sqrt{2310}}{9240}$ | 0 | $\frac{23\sqrt{2310}i}{9240}$ | 0 | 0 | 0 | $\frac{17\sqrt{154}}{1848}$ | 0 | $\frac{17\sqrt{154}i}{1848}$ | 0 | 0 | $\frac{19\sqrt{154}}{4620}$ |
| | | 0 | $-\frac{\sqrt{154}}{210}$ | 0 | 0 | $\frac{\sqrt{2310}}{4620}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{462}$ | 0 | 0 | $-\frac{47\sqrt{154}}{4620}$ | 0 | 0 | $-\frac{2\sqrt{154}i}{1155}$ |
| | | $-\frac{\sqrt{154}}{210}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2310}}{4620}$ | $\frac{\sqrt{2310}i}{462}$ | 0 | 0 | 0 | 0 | $\frac{47\sqrt{154}}{4620}$ | $\frac{2\sqrt{154}i}{1155}$ | 0 |
| | | 0 | $\frac{\sqrt{154}i}{210}$ | $\frac{\sqrt{2310}}{4620}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}}{462}$ | $\frac{47\sqrt{154}}{4620}$ | 0 | 0 | 0 | 0 | $-\frac{2\sqrt{154}}{1155}$ |
| | | $-\frac{\sqrt{154}i}{210}$ | 0 | 0 | $-\frac{\sqrt{2310}}{4620}$ | 0 | 0 | $\frac{\sqrt{2310}}{462}$ | 0 | 0 | $-\frac{47\sqrt{154}}{4620}$ | 0 | 0 | $-\frac{2\sqrt{154}}{1155}$ | 0 |
| | | $\frac{\sqrt{154}}{105}$ | 0 | 0 | $\frac{\sqrt{2310}i}{420}$ | 0 | $-\frac{\sqrt{2310}}{420}$ | 0 | 0 | 0 | $-\frac{\sqrt{154}i}{84}$ | 0 | $-\frac{\sqrt{154}}{84}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{154}}{105}$ | $-\frac{\sqrt{2310}i}{420}$ | 0 | $-\frac{\sqrt{2310}}{420}$ | 0 | 0 | 0 | $\frac{\sqrt{154}i}{84}$ | 0 | $-\frac{\sqrt{154}}{84}$ | 0 | 0 | 0 |
| 822 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---------------------------------------|----------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|----------------------------|-----------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------|
| | $\mathbb{M}_4^{(1,1;a)}(A, 3)$ | 0 | 0 | 0 | $-\frac{23\sqrt{2310}}{9240}$ | 0 | $-\frac{23\sqrt{2310}i}{9240}$ | 0 | 0 | 0 | $-\frac{\sqrt{154}}{3080}$ | 0 | $\frac{\sqrt{154}i}{3080}$ | $-\frac{3\sqrt{154}}{220}$ | 0 |
| | | 0 | 0 | $-\frac{23\sqrt{2310}}{9240}$ | 0 | $\frac{23\sqrt{2310}i}{9240}$ | 0 | 0 | 0 | $-\frac{\sqrt{154}}{3080}$ | 0 | $-\frac{\sqrt{154}i}{3080}$ | 0 | 0 | $\frac{3\sqrt{154}}{220}$ |
| | | 0 | 0 | 0 | $\frac{9\sqrt{770}}{3080}$ | 0 | $-\frac{9\sqrt{770}i}{3080}$ | $-\frac{\sqrt{770}}{220}$ | 0 | 0 | $\frac{41\sqrt{462}}{9240}$ | 0 | $\frac{41\sqrt{462}i}{9240}$ | 0 | 0 |
| | | 0 | 0 | $\frac{9\sqrt{770}}{3080}$ | 0 | $\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | $\frac{\sqrt{770}}{220}$ | $\frac{41\sqrt{462}}{9240}$ | 0 | $-\frac{41\sqrt{462}i}{9240}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{462}}{210}$ | 0 | 0 | $-\frac{\sqrt{770}}{220}$ | 0 | 0 | $\frac{\sqrt{770}i}{385}$ | 0 | 0 | $\frac{\sqrt{462}}{220}$ | 0 | 0 | $\frac{17\sqrt{462}i}{2310}$ |
| | | $\frac{\sqrt{462}}{210}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}}{220}$ | $-\frac{\sqrt{770}i}{385}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}}{220}$ | $-\frac{17\sqrt{462}i}{2310}$ | 0 |
| | | 0 | $\frac{\sqrt{462}i}{210}$ | $\frac{\sqrt{770}}{220}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}}{385}$ | $\frac{\sqrt{462}}{220}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{462}}{2310}$ |
| | | $-\frac{\sqrt{462}i}{210}$ | 0 | 0 | $-\frac{\sqrt{770}}{220}$ | 0 | 0 | $\frac{\sqrt{770}}{385}$ | 0 | 0 | $-\frac{\sqrt{462}}{220}$ | 0 | 0 | $-\frac{17\sqrt{462}}{2310}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{770}i}{1540}$ | 0 | $-\frac{3\sqrt{770}}{1540}$ | 0 | 0 | 0 | $-\frac{13\sqrt{462}i}{4620}$ | 0 | $\frac{13\sqrt{462}}{4620}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{770}i}{1540}$ | 0 | $-\frac{3\sqrt{770}}{1540}$ | 0 | 0 | 0 | $\frac{13\sqrt{462}i}{4620}$ | 0 | $\frac{13\sqrt{462}}{4620}$ | 0 | 0 | 0 |
| 823 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,1;a)}(A, 4)$ | 0 | $-\frac{9\sqrt{22}i}{440}$ | $-\frac{\sqrt{330}}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | $-\frac{13\sqrt{22}}{440}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{22}}{110}$ |
| | | $\frac{9\sqrt{22}i}{440}$ | 0 | 0 | $\frac{\sqrt{330}}{120}$ | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | $\frac{13\sqrt{22}}{440}$ | 0 | 0 | $\frac{3\sqrt{22}}{110}$ | 0 |
| | | 0 | $\frac{3\sqrt{66}i}{440}$ | $\frac{3\sqrt{110}}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}}{110}$ | $\frac{\sqrt{66}}{120}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{66}}{660}$ |
| | | $-\frac{3\sqrt{66}i}{440}$ | 0 | 0 | $-\frac{3\sqrt{110}}{440}$ | 0 | 0 | $\frac{\sqrt{110}}{110}$ | 0 | 0 | $-\frac{\sqrt{66}}{120}$ | 0 | 0 | $-\frac{7\sqrt{66}}{660}$ | 0 |
| | | $-\frac{\sqrt{66}}{330}$ | 0 | 0 | $\frac{3\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{66}i}{440}$ | 0 | $-\frac{\sqrt{66}}{330}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{66}}{330}$ | $-\frac{3\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{66}i}{440}$ | 0 | $-\frac{\sqrt{66}}{330}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{110}}{55}$ | 0 | 0 | $\frac{\sqrt{110}}{55}$ | 0 | 0 | $-\frac{\sqrt{66}}{66}$ | 0 | $-\frac{3\sqrt{66}i}{220}$ | $-\frac{\sqrt{66}}{66}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{110}}{55}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}}{55}$ | $-\frac{\sqrt{66}}{66}$ | 0 | $\frac{3\sqrt{66}i}{220}$ | 0 | 0 | $\frac{\sqrt{66}}{66}$ |
| | | 0 | $\frac{\sqrt{66}}{330}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{110}i}{440}$ | 0 | 0 | $-\frac{\sqrt{66}}{330}$ | 0 | 0 | $\frac{3\sqrt{66}i}{440}$ |
| | | $\frac{\sqrt{66}}{330}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}}{330}$ | $-\frac{3\sqrt{66}i}{440}$ | 0 |
| 824 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|-----------------------------------|------------------------------|-----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|------------------------------|----------------------------|---------------------------|------------------------------|------------------------------|
| 825 | $\mathbb{M}_4^{(1,1;a)}(A, 5)$ | 0 | $\frac{3\sqrt{154}i}{440}$ | $-\frac{\sqrt{2310}}{1848}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | $\frac{29\sqrt{154}}{3080}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{3\sqrt{154}i}{440}$ | 0 | 0 | $\frac{\sqrt{2310}}{1848}$ | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | $-\frac{29\sqrt{154}}{3080}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{3\sqrt{462}i}{440}$ | $\frac{\sqrt{770}}{616}$ | 0 | 0 | 0 | 0 | 0 | $\frac{29\sqrt{462}}{9240}$ | 0 | 0 | 0 | 0 | $-\frac{29\sqrt{462}}{4620}$ |
| | | $-\frac{3\sqrt{462}i}{440}$ | 0 | 0 | $-\frac{\sqrt{770}}{616}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{29\sqrt{462}}{9240}$ | 0 | 0 | $-\frac{29\sqrt{462}}{4620}$ | 0 |
| | | $\frac{17\sqrt{462}}{2310}$ | 0 | 0 | $\frac{\sqrt{770}i}{440}$ | 0 | $-\frac{\sqrt{770}}{385}$ | 0 | 0 | 0 | $-\frac{3\sqrt{462}i}{440}$ | 0 | $-\frac{\sqrt{462}}{210}$ | 0 | 0 |
| | | 0 | $-\frac{17\sqrt{462}}{2310}$ | $-\frac{\sqrt{770}i}{440}$ | 0 | $-\frac{\sqrt{770}}{385}$ | 0 | 0 | 0 | $\frac{3\sqrt{462}i}{440}$ | 0 | $-\frac{\sqrt{462}}{210}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{770}}{385}$ | 0 | $-\frac{\sqrt{770}i}{220}$ | $-\frac{\sqrt{770}}{385}$ | 0 | 0 | $\frac{\sqrt{462}}{210}$ | 0 | 0 | $-\frac{\sqrt{462}}{210}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{770}}{385}$ | 0 | $\frac{\sqrt{770}i}{220}$ | 0 | 0 | $\frac{\sqrt{770}}{385}$ | $\frac{\sqrt{462}}{210}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}}{210}$ |
| | | 0 | $\frac{17\sqrt{462}}{2310}$ | 0 | 0 | $-\frac{\sqrt{770}}{385}$ | 0 | 0 | $\frac{\sqrt{770}i}{440}$ | 0 | 0 | $\frac{\sqrt{462}}{210}$ | 0 | 0 | $\frac{3\sqrt{462}i}{440}$ |
| | | $\frac{17\sqrt{462}}{2310}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}}{385}$ | $-\frac{\sqrt{770}i}{440}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}}{210}$ | $-\frac{3\sqrt{462}i}{440}$ | 0 |
| 826 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |
| | | 0 | $-\frac{9\sqrt{22}}{440}$ | 0 | 0 | $\frac{\sqrt{330}}{120}$ | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | $-\frac{13\sqrt{22}}{440}$ | 0 | 0 | $-\frac{3\sqrt{22}i}{110}$ |
| | | $-\frac{9\sqrt{22}}{440}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{120}$ | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | $\frac{13\sqrt{22}}{440}$ | $\frac{3\sqrt{22}i}{110}$ | 0 |
| | | 0 | $-\frac{3\sqrt{66}}{440}$ | 0 | 0 | $\frac{3\sqrt{110}}{440}$ | 0 | 0 | $-\frac{\sqrt{110}i}{110}$ | 0 | 0 | $-\frac{\sqrt{66}}{120}$ | 0 | 0 | $-\frac{7\sqrt{66}i}{660}$ |
| | | $-\frac{3\sqrt{66}}{440}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{110}}{440}$ | $\frac{\sqrt{110}i}{110}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}}{120}$ | $\frac{7\sqrt{66}i}{660}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{55}$ | $-\frac{\sqrt{110}}{55}$ | 0 | 0 | $\frac{3\sqrt{66}}{220}$ | 0 | $\frac{\sqrt{66}i}{66}$ | $-\frac{\sqrt{66}}{66}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{55}$ | 0 | 0 | $\frac{\sqrt{110}}{55}$ | $\frac{3\sqrt{66}}{220}$ | 0 | $-\frac{\sqrt{66}i}{66}$ | 0 | 0 | $\frac{\sqrt{66}}{66}$ |
| | | $\frac{\sqrt{66}}{330}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{110}}{440}$ | 0 | 0 | 0 | $\frac{\sqrt{66}i}{330}$ | 0 | $-\frac{3\sqrt{66}}{440}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{66}}{330}$ | 0 | 0 | $\frac{3\sqrt{110}}{440}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{330}$ | 0 | $-\frac{3\sqrt{66}}{440}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{66}i}{330}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{110}}{440}$ | $-\frac{\sqrt{66}}{330}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{66}}{440}$ |
| | | $-\frac{\sqrt{66}i}{330}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{110}}{440}$ | 0 | 0 | $\frac{\sqrt{66}}{330}$ | 0 | 0 | $-\frac{3\sqrt{66}}{440}$ | 0 |
| 826 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
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continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|--------------------------------|---------------------------------------|-------------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|---------------------------|----------------------------|------------------------------|------------------------------|-------------------------------|------------------------------|
| | $\mathbb{M}_4^{(1,1;a)}(B, 2)$ | 0 | 0 | 0 | $\frac{\sqrt{330}i}{1320}$ | 0 | $\frac{\sqrt{330}}{1320}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{440}$ | 0 | $\frac{\sqrt{22}}{440}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{330}i}{1320}$ | 0 | $\frac{\sqrt{330}}{1320}$ | 0 | 0 | 0 | $\frac{\sqrt{22}i}{440}$ | 0 | $\frac{\sqrt{22}}{440}$ | 0 | 0 | 0 |
| | | $\frac{3\sqrt{66}}{220}$ | 0 | 0 | $\frac{7\sqrt{110}i}{440}$ | 0 | $-\frac{7\sqrt{110}}{440}$ | 0 | 0 | 0 | $-\frac{5\sqrt{66}i}{264}$ | 0 | $-\frac{5\sqrt{66}}{264}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{66}}{220}$ | $-\frac{7\sqrt{110}i}{440}$ | 0 | $-\frac{7\sqrt{110}}{440}$ | 0 | 0 | 0 | $\frac{5\sqrt{66}i}{264}$ | 0 | $-\frac{5\sqrt{66}}{264}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{66}i}{330}$ | $\frac{3\sqrt{110}}{440}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{66}}{440}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}}{330}$ | 0 |
| | | $\frac{\sqrt{66}i}{330}$ | 0 | 0 | $-\frac{3\sqrt{110}}{440}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{66}}{440}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}}{330}$ | 0 |
| | | 0 | $-\frac{\sqrt{66}}{330}$ | 0 | 0 | $-\frac{3\sqrt{110}}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{66}}{440}$ | 0 | 0 | $\frac{\sqrt{66}i}{330}$ |
| | | $-\frac{\sqrt{66}}{330}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{110}}{440}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{66}}{440}$ | $-\frac{\sqrt{66}i}{330}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{110}}{55}$ | 0 | $\frac{\sqrt{110}i}{55}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}}{66}$ | 0 | $\frac{\sqrt{66}i}{66}$ | $\frac{3\sqrt{66}}{220}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{110}}{55}$ | 0 | $-\frac{\sqrt{110}i}{55}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}}{66}$ | 0 | $-\frac{\sqrt{66}i}{66}$ | 0 | 0 | $-\frac{3\sqrt{66}}{220}$ |
| 827 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | |
| | $\mathbb{M}_4^{(1,1;a)}(B, 3)$ | 0 | $-\frac{3\sqrt{154}}{440}$ | 0 | 0 | $-\frac{\sqrt{2310}}{1848}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{924}$ | 0 | 0 | $-\frac{29\sqrt{154}}{3080}$ | 0 | 0 | 0 |
| | | $-\frac{3\sqrt{154}}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}}{1848}$ | $\frac{\sqrt{2310}i}{924}$ | 0 | 0 | 0 | 0 | $\frac{29\sqrt{154}}{3080}$ | 0 | 0 |
| | | 0 | $\frac{3\sqrt{462}}{440}$ | 0 | 0 | $-\frac{\sqrt{770}}{616}$ | 0 | 0 | 0 | 0 | 0 | $\frac{29\sqrt{462}}{9240}$ | 0 | 0 | $\frac{29\sqrt{462}i}{4620}$ |
| | | $\frac{3\sqrt{462}}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}}{616}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{29\sqrt{462}}{9240}$ | $-\frac{29\sqrt{462}i}{4620}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{770}}{220}$ | 0 | $\frac{\sqrt{770}i}{385}$ | $-\frac{\sqrt{770}}{385}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}i}{210}$ | $\frac{\sqrt{462}}{210}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{770}}{220}$ | 0 | $-\frac{\sqrt{770}i}{385}$ | 0 | 0 | $\frac{\sqrt{770}}{385}$ | 0 | 0 | $-\frac{\sqrt{462}i}{210}$ | 0 | 0 | $-\frac{\sqrt{462}}{210}$ |
| | | $\frac{17\sqrt{462}}{2310}$ | 0 | 0 | $\frac{\sqrt{770}i}{385}$ | 0 | $-\frac{\sqrt{770}}{440}$ | 0 | 0 | 0 | $-\frac{\sqrt{462}i}{210}$ | 0 | $-\frac{3\sqrt{462}}{440}$ | 0 | 0 |
| | | 0 | $-\frac{17\sqrt{462}}{2310}$ | $-\frac{\sqrt{770}i}{385}$ | 0 | $-\frac{\sqrt{770}}{440}$ | 0 | 0 | 0 | $\frac{\sqrt{462}i}{210}$ | 0 | $-\frac{3\sqrt{462}}{440}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{17\sqrt{462}i}{2310}$ | $-\frac{\sqrt{770}}{385}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{770}}{440}$ | $-\frac{\sqrt{462}}{210}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{462}}{440}$ |
| | | $\frac{17\sqrt{462}i}{2310}$ | 0 | 0 | $\frac{\sqrt{770}}{385}$ | 0 | 0 | $-\frac{\sqrt{770}}{440}$ | 0 | 0 | $\frac{\sqrt{462}}{210}$ | 0 | 0 | $\frac{3\sqrt{462}}{440}$ | 0 |
| 828 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 9

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|------------------------------|-------------------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|----------------------------|---------------------------|
| $\mathbb{M}_4^{(1,1;a)}(B, 4)$ | | $\frac{3\sqrt{154}}{220}$ | 0 | 0 | $\frac{\sqrt{2310}i}{1848}$ | 0 | $-\frac{\sqrt{2310}}{1848}$ | 0 | 0 | 0 | $-\frac{29\sqrt{154}i}{3080}$ | 0 | $-\frac{29\sqrt{154}}{3080}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{154}}{220}$ | $-\frac{\sqrt{2310}i}{1848}$ | 0 | $-\frac{\sqrt{2310}}{1848}$ | 0 | 0 | 0 | $\frac{29\sqrt{154}i}{3080}$ | 0 | $-\frac{29\sqrt{154}}{3080}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{770}i}{616}$ | 0 | $-\frac{\sqrt{770}}{616}$ | 0 | 0 | 0 | $-\frac{29\sqrt{462}i}{9240}$ | 0 | $\frac{29\sqrt{462}}{9240}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{770}i}{616}$ | 0 | $-\frac{\sqrt{770}}{616}$ | 0 | 0 | 0 | $\frac{29\sqrt{462}i}{9240}$ | 0 | $\frac{29\sqrt{462}}{9240}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{17\sqrt{462}i}{2310}$ | $-\frac{\sqrt{770}}{440}$ | 0 | 0 | 0 | $-\frac{\sqrt{770}}{385}$ | $-\frac{3\sqrt{462}}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}}{210}$ | 0 |
| | | $\frac{17\sqrt{462}i}{2310}$ | 0 | 0 | $\frac{\sqrt{770}}{440}$ | 0 | 0 | $-\frac{\sqrt{770}}{385}$ | 0 | 0 | $\frac{3\sqrt{462}}{440}$ | 0 | 0 | $\frac{\sqrt{462}}{210}$ | 0 |
| | | 0 | $\frac{17\sqrt{462}}{2310}$ | 0 | 0 | $-\frac{\sqrt{770}}{440}$ | 0 | 0 | $\frac{\sqrt{770}i}{385}$ | 0 | 0 | $\frac{3\sqrt{462}}{440}$ | 0 | 0 | $\frac{\sqrt{462}i}{210}$ |
| | | $\frac{17\sqrt{462}}{2310}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}}{440}$ | $-\frac{\sqrt{770}i}{385}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{462}}{440}$ | $-\frac{\sqrt{462}i}{210}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{770}}{385}$ | 0 | $\frac{\sqrt{770}i}{385}$ | $\frac{\sqrt{770}}{220}$ | 0 | 0 | $-\frac{\sqrt{462}}{210}$ | 0 | $-\frac{\sqrt{462}i}{210}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{770}}{385}$ | 0 | $-\frac{\sqrt{770}i}{385}$ | 0 | 0 | $-\frac{\sqrt{770}}{220}$ | $-\frac{\sqrt{462}}{210}$ | 0 | $\frac{\sqrt{462}i}{210}$ | 0 | 0 | 0 |

bra: = $\langle f_3, \uparrow |, \langle f_3, \downarrow |, \langle f_{ax}, \uparrow |, \langle f_{ax}, \downarrow |, \langle f_{ay}, \uparrow |, \langle f_{ay}, \downarrow |, \langle f_{az}, \uparrow |, \langle f_{az}, \downarrow |, \langle f_{bx}, \uparrow |, \langle f_{bx}, \downarrow |, \langle f_{by}, \uparrow |, \langle f_{by}, \downarrow |, \langle f_{bz}, \uparrow |, \langle f_{bz}, \downarrow |$
ket: = $|f_3, \uparrow \rangle, |f_3, \downarrow \rangle, |f_{ax}, \uparrow \rangle, |f_{ax}, \downarrow \rangle, |f_{ay}, \uparrow \rangle, |f_{ay}, \downarrow \rangle, |f_{az}, \uparrow \rangle, |f_{az}, \downarrow \rangle, |f_{bx}, \uparrow \rangle, |f_{bx}, \downarrow \rangle, |f_{by}, \uparrow \rangle, |f_{by}, \downarrow \rangle, |f_{bz}, \uparrow \rangle, |f_{bz}, \downarrow \rangle$

Table 10: (f,f) block.

| No. | multipole | matrix |
|-----|-----------|--------|
| 829 | symmetry | 1 |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------|-----------|--|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| $\mathbb{Q}_0^{(a)}(A)$ | | $\frac{\sqrt{14}}{14}$ | 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 | $\frac{\sqrt{14}}{14}$ |
| 830 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | |
|----------------------------|-----------|--------------------------------|---|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|---|
| $\mathbb{Q}_2^{(a)}(A, 1)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{28}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{21}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{21}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}}{28}$ | 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 | $-\frac{\sqrt{70}}{28}$ | 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 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 831 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|----------------------------|-----------|--------------|---|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| $\mathbb{Q}_2^{(a)}(A, 2)$ | | 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 | $\frac{\sqrt{14}}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{14}}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{84}$ | 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 | $-\frac{\sqrt{210}}{42}$ |
| | | 0 | 0 | $\frac{\sqrt{210}}{84}$ | 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 | $\frac{\sqrt{210}}{84}$ | 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 | $-\frac{\sqrt{210}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| 832 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|-----------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|---|--------------------------|--------------------------|
| $\mathbb{Q}_2^{(a)}(A, 3)$ | | 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 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ |
| | | $-\frac{\sqrt{210}}{42}$ | 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 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ |
| | | 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 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 |
| 833 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|-----------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---|--------------------------|--------------------------|---|---------------------------|---------------------------|
| $\mathbb{Q}_2^{(a)}(B, 1)$ | | 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 |
| | | $-\frac{\sqrt{210}}{42}$ | 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 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 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 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ | 0 | 0 | 0 |
| 834 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|----------------------------|-----------|--|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---|
| $\mathbb{Q}_2^{(a)}(B, 2)$ | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{42}$ | 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 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{210}}{42}$ | 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 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{14}}{56}$ | 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 | 0 |
| 835 | symmetry | $\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|--|-------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | $\mathbb{Q}_4^{(a)}(A, 1)$ | $-\frac{\sqrt{33}}{11}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{33}}{11}$ | 0 | 0 | 0 | 0 | 0 | 0 | 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 | $\frac{\sqrt{33}}{22}$ | 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 | $\frac{\sqrt{33}}{22}$ | 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 | $-\frac{\sqrt{33}}{66}$ | 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 | $-\frac{\sqrt{33}}{66}$ | 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 | $-\frac{\sqrt{33}}{66}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{66}$ |
| 836 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|----------------------------|-----------|--|---|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
| $\mathbb{Q}_4^{(a)}(A, 2)$ | | 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 | $-\frac{\sqrt{1155}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{308}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{308}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{77}}{308}$ | 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 | $\frac{\sqrt{1155}}{154}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{132}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{132}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{132}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{132}$ | 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 | $-\frac{\sqrt{1155}}{66}$ | 0 |
| 837 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|----------------------------|-----------|------------------------------------|---|---------------------------|---------------------------|----------------------------|----------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---|
| $\mathbb{Q}_4^{(a)}(A, 3)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{385}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{308}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{385}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{308}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{385}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{308}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{385}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{308}$ | 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 | $\frac{\sqrt{231}}{154}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{231}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{385}}{44}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{231}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{385}}{44}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{44}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{44}$ | 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 | $\frac{\sqrt{231}}{154}$ | 0 | 0 | 0 | 0 | 0 |
| 838 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|-----------|--|------------------------|-------------------------|-------------------------|---|---|-------------------------|-------------------------|-------------------------|------------------------|------------------------|-------------------------|-------------------------|--|
| $\mathbb{Q}_4^{(a)}(A, 4)$ | | 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 | $\frac{\sqrt{55}}{22}$ | 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 | $-\frac{\sqrt{33}}{22}$ | |
| | | 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 | $-\frac{\sqrt{33}}{22}$ | 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 | $-\frac{\sqrt{33}}{22}$ | 0 | 0 | 0 | 0 | 0 | |
| | | $\frac{\sqrt{55}}{22}$ | 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 | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{33}}{22}$ | 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 | |
| 839 | symmetry | $-\frac{\sqrt{5}xz\left(x^2-6y^2+z^2\right)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|-----------|-----------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---|--------------------------|--------------------------|---|
| $\mathbb{Q}_4^{(a)}(A, 5)$ | | 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 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{231}}{77}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{231}}{77}$ | 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 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ | 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 | $\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 |
| 840 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|-----------|-----------------------------------|------------------------|---|---|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| $\mathbb{Q}_4^{(a)}(B, 1)$ | | 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 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{22}$ | 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 |
| | | $\frac{\sqrt{55}}{22}$ | 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 | 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 |
| 841 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | |
|----------------------------|------------------------|--------------------------------------|---|-------------------------|-------------------------|-------------------------|-------------------------|---|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|--|--|
| $\mathbb{Q}_4^{(a)}(B, 2)$ | | 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 | 0 | 0 | 0 | $\frac{\sqrt{55}}{22}$ | | |
| | | 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 | $-\frac{\sqrt{33}}{22}$ | 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 | $-\frac{\sqrt{33}}{22}$ | 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 | $-\frac{\sqrt{33}}{22}$ | 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 | $-\frac{\sqrt{33}}{22}$ | 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 | | |
| | $\frac{\sqrt{55}}{22}$ | 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 | 0 | 0 | | |
| 842 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|----------------------------|---------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-------------------------|---|--------------------------|--------------------------|---|--------------------------|--------------------------|
| 843 | $\mathbb{Q}_4^{(a)}(B, 3)$ | 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 |
| | | $-\frac{\sqrt{231}}{154}$ | 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 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{77}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{77}$ |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ | 0 | 0 | 0 |
| 843 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|----------------------------|-----------|---|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---|
| $\mathbb{Q}_4^{(a)}(B, 4)$ | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{154}$ | 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 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{77}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{231}}{154}$ | 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 | $\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{231}}{77}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{154}$ | 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 |
| 844 | symmetry | $\frac{\sqrt{2}(2x^6 - 15x^4y^2 - 15x^4z^2 - 15x^2y^4 + 180x^2y^2z^2 - 15x^2z^4 + 2y^6 - 15y^4z^2 - 15y^2z^4 + 2z^6)}{8}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|----------------------------|-----------|--|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| $\mathbb{Q}_6^{(a)}(A, 1)$ | | $\frac{2\sqrt{231}}{77}$ | 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 | $\frac{5\sqrt{231}}{462}$ | 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 | $\frac{5\sqrt{231}}{462}$ | 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 | $\frac{5\sqrt{231}}{462}$ | 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 | $-\frac{3\sqrt{231}}{154}$ | 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 | $-\frac{3\sqrt{231}}{154}$ | 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 | $-\frac{3\sqrt{231}}{154}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{231}}{154}$ |
| 845 | symmetry | $-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|-----------|--|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|---|
| $\mathbb{Q}_6^{(a)}(A, 2)$ | | 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 | $-\frac{\sqrt{3}}{6}$ | 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 | $-\frac{\sqrt{3}}{6}$ | 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 | $-\frac{\sqrt{3}}{6}$ | 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 | $-\frac{\sqrt{3}}{6}$ | 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 |
| 846 | symmetry | $-\frac{\sqrt{14}(x^6-15x^4z^2+15x^2z^4+y^6-15y^4z^2+15y^2z^4-2z^6)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|----------------------------|-----------|---|---|---------------------------|---------------------------|---------------------------|---------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|---|
| $\mathbb{Q}_6^{(a)}(A, 3)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{33}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{44}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{33}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{44}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{33}}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{44}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{33}}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{44}$ | 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 | $\frac{5\sqrt{33}}{66}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{55}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{55}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{44}$ | 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 | $\frac{\sqrt{33}}{22}$ | 0 |
| 847 | symmetry | $\frac{\sqrt{42}(x-y)(x+y)(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4)}{8}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|----------------------------|-----------|--|---|---------------------------|---------------------------|---------------------------|---------------------------|---|---------------------------|---------------------------|---------------------------|---------------------------|-------------------------|---|
| $\mathbb{Q}_6^{(a)}(A, 4)$ | | 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 | $\frac{5\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 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 | $\frac{\sqrt{165}}{66}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{66}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{66}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 848 | symmetry | $\frac{3\sqrt{7}xz(x-z)(x+z)(x^2-10y^2+z^2)}{4}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | |
|----------------------------|------------------------|---|-------------------------|-------------------------|---|---|---|-------------------------|-------------------------|-------------------------|---|------------------------|------------------------|-------------------------|-------------------------|--|
| $\mathbb{Q}_6^{(a)}(A, 5)$ | | 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 | 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 | $\frac{\sqrt{110}}{44}$ | 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 | $\frac{\sqrt{110}}{44}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}}{44}$ | 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 | |
| | 0 | $\frac{\sqrt{66}}{22}$ | 0 | 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 | $\frac{\sqrt{110}}{44}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 849 | symmetry | $\frac{\sqrt{462}xz\left(x^2-3z^2\right)\left(3x^2-z^2\right)}{16}$ | | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|-----------|--|---|------------------------|------------------------|---|---|-------------------------|-------------------------|---|-------------------------|---|---|------------------------|------------------------|
| $\mathbb{Q}_6^{(a)}(A, 6)$ | | 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 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{16}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{16}$ |
| | | 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 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3}{16}$ |
| | | 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 | $\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | 0 | 0 | 0 | 0 |
| 850 | symmetry | $\frac{\sqrt{210}xz(x^4-16x^2y^2+2x^2z^2+16y^4-16y^2z^2+z^4)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|----------------------------|-----------|--|-------------------------|---------------------------|---------------------------|-------------------------|-------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---|---------------------------|---------------------------|
| $\mathbb{Q}_6^{(a)}(A, 7)$ | | 0 | 0 | 0 | 0 | $\frac{2\sqrt{33}}{33}$ | 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 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | $\frac{13\sqrt{33}}{528}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | $\frac{13\sqrt{33}}{528}$ |
| | | $\frac{2\sqrt{33}}{33}$ | 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 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ | 0 | 0 | 0 |
| 851 | symmetry | $\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | |
|----------------------------|-----------|---|------------------------|---|---|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|---|
| $\mathbb{Q}_6^{(a)}(B, 1)$ | | 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 | 0 | $\frac{\sqrt{66}}{22}$ | 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 | 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 | $\frac{\sqrt{110}}{44}$ | 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 | $\frac{\sqrt{110}}{44}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{66}}{22}$ | 0 | 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 | 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 | $\frac{\sqrt{110}}{44}$ | 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 | $\frac{\sqrt{110}}{44}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 852 | symmetry | $-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$ | | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|------------------------|---|---|-------------------------|-------------------------|-------------------------|-------------------------|---|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|------------------------|--|
| $\mathbb{Q}_6^{(a)}(B, 2)$ | | 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 | 0 | 0 | 0 | $\frac{\sqrt{66}}{22}$ | |
| | | 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 | $\frac{\sqrt{110}}{44}$ | 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 | $\frac{\sqrt{110}}{44}$ | 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 | $\frac{\sqrt{110}}{44}$ | 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 | $\frac{\sqrt{110}}{44}$ | 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 | |
| | $\frac{\sqrt{66}}{22}$ | 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 | 0 | 0 | |
| 853 | symmetry | $\frac{\sqrt{462}yz(y^2-3z^2)(3y^2-z^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|-----------|---|---|---|---|-------------------------|-------------------------|------------------------|---|---|------------------------|------------------------|-------------------------|-------------------------|---|
| $\mathbb{Q}_6^{(a)}(B, 3)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | |
| | | 0 | 0 | 0 | 0 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{16}$ | 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 | $\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | 0 | 0 | |
| 854 | symmetry | $\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|----------------------------|-----------|--|---|-------------------------|-------------------------|------------------------|------------------------|---|------------------------|------------------------|-------------------------|-------------------------|---|---|
| $\mathbb{Q}_6^{(a)}(B, 4)$ | | 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 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{16}$ | 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 | $\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}}{16}$ | 0 | 0 | 0 | 0 | $\frac{3}{16}$ | 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 |
| 855 | symmetry | $\frac{\sqrt{210}yz(16x^4-16x^2y^2-16x^2z^2+y^4+2y^2z^2+z^4)}{16}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|-----------|--|-------------------------|-------------------------|-------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---|---------------------------|---|---------------------------|----------------------------|----------------------------|
| $\mathbb{Q}_6^{(a)}(B, 5)$ | | 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 | 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 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | $\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | 0 | $\frac{13\sqrt{33}}{528}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ | 0 | 0 |
| 856 | symmetry | $\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|----------------------------|-----------|--|-------------------------|----------------------------|----------------------------|---------------------------|---------------------------|-------------------------|-------------------------|---------------------------|---------------------------|----------------------------|----------------------------|---|
| $\mathbb{Q}_6^{(a)}(B, 6)$ | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{2\sqrt{33}}{33}$ | 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 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | 0 | $\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 | 0 | $\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 |
| | | $\frac{2\sqrt{33}}{33}$ | 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 | 0 | $\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ | 0 |
| | | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{13\sqrt{33}}{528}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{55}}{176}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 857 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--------------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|
| $\mathbb{Q}_2^{(1,-1;a)}(A,1)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{21}i}{21}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{21}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $\frac{\sqrt{21}}{56}$ | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | $-\frac{\sqrt{35}}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | $-\frac{\sqrt{21}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | $\frac{\sqrt{35}}{56}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $-\frac{\sqrt{21}i}{56}$ | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}}{56}$ | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{56}$ | 0 | $\frac{\sqrt{21}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | $-\frac{\sqrt{21}}{168}$ |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | $\frac{\sqrt{21}}{168}$ | 0 |
| | | 0 | $\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{168}$ |
| | | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 |
| | | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}i}{21}$ | $-\frac{\sqrt{35}}{56}$ | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 |
| 858 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-------------------------|-------------------------|--------------------------|-------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| $\mathbb{Q}_2^{(1,-1;a)}(A,2)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 |
| | | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ |
| | | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| 859 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-------------------------|-------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|---------------------------|
| $\mathbb{Q}_2^{(1,-1;a)}(A,3)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ |
| | | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 |
| 860 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|--------------------------------|-----------|-------------------------|------------------------|---------------------------|--------------------------|-------------------------|--------------------------|---------------------------|--------------------------|--------------------------|---------------------------|--------------------------|--------------------------|---------------------------|
| $\mathbb{Q}_2^{(1,-1;a)}(B,1)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{7}}{14}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | $\frac{\sqrt{105}i}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | $-\frac{\sqrt{105}i}{56}$ |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | $\frac{\sqrt{7}i}{56}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{56}$ |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{14}$ | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| 861 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|-------------------------|---------------------------|---------------------------|-------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|
| $\mathbb{Q}_2^{(1,-1;a)}(B,2)$ | | 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 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ |
| | | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 |
| 862 | symmetry | $\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | |
|--------------------------------|-----------|----------------|---|---------------|----------------|----------------|---------------|----------------|----------------|---------------|----------------|----------------|---------------|----------------|---|--|
| $\mathbb{Q}_4^{(1,-1;a)}(A,1)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | $\frac{1}{6}$ | $\frac{i}{6}$ | 0 | | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | $-\frac{1}{6}$ | 0 | 0 | $-\frac{i}{6}$ | | |
| | | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | $-\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{1}{6}$ | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | $\frac{1}{6}$ | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | $-\frac{1}{6}$ | | |
| | | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | $\frac{1}{6}$ | 0 | | |
| | | 0 | $-\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | | |
| | | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | $\frac{i}{6}$ | 0 | | |
| | | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{1}{6}$ | 0 | $-\frac{i}{6}$ | 0 | 0 | | |
| | | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{6}$ | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | | |
| | 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 | | | | | | | | | | | | | |
|--------------------------------|-----------|--|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| $\mathbb{Q}_4^{(1,-1;a)}(A,2)$ | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | $-\frac{\sqrt{35}}{84}$ | $\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ |
| | | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ |
| | | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 |
| | | 0 | $-\frac{\sqrt{21}}{28}$ | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ |
| | | $\frac{\sqrt{21}}{28}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{84}$ |
| | | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{84}$ | 0 |
| | | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ |
| | | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 |
| | | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{28}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 |
| 864 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|------------------------------------|---------------------------|--------------------------|-------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|
| $\mathbb{Q}_4^{(1,-1;a)}(A,3)$ | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{7}}{28}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | $\frac{\sqrt{105}i}{84}$ | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ |
| | | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | $\frac{\sqrt{7}}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ |
| | | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ |
| | | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 |
| | | 0 | $\frac{\sqrt{105}}{84}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ |
| | | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 |
| 865 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---------------------------------------|--------------------------|-------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|
| $\mathbb{Q}_4^{(1,-1;a)}(A,4)$ | | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ |
| | | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 |
| | | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 |
| | | 0 | $\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $-\frac{i}{8}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ |
| | | 0 | $-\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 |
| | | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| 866 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-----------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| $\mathbb{Q}_4^{(1,-1;a)}(A,5)$ | | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ |
| | | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 |
| | | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{14}$ | $\frac{3\sqrt{7}i}{56}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ |
| | | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ |
| | | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | $\frac{\sqrt{7}}{14}$ | 0 |
| | | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{168}$ | $-\frac{\sqrt{7}}{14}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{14}$ | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ |
| | | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 |
| 867 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-----------------------------------|-------------------------|--------------------------|-------------------------|-------------------------|------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|
| $\mathbb{Q}_4^{(1,-1;a)}(B,1)$ | | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | $\frac{\sqrt{15}}{24}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | $\frac{i}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $-\frac{i}{8}$ |
| | | $-\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{i}{8}$ | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{1}{8}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | $-\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ |
| | | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{24}$ | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 |
| 868 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|
| $\mathbb{Q}_4^{(1,-1;a)}(B,2)$ | | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ |
| | | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 |
| | | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ |
| | | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | $\frac{1}{8}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ |
| | | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 |
| 869 | symmetry | $\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---------------------------------------|----------------------------|---------------------------|----------------------------|---------------------------|--------------------------|----------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|---------------------------|----------------------------|
| $\mathbb{Q}_4^{(1,-1;a)}(B,3)$ | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | $\frac{\sqrt{105}}{168}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $\frac{3\sqrt{7}}{56}$ | $\frac{3\sqrt{7}i}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | $-\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ |
| | | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 |
| | | 0 | $\frac{3\sqrt{7}i}{56}$ | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 |
| | | 0 | $\frac{3\sqrt{7}}{56}$ | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ |
| | | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $\frac{3\sqrt{7}}{56}$ | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | $\frac{\sqrt{105}i}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ |
| | | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{168}$ | $\frac{3\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{168}$ | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 |
| 870 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|---------------------------|
| $\mathbb{Q}_4^{(1,-1;a)}(B,4)$ | | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ |
| | | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 |
| | | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ |
| | | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | $\frac{3\sqrt{7}}{56}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{56}$ | $-\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ |
| | | 0 | $\frac{\sqrt{105}}{168}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ |
| | | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 |
| | | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ |
| | | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{168}$ | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{56}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 |
| 871 | symmetry | $\frac{\sqrt{2}(2x^6-15x^4y^2-15x^4z^2-15x^2y^4+180x^2y^2z^2-15x^2z^4+2y^6-15y^4z^2-15y^2z^4+2z^6)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|--------------------------------|-----------|--|----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|
| $\mathbb{Q}_6^{(1,-1;a)}(A,1)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{154}i}{154}$ | 0 | $-\frac{\sqrt{154}}{154}$ | $-\frac{\sqrt{154}i}{154}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{154}i}{154}$ | 0 | $\frac{\sqrt{154}}{154}$ | 0 | 0 | $\frac{\sqrt{154}i}{154}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{154}i}{308}$ | 0 | 0 | $\frac{5\sqrt{154}}{308}$ | 0 | 0 | $\frac{\sqrt{2310}i}{462}$ | 0 | $\frac{\sqrt{2310}}{462}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{154}i}{308}$ | $-\frac{5\sqrt{154}}{308}$ | 0 | 0 | 0 | $-\frac{\sqrt{2310}i}{462}$ | $-\frac{\sqrt{2310}}{462}$ | 0 |
| | | 0 | 0 | $\frac{5\sqrt{154}i}{308}$ | 0 | 0 | 0 | $-\frac{5\sqrt{154}i}{308}$ | $\frac{\sqrt{2310}i}{462}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}i}{462}$ |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{154}i}{308}$ | 0 | 0 | $-\frac{5\sqrt{154}}{308}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{462}$ | 0 | 0 | $\frac{\sqrt{2310}i}{462}$ |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{154}}{308}$ | 0 | $\frac{5\sqrt{154}i}{308}$ | 0 | 0 | 0 | $\frac{\sqrt{2310}}{462}$ | 0 | $\frac{\sqrt{2310}i}{462}$ | 0 |
| | | 0 | 0 | $\frac{5\sqrt{154}}{308}$ | 0 | $\frac{5\sqrt{154}i}{308}$ | 0 | 0 | $-\frac{\sqrt{2310}}{462}$ | 0 | $\frac{\sqrt{2310}i}{462}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{154}i}{154}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{462}$ | 0 | 0 | $-\frac{\sqrt{2310}}{462}$ | 0 | 0 | $-\frac{3\sqrt{154}i}{308}$ | 0 | $\frac{3\sqrt{154}}{308}$ |
| | | $\frac{\sqrt{154}i}{154}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}i}{462}$ | $\frac{\sqrt{2310}}{462}$ | 0 | 0 | 0 | $\frac{3\sqrt{154}i}{308}$ | $-\frac{3\sqrt{154}}{308}$ | 0 |
| | | 0 | $\frac{\sqrt{154}}{154}$ | $-\frac{\sqrt{2310}i}{462}$ | 0 | 0 | 0 | $-\frac{\sqrt{2310}i}{462}$ | $\frac{3\sqrt{154}i}{308}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{154}i}{308}$ |
| | | $-\frac{\sqrt{154}}{154}$ | 0 | 0 | $\frac{\sqrt{2310}i}{462}$ | 0 | 0 | $-\frac{\sqrt{2310}}{462}$ | 0 | 0 | $-\frac{3\sqrt{154}i}{308}$ | 0 | 0 | $-\frac{3\sqrt{154}i}{308}$ |
| | | $\frac{\sqrt{154}i}{154}$ | 0 | 0 | $-\frac{\sqrt{2310}}{462}$ | 0 | $-\frac{\sqrt{2310}i}{462}$ | 0 | 0 | 0 | $-\frac{3\sqrt{154}}{308}$ | 0 | $\frac{3\sqrt{154}i}{308}$ | 0 |
| | | 0 | $-\frac{\sqrt{154}i}{154}$ | $\frac{\sqrt{2310}}{462}$ | 0 | $-\frac{\sqrt{2310}i}{462}$ | 0 | 0 | 0 | $\frac{3\sqrt{154}}{308}$ | 0 | $\frac{3\sqrt{154}i}{308}$ | 0 | 0 |
| 872 | symmetry | $-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|------------------------|-------------------------|------------------------|-------------------------|-------------------------|------------------------|------------------------|-------------------------|------------------------|-------------------------|-------------------------|------------------------|---|
| $\mathbb{Q}_6^{(1,-1;a)}(A,2)$ | | 0 | 0 | 0 | $\frac{\sqrt{2}i}{6}$ | 0 | $\frac{\sqrt{2}}{6}$ | $\frac{\sqrt{2}i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{2}i}{6}$ | 0 | $-\frac{\sqrt{2}}{6}$ | 0 | 0 | $-\frac{\sqrt{2}i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{2}i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{12}$ | 0 | 0 | $-\frac{\sqrt{2}}{12}$ | |
| | | $-\frac{\sqrt{2}i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{12}$ | $\frac{\sqrt{2}}{12}$ | 0 | |
| | | 0 | $-\frac{\sqrt{2}}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 | 0 | $\frac{\sqrt{2}i}{12}$ | |
| | | $\frac{\sqrt{2}}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{12}$ | 0 | 0 | $\frac{\sqrt{2}i}{12}$ | 0 |
| | | $-\frac{\sqrt{2}i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}}{12}$ | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{2}i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2}}{12}$ | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{12}$ | 0 | 0 | $-\frac{\sqrt{2}}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{12}$ | $\frac{\sqrt{2}}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{2}i}{12}$ | 0 | 0 | $\frac{\sqrt{2}i}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{2}}{12}$ | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{2}}{12}$ | 0 | $-\frac{\sqrt{2}i}{12}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 873 | symmetry | $-\frac{\sqrt{14}(x^6-15x^4z^2+15x^2z^4+y^6-15y^4z^2+15y^2z^4-2z^6)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|----------------------------|----------------------------|---------------------------|----------------------------|---------------------------|---------------------------|--------------------------|----------------------------|----------------------------|----------------------------|-------------------------|--------------------------|-------------------------|
| $\mathbb{Q}_6^{(1,-1;a)}(A,3)$ | | 0 | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | $\frac{\sqrt{22}i}{44}$ | 0 | $\frac{\sqrt{22}}{44}$ | $-\frac{\sqrt{22}i}{22}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | $\frac{\sqrt{22}i}{44}$ | 0 | $-\frac{\sqrt{22}}{44}$ | 0 | 0 | $\frac{\sqrt{22}i}{22}$ |
| | | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{22}i}{44}$ | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | $\frac{\sqrt{22}i}{22}$ | 0 | 0 | $\frac{\sqrt{22}}{44}$ |
| | | $-\frac{\sqrt{22}i}{44}$ | 0 | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{22}$ | $-\frac{\sqrt{22}}{44}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{22}}{44}$ | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | $-\frac{\sqrt{22}i}{22}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{44}$ | 0 |
| | | $\frac{\sqrt{22}}{44}$ | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | $\frac{\sqrt{22}i}{22}$ | 0 | 0 | $-\frac{\sqrt{22}i}{44}$ | 0 |
| | | $\frac{\sqrt{22}i}{22}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{22}}{44}$ | 0 | $\frac{\sqrt{22}i}{44}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{22}i}{22}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}}{44}$ | 0 | $\frac{\sqrt{22}i}{44}$ | 0 | 0 | 0 | 0 |
| 874 | symmetry | $\frac{\sqrt{42}(x-y)(x+y)(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|--------------------------|--------------------------|
| $\mathbb{Q}_6^{(1,-1;a)}(A,4)$ | | 0 | 0 | 0 | $\frac{\sqrt{110}i}{132}$ | 0 | $\frac{\sqrt{110}}{132}$ | $-\frac{\sqrt{110}i}{66}$ | 0 | 0 | $-\frac{\sqrt{66}i}{44}$ | 0 | $\frac{\sqrt{66}}{44}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{110}i}{132}$ | 0 | $-\frac{\sqrt{110}}{132}$ | 0 | 0 | $\frac{\sqrt{110}i}{66}$ | $-\frac{\sqrt{66}i}{44}$ | 0 | $-\frac{\sqrt{66}}{44}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{110}i}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{132}$ | 0 | 0 | $-\frac{\sqrt{110}}{66}$ |
| | | $-\frac{\sqrt{110}i}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{132}$ | $\frac{\sqrt{110}}{66}$ | 0 |
| | | 0 | $-\frac{\sqrt{110}}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{66}$ |
| | | $\frac{\sqrt{110}}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{132}$ | 0 | 0 | $\frac{\sqrt{110}i}{66}$ | 0 |
| | | $\frac{\sqrt{110}i}{66}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}}{132}$ | 0 | $\frac{\sqrt{110}i}{132}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{110}i}{66}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}}{132}$ | 0 | $\frac{\sqrt{110}i}{132}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{66}i}{44}$ | 0 | 0 | $-\frac{\sqrt{110}i}{132}$ | 0 | 0 | $\frac{\sqrt{110}}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}}{44}$ |
| | | $\frac{\sqrt{66}i}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{132}$ | $-\frac{\sqrt{110}}{132}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}}{44}$ | 0 |
| | | 0 | $-\frac{\sqrt{66}}{44}$ | $\frac{\sqrt{110}i}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}i}{44}$ |
| | | $\frac{\sqrt{66}}{44}$ | 0 | 0 | $-\frac{\sqrt{110}i}{132}$ | 0 | 0 | $-\frac{\sqrt{110}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}i}{44}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{110}}{66}$ | 0 | $-\frac{\sqrt{110}i}{66}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}}{44}$ | 0 | $-\frac{\sqrt{66}i}{44}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{110}}{66}$ | 0 | $-\frac{\sqrt{110}i}{66}$ | 0 | 0 | 0 | $\frac{\sqrt{66}}{44}$ | 0 | $-\frac{\sqrt{66}i}{44}$ | 0 | 0 | 0 |
| 875 | symmetry | $\frac{3\sqrt{7}xz(x-z)(x+z)(x^2-10y^2+z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|----------------------------|---------------------------|----------------------------|---------------------------|---------------------------|----------------------------|---------------------------|---------------------------|---------------------------|----------------------------|----------------------------|---------------------------|---------------------------|
| $\mathbb{Q}_6^{(1,-1;a)}(A,5)$ | | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}i}{44}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | $\frac{\sqrt{11}i}{44}$ | 0 | 0 | $\frac{\sqrt{11}i}{44}$ | 0 |
| | | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{11}i}{88}$ | 0 | 0 | 0 | $\frac{\sqrt{165}}{66}$ | 0 | $-\frac{\sqrt{165}i}{264}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | $\frac{5\sqrt{11}i}{88}$ | 0 | 0 | 0 | $-\frac{\sqrt{165}}{66}$ | 0 | $-\frac{\sqrt{165}i}{264}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{11}i}{88}$ | 0 | 0 | $-\frac{5\sqrt{11}i}{88}$ | 0 | 0 | $-\frac{\sqrt{165}i}{88}$ | 0 | 0 | $\frac{\sqrt{165}i}{88}$ | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{11}i}{88}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{11}i}{88}$ | $-\frac{\sqrt{165}i}{88}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{88}$ |
| | | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | $\frac{5\sqrt{11}i}{88}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{165}}{66}$ |
| | | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{11}i}{88}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{264}$ | $\frac{\sqrt{165}}{66}$ | 0 |
| | | $\frac{\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{165}}{66}$ | 0 | $\frac{\sqrt{165}i}{88}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}i}{44}$ | $\frac{\sqrt{165}}{66}$ | 0 | $\frac{\sqrt{165}i}{88}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{165}i}{264}$ | 0 | 0 | $-\frac{\sqrt{165}i}{264}$ | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{165}i}{264}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{264}$ | $-\frac{3\sqrt{11}i}{88}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ |
| | | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{165}i}{88}$ | 0 | 0 | $\frac{\sqrt{165}}{66}$ | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{88}$ | $-\frac{\sqrt{165}}{66}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | 0 |
| 876 | symmetry | $\frac{\sqrt{462}xz(x^2-3z^2)(3x^2-z^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|--------------------------|--------------------------|--------------------------|---|---|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------------------------|-------------------------|-------------------------|
| $\mathbb{Q}_6^{(1,-1;a)}(A,6)$ | | 0 | 0 | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | $-\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{16}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | $\frac{\sqrt{6}i}{16}$ | 0 | 0 | $-\frac{\sqrt{6}i}{16}$ | 0 |
| | | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | 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 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 |
| | | $\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{16}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{6}i}{16}$ | 0 | 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 | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 | $-\frac{\sqrt{6}i}{16}$ | 0 | 0 | $\frac{\sqrt{6}i}{16}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | $-\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{16}$ |
| | | 0 | $\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{16}$ | 0 | 0 |
| 877 | symmetry | $\frac{\sqrt{210}xz(x^4-16x^2y^2+2x^2z^2+16y^4-16y^2z^2+z^4)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|
| $\mathbb{Q}_6^{(1,-1;a)}(A,7)$ | | 0 | 0 | $\frac{\sqrt{22}i}{48}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{48}$ | $-\frac{\sqrt{330}i}{528}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{528}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{48}$ | 0 | 0 | $-\frac{\sqrt{22}i}{48}$ | 0 | 0 | $\frac{\sqrt{330}i}{528}$ | 0 | 0 | $-\frac{\sqrt{330}i}{528}$ | 0 |
| | | $-\frac{\sqrt{22}i}{48}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | $\frac{\sqrt{22}}{33}$ | 0 | $-\frac{7\sqrt{22}i}{528}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{22}i}{48}$ | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}}{33}$ | 0 | $-\frac{7\sqrt{22}i}{528}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | $\frac{\sqrt{22}i}{132}$ | 0 | $-\frac{2\sqrt{22}}{33}$ | $\frac{\sqrt{22}i}{132}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | $\frac{\sqrt{22}i}{132}$ | 0 | $\frac{2\sqrt{22}}{33}$ | 0 | 0 | $-\frac{\sqrt{22}i}{132}$ |
| | | 0 | $\frac{\sqrt{22}i}{48}$ | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{22}i}{528}$ | 0 | 0 | $\frac{\sqrt{22}}{33}$ |
| | | $\frac{\sqrt{22}i}{48}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{7\sqrt{22}i}{528}$ | $-\frac{\sqrt{22}}{33}$ | 0 |
| | | $\frac{\sqrt{330}i}{528}$ | 0 | 0 | $-\frac{\sqrt{22}}{33}$ | 0 | $-\frac{\sqrt{22}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{330}i}{528}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{330}i}{528}$ | $\frac{\sqrt{22}}{33}$ | 0 | $-\frac{\sqrt{22}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{330}i}{528}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{7\sqrt{22}i}{528}$ | 0 | $\frac{2\sqrt{22}}{33}$ | $\frac{7\sqrt{22}i}{528}$ | 0 | 0 | $-\frac{5\sqrt{330}i}{528}$ | 0 | 0 | $\frac{5\sqrt{330}i}{528}$ | 0 |
| | | 0 | 0 | $\frac{7\sqrt{22}i}{528}$ | 0 | $-\frac{2\sqrt{22}}{33}$ | 0 | 0 | $-\frac{7\sqrt{22}i}{528}$ | $-\frac{5\sqrt{330}i}{528}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{330}i}{528}$ |
| | | 0 | $\frac{\sqrt{330}i}{528}$ | 0 | 0 | $-\frac{\sqrt{22}i}{132}$ | 0 | 0 | $-\frac{\sqrt{22}}{33}$ | 0 | 0 | $-\frac{5\sqrt{330}i}{528}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{330}i}{528}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}i}{132}$ | $\frac{\sqrt{22}}{33}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{330}i}{528}$ | 0 | 0 |
| 878 | symmetry | $\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|---------------------------|--------------------------|---------------------------|---------------------------|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|
| $\mathbb{Q}_6^{(1,-1;a)}(B,1)$ | | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | $\frac{\sqrt{165}}{132}$ | 0 | 0 | $\frac{\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{11}}{44}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{132}$ | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | $\frac{\sqrt{11}}{44}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{11}}{88}$ | $-\frac{5\sqrt{11}i}{88}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{88}$ | $-\frac{\sqrt{165}i}{88}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{5\sqrt{11}}{88}$ | 0 | 0 | $\frac{5\sqrt{11}i}{88}$ | 0 | 0 | $-\frac{\sqrt{165}}{88}$ | 0 | 0 | $\frac{\sqrt{165}i}{88}$ |
| | | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | $\frac{5\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{264}$ | 0 | $-\frac{\sqrt{165}i}{66}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{165}i}{132}$ | $-\frac{5\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{264}$ | 0 | $-\frac{\sqrt{165}i}{66}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{165}}{132}$ | $\frac{5\sqrt{11}i}{88}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{264}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{66}$ |
| | | $\frac{\sqrt{165}}{132}$ | 0 | 0 | $-\frac{5\sqrt{11}i}{88}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{264}$ | 0 | 0 | $\frac{\sqrt{165}i}{66}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{264}$ | $\frac{\sqrt{165}i}{264}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | $-\frac{3\sqrt{11}i}{88}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{264}$ | 0 | 0 | $-\frac{\sqrt{165}i}{264}$ | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ |
| | | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{165}}{88}$ | 0 | $\frac{\sqrt{165}i}{66}$ | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}i}{44}$ | $\frac{\sqrt{165}}{88}$ | 0 | $\frac{\sqrt{165}i}{66}$ | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}}{44}$ | $\frac{\sqrt{165}i}{88}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{66}$ | $\frac{3\sqrt{11}i}{88}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | $-\frac{\sqrt{165}i}{88}$ | 0 | 0 | $-\frac{\sqrt{165}i}{66}$ | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | 0 | 0 | 0 |
| 879 | symmetry | $-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|----------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|---------------------------|---------------------------|
| $\mathbb{Q}_6^{(1,-1;a)}(B,2)$ | | 0 | 0 | 0 | $\frac{\sqrt{165}}{132}$ | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | $\frac{\sqrt{11}}{44}$ | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | $\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{11}i}{88}$ | $-\frac{\sqrt{165}i}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{264}$ |
| | | $\frac{\sqrt{165}}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{11}i}{88}$ | 0 | 0 | $\frac{\sqrt{165}i}{66}$ | 0 | 0 | $\frac{\sqrt{165}i}{264}$ | 0 |
| | | 0 | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{11}}{88}$ | 0 | 0 | $\frac{\sqrt{165}i}{66}$ | 0 | 0 | $-\frac{\sqrt{165}}{264}$ |
| | | $-\frac{\sqrt{165}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{66}$ | $\frac{\sqrt{165}}{264}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{11}i}{88}$ | 0 | $-\frac{5\sqrt{11}}{88}$ | 0 | 0 | 0 | $\frac{\sqrt{165}i}{88}$ | 0 | $-\frac{\sqrt{165}}{88}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{11}i}{88}$ | 0 | $\frac{5\sqrt{11}}{88}$ | 0 | 0 | 0 | $\frac{\sqrt{165}i}{88}$ | 0 | $\frac{\sqrt{165}}{88}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}}{44}$ | $\frac{\sqrt{165}i}{66}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{88}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ |
| | | $\frac{\sqrt{11}}{44}$ | 0 | 0 | $-\frac{\sqrt{165}i}{66}$ | 0 | 0 | $-\frac{\sqrt{165}i}{88}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ | 0 |
| | | 0 | $\frac{\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{165}i}{66}$ | 0 | 0 | $\frac{\sqrt{165}}{88}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ |
| | | $\frac{\sqrt{11}i}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{66}$ | $-\frac{\sqrt{165}}{88}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{264}$ | 0 | $\frac{\sqrt{165}}{264}$ | 0 | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | $-\frac{3\sqrt{11}}{88}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{165}i}{264}$ | 0 | $-\frac{\sqrt{165}}{264}$ | 0 | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 |
| 880 | symmetry | $\frac{\sqrt{462}yz(y^2-3z^2)(3y^2-z^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|-------------------------|---|---|-------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|-------------------------|------------------------|-------------------------|------------------------|
| $\mathbb{Q}_6^{(1,-1;a)}(B,3)$ | | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | $-\frac{\sqrt{10}}{16}$ | 0 | 0 | $-\frac{\sqrt{6}i}{16}$ | 0 | 0 | $-\frac{\sqrt{6}}{16}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{16}$ | $\frac{\sqrt{10}}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{16}$ | $\frac{\sqrt{6}}{16}$ | 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 |
| | | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}}{16}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{16}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{10}}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{10}}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{10}}{16}$ | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}}{16}$ | $-\frac{\sqrt{6}i}{16}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}}{16}$ | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | $-\frac{\sqrt{6}}{16}$ | 0 | 0 | $\frac{\sqrt{6}i}{16}$ |
| | | $\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}}{16}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}}{16}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{6}}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{6}}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 |
| 881 | symmetry | $\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | |
|--------------------------------|-----------|--|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---|---|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--|
| $\mathbb{Q}_6^{(1,-1;a)}(B,4)$ | | 0 | 0 | 0 | $\frac{\sqrt{10}}{16}$ | 0 | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | $-\frac{\sqrt{6}}{16}$ | 0 | $-\frac{\sqrt{6}i}{16}$ | 0 | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{10}}{16}$ | 0 | $-\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{6}}{16}$ | 0 | $-\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | |
| | | 0 | $-\frac{\sqrt{10}}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | |
| | | $\frac{\sqrt{10}}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | |
| | | 0 | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{10}}{16}$ | |
| | | $\frac{\sqrt{10}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 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 | 0 | |
| | | 0 | $\frac{\sqrt{6}}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{16}$ | |
| | | $-\frac{\sqrt{6}}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}i}{16}$ | 0 | |
| | | 0 | $\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}}{16}$ | |
| | | $\frac{\sqrt{6}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{6}}{16}$ | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{10}i}{16}$ | 0 | $-\frac{\sqrt{10}}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{6}i}{16}$ | 0 | $-\frac{\sqrt{6}}{16}$ | 0 | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{10}i}{16}$ | 0 | $\frac{\sqrt{10}}{16}$ | 0 | 0 | 0 | $\frac{\sqrt{6}i}{16}$ | 0 | $\frac{\sqrt{6}}{16}$ | 0 | 0 | 0 | |
| 882 | symmetry | $\frac{\sqrt{210}yz(16x^4-16x^2y^2-16x^2z^2+y^4+2y^2z^2+z^4)}{16}$ | | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|--------------------------------|-----------|--|----------------------------|---------------------------|----------------------------|---------------------------|--------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|
| $\mathbb{Q}_6^{(1,-1;a)}(B,5)$ | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{48}$ | 0 | 0 | $\frac{\sqrt{22}}{48}$ | 0 | 0 | $-\frac{\sqrt{330}i}{528}$ | 0 | $-\frac{\sqrt{330}}{528}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}i}{48}$ | $-\frac{\sqrt{22}}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{330}i}{528}$ | $\frac{\sqrt{330}}{528}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{132}$ | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | $-\frac{2\sqrt{22}i}{33}$ | 0 | $\frac{\sqrt{22}}{132}$ | $\frac{\sqrt{22}i}{132}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | $-\frac{2\sqrt{22}i}{33}$ | 0 | $-\frac{\sqrt{22}}{132}$ | 0 | $-\frac{\sqrt{22}i}{132}$ |
| | | $\frac{\sqrt{22}i}{48}$ | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{22}}{528}$ | 0 | $\frac{\sqrt{22}i}{33}$ | 0 |
| | | 0 | $-\frac{\sqrt{22}i}{48}$ | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | $\frac{7\sqrt{22}}{528}$ | 0 | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{22}}{48}$ | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{22}i}{528}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}i}{33}$ |
| | | $\frac{\sqrt{22}}{48}$ | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | $\frac{7\sqrt{22}i}{528}$ | 0 | 0 | $\frac{\sqrt{22}i}{33}$ | 0 |
| | | 0 | 0 | 0 | $\frac{2\sqrt{22}i}{33}$ | 0 | $\frac{7\sqrt{22}}{528}$ | $\frac{7\sqrt{22}i}{528}$ | 0 | 0 | 0 | $\frac{5\sqrt{330}}{528}$ | $-\frac{5\sqrt{330}i}{528}$ | 0 |
| | | 0 | 0 | $\frac{2\sqrt{22}i}{33}$ | 0 | $-\frac{7\sqrt{22}}{528}$ | 0 | $-\frac{7\sqrt{22}i}{528}$ | 0 | 0 | $-\frac{5\sqrt{330}}{528}$ | 0 | 0 | $\frac{5\sqrt{330}i}{528}$ |
| | | $\frac{\sqrt{330}i}{528}$ | 0 | 0 | $-\frac{\sqrt{22}}{132}$ | 0 | $-\frac{\sqrt{22}i}{33}$ | 0 | 0 | $-\frac{5\sqrt{330}}{528}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{330}i}{528}$ | $\frac{\sqrt{22}}{132}$ | 0 | $-\frac{\sqrt{22}i}{33}$ | 0 | 0 | $\frac{5\sqrt{330}}{528}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{330}}{528}$ | $-\frac{\sqrt{22}i}{132}$ | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{33}$ | $\frac{5\sqrt{330}i}{528}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{330}}{528}$ | 0 | 0 | $\frac{\sqrt{22}i}{132}$ | 0 | 0 | $-\frac{\sqrt{22}i}{33}$ | 0 | $-\frac{5\sqrt{330}i}{528}$ | 0 | 0 | 0 | 0 |
| 883 | symmetry | $\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|
| $\mathbb{Q}_6^{(1,-1;a)}(B,6)$ | | 0 | 0 | 0 | $-\frac{\sqrt{22}}{48}$ | 0 | $\frac{\sqrt{22}i}{48}$ | 0 | 0 | 0 | $-\frac{\sqrt{330}}{528}$ | 0 | $-\frac{\sqrt{330}i}{528}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{22}}{48}$ | 0 | $\frac{\sqrt{22}i}{48}$ | 0 | 0 | 0 | $\frac{\sqrt{330}}{528}$ | 0 | $-\frac{\sqrt{330}i}{528}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{22}}{48}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{22}i}{528}$ |
| | | $-\frac{\sqrt{22}}{48}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | $-\frac{\sqrt{22}i}{33}$ | 0 | 0 | $-\frac{7\sqrt{22}i}{528}$ | 0 |
| | | 0 | $-\frac{\sqrt{22}i}{48}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | $-\frac{7\sqrt{22}i}{528}$ |
| | | $-\frac{\sqrt{22}i}{48}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{33}$ | $\frac{7\sqrt{22}}{528}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | $\frac{\sqrt{22}i}{132}$ | 0 | $\frac{\sqrt{22}}{132}$ | $-\frac{2\sqrt{22}i}{33}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | $\frac{\sqrt{22}i}{132}$ | 0 | $-\frac{\sqrt{22}}{132}$ | 0 | 0 | $\frac{2\sqrt{22}i}{33}$ |
| | | 0 | $\frac{\sqrt{330}}{528}$ | $-\frac{\sqrt{22}i}{33}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{22}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{330}i}{528}$ |
| | | $-\frac{\sqrt{330}}{528}$ | 0 | 0 | $\frac{\sqrt{22}i}{33}$ | 0 | 0 | $-\frac{\sqrt{22}i}{132}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{330}i}{528}$ | 0 |
| | | 0 | $\frac{\sqrt{330}i}{528}$ | 0 | 0 | $-\frac{\sqrt{22}i}{33}$ | 0 | 0 | $-\frac{\sqrt{22}}{132}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{330}}{528}$ |
| | | $\frac{\sqrt{330}i}{528}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}i}{33}$ | $\frac{\sqrt{22}}{132}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{330}}{528}$ | 0 |
| | | 0 | 0 | 0 | $\frac{7\sqrt{22}i}{528}$ | 0 | $\frac{7\sqrt{22}}{528}$ | $\frac{2\sqrt{22}i}{33}$ | 0 | 0 | $\frac{5\sqrt{330}i}{528}$ | 0 | $-\frac{5\sqrt{330}}{528}$ | 0 | 0 |
| | | 0 | 0 | $\frac{7\sqrt{22}i}{528}$ | 0 | $-\frac{7\sqrt{22}}{528}$ | 0 | 0 | $-\frac{2\sqrt{22}i}{33}$ | $\frac{5\sqrt{330}i}{528}$ | 0 | $\frac{5\sqrt{330}}{528}$ | 0 | 0 | 0 |
| 884 | symmetry | 1 | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----------------------------|-----------|------------------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|---------------------------|---------------------------|
| $\mathbb{Q}_0^{(1,1;a)}(A)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{42}}{42}$ | $\frac{\sqrt{42}i}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | $\frac{\sqrt{70}}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | $\frac{\sqrt{42}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | $-\frac{\sqrt{70}}{56}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | $\frac{\sqrt{42}i}{56}$ | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}}{56}$ | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}}{56}$ | 0 | $-\frac{\sqrt{42}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | $\frac{\sqrt{42}}{168}$ |
| | | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | $-\frac{\sqrt{42}}{168}$ | 0 |
| | | 0 | $-\frac{\sqrt{42}}{42}$ | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | $\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ |
| | | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 |
| | | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{42}i}{42}$ | $\frac{\sqrt{70}}{56}$ | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 |
| 885 | symmetry | $-\frac{x^2}{2}-\frac{y^2}{2}+z^2$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--------------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|-------------------------|--------------------------|--------------------------|---------------------------|---------------------------|
| $\mathbb{Q}_2^{(1,1;a)}(A, 1)$ | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $-\frac{\sqrt{7}}{28}$ | $\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ |
| | | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ |
| | | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 |
| | | 0 | $\frac{\sqrt{105}}{84}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ |
| | | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}}{28}$ |
| | | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{7}}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ |
| | | $-\frac{\sqrt{7}}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{84}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{7}i}{28}$ | 0 |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{105}}{84}$ | 0 | $\frac{\sqrt{105}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{7}}{28}$ | 0 | $\frac{\sqrt{7}i}{28}$ | 0 | 0 | 0 |
| 886 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| $\mathbb{Q}_2^{(1,1;a)}(A, 2)$ | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | $\frac{\sqrt{35}}{84}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}i}{28}$ | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{84}$ |
| | | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ |
| | | $\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 |
| | | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{21}}{28}$ | 0 | $\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ |
| | | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{21}}{28}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ |
| | | $-\frac{\sqrt{21}}{28}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{28}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{28}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | $\frac{\sqrt{35}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{28}$ | 0 | $-\frac{\sqrt{21}i}{28}$ | 0 | 0 | 0 |
| 887 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| $\mathbb{Q}_2^{(1,1;a)}(A, 3)$ | | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 |
| | | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ |
| | | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ |
| | | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{35}}{42}$ | 0 |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ |
| | | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 |
| 888 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| $\mathbb{Q}_2^{(1,1;a)}(B,1)$ | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ |
| | | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ |
| | | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 |
| 889 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|
| $\mathbb{Q}_2^{(1,1;a)}(B, 2)$ | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ |
| | | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ |
| | | 0 | $\frac{\sqrt{21}}{42}$ | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ |
| | | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{42}$ | 0 |
| | | 0 | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{42}$ |
| | | $\frac{\sqrt{21}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{42}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}i}{42}$ | 0 | $\frac{\sqrt{21}}{42}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | $-\frac{\sqrt{21}i}{42}$ | 0 | $-\frac{\sqrt{21}}{42}$ | 0 | 0 | 0 |
| 890 | symmetry | $\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|---------------------------|----------------------------|---------------------------|----------------------------|----------------------------|--------------------------|---------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|
| $\mathbb{Q}_4^{(1,1;a)}(A, 1)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{66}$ | 0 | $-\frac{\sqrt{110}}{66}$ | $-\frac{\sqrt{110}i}{66}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{66}$ | 0 | $\frac{\sqrt{110}}{66}$ | 0 | 0 | $\frac{\sqrt{110}i}{66}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{264}$ | 0 | 0 | $-\frac{\sqrt{110}}{264}$ | 0 | 0 | $\frac{\sqrt{66}i}{88}$ | 0 | 0 | $\frac{\sqrt{66}}{88}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{264}$ | $\frac{\sqrt{110}}{264}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{88}$ | $-\frac{\sqrt{66}}{88}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{110}i}{264}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{264}$ | $\frac{\sqrt{66}i}{88}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}i}{88}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{110}i}{264}$ | 0 | 0 | $\frac{\sqrt{110}}{264}$ | 0 | 0 | $-\frac{\sqrt{66}i}{88}$ | 0 | 0 | $\frac{\sqrt{66}i}{88}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{110}}{264}$ | 0 | $-\frac{\sqrt{110}i}{264}$ | 0 | 0 | 0 | $\frac{\sqrt{66}}{88}$ | 0 | $\frac{\sqrt{66}i}{88}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{110}}{264}$ | 0 | $-\frac{\sqrt{110}i}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}}{88}$ | 0 | $\frac{\sqrt{66}i}{88}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{110}i}{66}$ | 0 | 0 | $-\frac{\sqrt{66}i}{88}$ | 0 | 0 | $-\frac{\sqrt{66}}{88}$ | 0 | 0 | $\frac{5\sqrt{110}i}{264}$ | 0 | 0 | $-\frac{5\sqrt{110}}{264}$ |
| | | $\frac{\sqrt{110}i}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}i}{88}$ | $\frac{\sqrt{66}}{88}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{110}i}{264}$ | $\frac{5\sqrt{110}}{264}$ | 0 |
| | | 0 | $\frac{\sqrt{110}}{66}$ | $-\frac{\sqrt{66}i}{88}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{88}$ | $-\frac{5\sqrt{110}i}{264}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{110}i}{264}$ |
| | | $-\frac{\sqrt{110}}{66}$ | 0 | 0 | $\frac{\sqrt{66}i}{88}$ | 0 | 0 | $-\frac{\sqrt{66}i}{88}$ | 0 | 0 | $\frac{5\sqrt{110}i}{264}$ | 0 | 0 | $\frac{5\sqrt{110}i}{264}$ | 0 |
| | | $\frac{\sqrt{110}i}{66}$ | 0 | 0 | $-\frac{\sqrt{66}}{88}$ | 0 | $-\frac{\sqrt{66}i}{88}$ | 0 | 0 | 0 | $\frac{5\sqrt{110}}{264}$ | 0 | $-\frac{5\sqrt{110}i}{264}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{110}i}{66}$ | $\frac{\sqrt{66}}{88}$ | 0 | $-\frac{\sqrt{66}i}{88}$ | 0 | 0 | 0 | $-\frac{5\sqrt{110}}{264}$ | 0 | $-\frac{5\sqrt{110}i}{264}$ | 0 | 0 | 0 |
| 891 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|-----------------------------|-----------------------------|
| $\mathbb{Q}_4^{(1,1;a)}(A, 2)$ | | 0 | 0 | 0 | $-\frac{\sqrt{2310}i}{220}$ | 0 | $\frac{\sqrt{2310}}{220}$ | 0 | 0 | 0 | $\frac{5\sqrt{154}i}{924}$ | 0 | $\frac{5\sqrt{154}}{924}$ | $-\frac{5\sqrt{154}i}{462}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{2310}i}{220}$ | 0 | $-\frac{\sqrt{2310}}{220}$ | 0 | 0 | 0 | $\frac{5\sqrt{154}i}{924}$ | 0 | $-\frac{5\sqrt{154}}{924}$ | 0 | 0 | $\frac{5\sqrt{154}i}{462}$ |
| | | 0 | $\frac{\sqrt{2310}i}{220}$ | 0 | 0 | $-\frac{\sqrt{154}i}{84}$ | 0 | 0 | $-\frac{\sqrt{154}}{168}$ | 0 | 0 | $\frac{\sqrt{2310}i}{385}$ | 0 | 0 | $-\frac{\sqrt{2310}}{280}$ |
| | | $\frac{\sqrt{2310}i}{220}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{154}i}{84}$ | $\frac{\sqrt{154}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2310}i}{385}$ | $\frac{\sqrt{2310}}{280}$ | 0 |
| | | 0 | $-\frac{\sqrt{2310}}{220}$ | $\frac{\sqrt{154}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{154}i}{168}$ | $\frac{\sqrt{2310}i}{385}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2310}i}{280}$ |
| | | $\frac{\sqrt{2310}}{220}$ | 0 | 0 | $-\frac{\sqrt{154}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{154}}{168}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{385}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{280}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{154}}{168}$ | 0 | $-\frac{\sqrt{154}i}{168}$ | 0 | 0 | 0 | $\frac{3\sqrt{2310}}{3080}$ | 0 | $\frac{3\sqrt{2310}i}{3080}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{154}}{168}$ | 0 | $-\frac{\sqrt{154}i}{168}$ | 0 | 0 | 0 | $-\frac{3\sqrt{2310}}{3080}$ | 0 | $\frac{3\sqrt{2310}i}{3080}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{5\sqrt{154}i}{924}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{385}$ | 0 | 0 | $-\frac{3\sqrt{2310}}{3080}$ | 0 | 0 | $-\frac{\sqrt{154}i}{924}$ | 0 | 0 | $-\frac{\sqrt{154}}{1848}$ |
| | | $-\frac{5\sqrt{154}i}{924}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}i}{385}$ | $\frac{3\sqrt{2310}}{3080}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{154}i}{924}$ | $\frac{\sqrt{154}}{1848}$ | 0 |
| | | 0 | $-\frac{5\sqrt{154}}{924}$ | $-\frac{\sqrt{2310}i}{385}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{2310}i}{3080}$ | $\frac{\sqrt{154}i}{924}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{154}i}{1848}$ |
| | | $\frac{5\sqrt{154}}{924}$ | 0 | 0 | $\frac{\sqrt{2310}i}{385}$ | 0 | 0 | $-\frac{3\sqrt{2310}i}{3080}$ | 0 | 0 | $-\frac{\sqrt{154}i}{924}$ | 0 | 0 | $\frac{\sqrt{154}i}{1848}$ | 0 |
| | | $\frac{5\sqrt{154}i}{462}$ | 0 | 0 | $\frac{\sqrt{2310}}{280}$ | 0 | $\frac{\sqrt{2310}i}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{154}}{1848}$ | 0 | $-\frac{\sqrt{154}i}{1848}$ | 0 | 0 |
| | | 0 | $-\frac{5\sqrt{154}i}{462}$ | $-\frac{\sqrt{2310}}{280}$ | 0 | $\frac{\sqrt{2310}i}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{154}}{1848}$ | 0 | $-\frac{\sqrt{154}i}{1848}$ | 0 | 0 | 0 |
| 892 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-------------------------------|-------------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|-----------------------------|-----------------------------|
| $\mathbb{Q}_4^{(1,1;a)}(A, 3)$ | | 0 | 0 | 0 | $-\frac{\sqrt{770}i}{220}$ | 0 | $-\frac{\sqrt{770}}{220}$ | $\frac{\sqrt{770}i}{110}$ | 0 | 0 | $-\frac{5\sqrt{462}i}{924}$ | 0 | $\frac{5\sqrt{462}}{924}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{770}i}{220}$ | 0 | $\frac{\sqrt{770}}{220}$ | 0 | 0 | $-\frac{\sqrt{770}i}{110}$ | $-\frac{5\sqrt{462}i}{924}$ | 0 | $-\frac{5\sqrt{462}}{924}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{770}i}{220}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}}{168}$ | 0 | 0 | $\frac{\sqrt{770}i}{220}$ | 0 | 0 | $-\frac{\sqrt{770}}{616}$ |
| | | $\frac{\sqrt{770}i}{220}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{770}i}{220}$ | $\frac{\sqrt{770}}{616}$ | 0 |
| | | 0 | $\frac{\sqrt{770}}{220}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}i}{168}$ | $-\frac{\sqrt{770}i}{220}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}i}{616}$ |
| | | $-\frac{\sqrt{770}}{220}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}i}{168}$ | 0 | 0 | $\frac{\sqrt{770}i}{220}$ | 0 | 0 | $\frac{\sqrt{770}i}{616}$ | 0 |
| | | $-\frac{\sqrt{770}i}{110}$ | 0 | 0 | $\frac{\sqrt{462}}{168}$ | 0 | $\frac{\sqrt{462}i}{168}$ | 0 | 0 | 0 | $-\frac{19\sqrt{770}}{3080}$ | 0 | $\frac{19\sqrt{770}i}{3080}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{770}i}{110}$ | $-\frac{\sqrt{462}}{168}$ | 0 | $\frac{\sqrt{462}i}{168}$ | 0 | 0 | 0 | $\frac{19\sqrt{770}}{3080}$ | 0 | $\frac{19\sqrt{770}i}{3080}$ | 0 | 0 | 0 |
| | | 0 | $\frac{5\sqrt{462}i}{924}$ | 0 | 0 | $\frac{\sqrt{770}i}{220}$ | 0 | 0 | $\frac{19\sqrt{770}}{3080}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}}{1848}$ |
| | | $\frac{5\sqrt{462}i}{924}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{770}i}{220}$ | $-\frac{19\sqrt{770}}{3080}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}}{1848}$ | 0 |
| | | 0 | $-\frac{5\sqrt{462}}{924}$ | $-\frac{\sqrt{770}i}{220}$ | 0 | 0 | 0 | 0 | $-\frac{19\sqrt{770}i}{3080}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}i}{1848}$ |
| | | $\frac{5\sqrt{462}}{924}$ | 0 | 0 | $\frac{\sqrt{770}i}{220}$ | 0 | 0 | $-\frac{19\sqrt{770}i}{3080}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}i}{1848}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{770}}{616}$ | 0 | $-\frac{\sqrt{770}i}{616}$ | 0 | 0 | 0 | $\frac{\sqrt{462}}{1848}$ | 0 | $\frac{\sqrt{462}i}{1848}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{770}}{616}$ | 0 | $-\frac{\sqrt{770}i}{616}$ | 0 | 0 | 0 | $-\frac{\sqrt{462}}{1848}$ | 0 | $\frac{\sqrt{462}i}{1848}$ | 0 | 0 | 0 |
| 893 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---------------------------------------|---------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|
| $\mathbb{Q}_4^{(1,1;a)}(A, 4)$ | | 0 | 0 | $-\frac{\sqrt{110}i}{55}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{55}$ | $-\frac{\sqrt{66}i}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}i}{66}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{110}i}{55}$ | 0 | 0 | $-\frac{\sqrt{110}i}{55}$ | 0 | 0 | $\frac{\sqrt{66}i}{66}$ | 0 | 0 | $\frac{\sqrt{66}i}{66}$ | 0 |
| | | $\frac{\sqrt{110}i}{55}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{264}$ | 0 | 0 | 0 | $\frac{3\sqrt{110}}{220}$ | 0 | $-\frac{7\sqrt{110}i}{440}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{110}i}{55}$ | 0 | 0 | $-\frac{\sqrt{66}i}{264}$ | 0 | 0 | 0 | $-\frac{3\sqrt{110}}{220}$ | 0 | $-\frac{7\sqrt{110}i}{440}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{66}i}{264}$ | 0 | 0 | $\frac{\sqrt{66}i}{264}$ | 0 | 0 | $\frac{\sqrt{110}i}{440}$ | 0 | 0 | $-\frac{\sqrt{110}i}{440}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{66}i}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{264}$ | $\frac{\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{440}$ |
| | | 0 | $\frac{\sqrt{110}i}{55}$ | 0 | 0 | $-\frac{\sqrt{66}i}{264}$ | 0 | 0 | 0 | 0 | $\frac{7\sqrt{110}i}{440}$ | 0 | 0 | 0 | $-\frac{3\sqrt{110}}{220}$ |
| | | $\frac{\sqrt{110}i}{55}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}i}{264}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{110}i}{440}$ | $\frac{3\sqrt{110}}{220}$ | 0 |
| | | $\frac{\sqrt{66}i}{66}$ | 0 | 0 | $-\frac{3\sqrt{110}}{220}$ | 0 | $-\frac{\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{66}i}{264}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{66}i}{66}$ | $\frac{3\sqrt{110}}{220}$ | 0 | $-\frac{\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{66}i}{264}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{7\sqrt{110}i}{440}$ | 0 | 0 | $-\frac{7\sqrt{110}i}{440}$ | 0 | 0 | $\frac{5\sqrt{66}i}{264}$ | 0 | 0 | $\frac{5\sqrt{66}i}{264}$ | 0 |
| | | 0 | 0 | $\frac{7\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{7\sqrt{110}i}{440}$ | $\frac{5\sqrt{66}i}{264}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{66}i}{264}$ |
| | | 0 | $-\frac{\sqrt{66}i}{66}$ | 0 | 0 | $\frac{\sqrt{110}i}{440}$ | 0 | 0 | $\frac{3\sqrt{110}}{220}$ | 0 | 0 | $-\frac{5\sqrt{66}i}{264}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{66}i}{66}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{440}$ | $-\frac{3\sqrt{110}}{220}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{66}i}{264}$ | 0 | 0 |
| 894 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-----------------------------------|----------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|
| $\mathbb{Q}_4^{(1,1;a)}(A, 5)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}i}{462}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}i}{462}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}i}{462}$ | 0 | 0 | $-\frac{\sqrt{462}i}{462}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{462}i}{1848}$ | 0 | 0 | 0 | $\frac{\sqrt{770}}{220}$ | 0 | $\frac{9\sqrt{770}i}{3080}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{462}i}{1848}$ | 0 | 0 | 0 | $-\frac{\sqrt{770}}{220}$ | 0 | $\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{17\sqrt{462}i}{1848}$ | 0 | 0 | $-\frac{17\sqrt{462}i}{1848}$ | 0 | 0 | $\frac{9\sqrt{770}i}{3080}$ | 0 | $-\frac{\sqrt{770}}{110}$ | $\frac{9\sqrt{770}i}{3080}$ | 0 |
| | | 0 | 0 | $\frac{17\sqrt{462}i}{1848}$ | 0 | 0 | 0 | 0 | $\frac{17\sqrt{462}i}{1848}$ | $\frac{9\sqrt{770}i}{3080}$ | 0 | $\frac{\sqrt{770}}{110}$ | 0 | 0 | $-\frac{9\sqrt{770}i}{3080}$ |
| | | 0 | 0 | 0 | 0 | $\frac{17\sqrt{462}i}{1848}$ | 0 | 0 | 0 | 0 | 0 | $\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | $\frac{\sqrt{770}}{220}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{462}i}{1848}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{9\sqrt{770}i}{3080}$ | $-\frac{\sqrt{770}}{220}$ | 0 |
| | | $\frac{\sqrt{462}i}{462}$ | 0 | 0 | $-\frac{\sqrt{770}}{220}$ | 0 | $-\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{462}i}{1848}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{462}i}{462}$ | $\frac{\sqrt{770}}{220}$ | 0 | $-\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{462}i}{1848}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{9\sqrt{770}i}{3080}$ | 0 | $\frac{\sqrt{770}}{110}$ | $-\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | $\frac{13\sqrt{462}i}{1848}$ | 0 | 0 | $-\frac{13\sqrt{462}i}{1848}$ | 0 |
| | | 0 | 0 | $-\frac{9\sqrt{770}i}{3080}$ | 0 | $-\frac{\sqrt{770}}{110}$ | 0 | 0 | $\frac{9\sqrt{770}i}{3080}$ | $\frac{13\sqrt{462}i}{1848}$ | 0 | 0 | 0 | 0 | $\frac{13\sqrt{462}i}{1848}$ |
| | | 0 | $\frac{\sqrt{462}i}{462}$ | 0 | 0 | $-\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | $-\frac{\sqrt{770}}{220}$ | 0 | 0 | $\frac{13\sqrt{462}i}{1848}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{462}i}{462}$ | 0 | 0 | 0 | 0 | $\frac{9\sqrt{770}i}{3080}$ | $\frac{\sqrt{770}}{220}$ | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{462}i}{1848}$ | 0 | 0 |
| 895 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|-----------------------------------|---------------------------|----------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|
| $\mathbb{Q}_4^{(1,1;a)}(B,1)$ | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}i}{55}$ | 0 | 0 | $-\frac{\sqrt{110}}{55}$ | 0 | 0 | $\frac{\sqrt{66}i}{66}$ | 0 | 0 | $-\frac{\sqrt{66}}{66}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{110}i}{55}$ | $\frac{\sqrt{110}}{55}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}i}{66}$ | $\frac{\sqrt{66}}{66}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}}{264}$ | $\frac{\sqrt{66}i}{264}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{110}}{440}$ | $\frac{\sqrt{110}i}{440}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}}{264}$ | 0 | 0 | $-\frac{\sqrt{66}i}{264}$ | 0 | 0 | $\frac{\sqrt{110}}{440}$ | 0 | 0 | $-\frac{\sqrt{110}i}{440}$ |
| | | $\frac{\sqrt{110}i}{55}$ | 0 | 0 | $-\frac{\sqrt{66}}{264}$ | 0 | 0 | 0 | 0 | 0 | $\frac{7\sqrt{110}}{440}$ | 0 | $-\frac{3\sqrt{110}i}{220}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{110}i}{55}$ | $\frac{\sqrt{66}}{264}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{110}}{440}$ | 0 | $-\frac{3\sqrt{110}i}{220}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{110}}{55}$ | $-\frac{\sqrt{66}i}{264}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{110}i}{220}$ |
| | | $-\frac{\sqrt{110}}{55}$ | 0 | 0 | $\frac{\sqrt{66}i}{264}$ | 0 | 0 | 0 | 0 | 0 | $\frac{7\sqrt{110}i}{440}$ | 0 | 0 | $\frac{3\sqrt{110}i}{220}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{110}}{440}$ | $\frac{7\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{66}}{264}$ | $\frac{5\sqrt{66}i}{264}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{7\sqrt{110}}{440}$ | 0 | 0 | $-\frac{7\sqrt{110}i}{440}$ | 0 | 0 | $-\frac{5\sqrt{66}}{264}$ | 0 | 0 | $-\frac{5\sqrt{66}i}{264}$ |
| | | $-\frac{\sqrt{66}i}{66}$ | 0 | 0 | $\frac{\sqrt{110}}{440}$ | 0 | $\frac{3\sqrt{110}i}{220}$ | 0 | 0 | 0 | $-\frac{5\sqrt{66}}{264}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{66}i}{66}$ | $-\frac{\sqrt{110}}{440}$ | 0 | $\frac{3\sqrt{110}i}{220}$ | 0 | 0 | 0 | $\frac{5\sqrt{66}}{264}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{66}}{66}$ | $-\frac{\sqrt{110}i}{440}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{110}i}{220}$ | $-\frac{5\sqrt{66}i}{264}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{66}}{66}$ | 0 | 0 | $\frac{\sqrt{110}i}{440}$ | 0 | 0 | $-\frac{3\sqrt{110}i}{220}$ | 0 | 0 | $\frac{5\sqrt{66}i}{264}$ | 0 | 0 | 0 | 0 |
| 896 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|--------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|---------------------------|---------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|
| $\mathbb{Q}_4^{(1,1;a)}(B, 2)$ | | 0 | 0 | 0 | $-\frac{\sqrt{110}}{55}$ | 0 | $-\frac{\sqrt{110i}}{55}$ | 0 | 0 | 0 | $\frac{\sqrt{66}}{66}$ | 0 | $-\frac{\sqrt{66i}}{66}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{110}}{55}$ | 0 | $-\frac{\sqrt{110i}}{55}$ | 0 | 0 | 0 | $-\frac{\sqrt{66}}{66}$ | 0 | $-\frac{\sqrt{66i}}{66}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{110}}{55}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66i}}{264}$ | $-\frac{3\sqrt{110i}}{220}$ | 0 | 0 | 0 | 0 | $\frac{7\sqrt{110i}}{440}$ |
| | | $-\frac{\sqrt{110}}{55}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66i}}{264}$ | 0 | 0 | $\frac{3\sqrt{110i}}{220}$ | 0 | 0 | $\frac{7\sqrt{110i}}{440}$ | 0 |
| | | 0 | $\frac{\sqrt{110i}}{55}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{66}}{264}$ | 0 | 0 | $\frac{3\sqrt{110i}}{220}$ | 0 | 0 | $-\frac{7\sqrt{110}}{440}$ |
| | | $\frac{\sqrt{110i}}{55}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{66}}{264}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{110i}}{220}$ | $\frac{7\sqrt{110}}{440}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{66i}}{264}$ | 0 | $\frac{\sqrt{66}}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{110i}}{440}$ | 0 | $\frac{\sqrt{110}}{440}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{66i}}{264}$ | 0 | $-\frac{\sqrt{66}}{264}$ | 0 | 0 | 0 | $-\frac{\sqrt{110i}}{440}$ | 0 | $-\frac{\sqrt{110}}{440}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{66}}{66}$ | $\frac{3\sqrt{110i}}{220}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{110i}}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{66i}}{264}$ |
| | | $\frac{\sqrt{66}}{66}$ | 0 | 0 | $-\frac{3\sqrt{110i}}{220}$ | 0 | 0 | $\frac{\sqrt{110i}}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{66i}}{264}$ | 0 |
| | | 0 | $\frac{\sqrt{66i}}{66}$ | 0 | 0 | $-\frac{3\sqrt{110i}}{220}$ | 0 | 0 | $-\frac{\sqrt{110}}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{66}}{264}$ |
| | | $\frac{\sqrt{66i}}{66}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{110i}}{220}$ | $\frac{\sqrt{110}}{440}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{66}}{264}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{7\sqrt{110i}}{440}$ | 0 | $\frac{7\sqrt{110}}{440}$ | 0 | 0 | 0 | $\frac{5\sqrt{66i}}{264}$ | 0 | $\frac{5\sqrt{66}}{264}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{7\sqrt{110i}}{440}$ | 0 | $-\frac{7\sqrt{110}}{440}$ | 0 | 0 | 0 | $\frac{5\sqrt{66i}}{264}$ | 0 | $-\frac{5\sqrt{66}}{264}$ | 0 | 0 | 0 |
| 897 | symmetry | $\frac{\sqrt{5}yz(6x^2 - y^2 - z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|-------------------------------|-----------|---------------------------------------|----------------------------|-------------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|
| $\mathbb{Q}_4^{(1,1;a)}(B,3)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}i}{462}$ | 0 | 0 | $-\frac{\sqrt{462}}{462}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}i}{462}$ | $\frac{\sqrt{462}}{462}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{462}}{1848}$ | $\frac{17\sqrt{462}i}{1848}$ | 0 | 0 | $-\frac{\sqrt{770}i}{110}$ | 0 | $\frac{9\sqrt{770}}{3080}$ | $\frac{9\sqrt{770}i}{3080}$ |
| | | 0 | 0 | 0 | 0 | $\frac{17\sqrt{462}}{1848}$ | 0 | 0 | $-\frac{17\sqrt{462}i}{1848}$ | $-\frac{\sqrt{770}i}{110}$ | 0 | $-\frac{9\sqrt{770}}{3080}$ | 0 | $-\frac{9\sqrt{770}i}{3080}$ |
| | | 0 | 0 | 0 | $\frac{17\sqrt{462}}{1848}$ | 0 | 0 | 0 | 0 | 0 | $\frac{9\sqrt{770}}{3080}$ | 0 | $\frac{\sqrt{770}i}{220}$ | 0 |
| | | 0 | 0 | $-\frac{17\sqrt{462}}{1848}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{9\sqrt{770}}{3080}$ | 0 | $\frac{\sqrt{770}i}{220}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{17\sqrt{462}i}{1848}$ | 0 | 0 | 0 | 0 | 0 | $\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | 0 | $\frac{\sqrt{770}i}{220}$ |
| | | 0 | 0 | 0 | $\frac{17\sqrt{462}i}{1848}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | $\frac{\sqrt{770}i}{220}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{770}i}{110}$ | 0 | $-\frac{9\sqrt{770}}{3080}$ | $-\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | 0 | $-\frac{13\sqrt{462}}{1848}$ | $\frac{13\sqrt{462}i}{1848}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{770}i}{110}$ | 0 | $\frac{9\sqrt{770}}{3080}$ | 0 | 0 | $\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | $\frac{13\sqrt{462}}{1848}$ | 0 | $-\frac{13\sqrt{462}i}{1848}$ |
| | | $\frac{\sqrt{462}i}{462}$ | 0 | 0 | $-\frac{9\sqrt{770}}{3080}$ | 0 | $-\frac{\sqrt{770}i}{220}$ | 0 | 0 | 0 | $\frac{13\sqrt{462}}{1848}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{462}i}{462}$ | $\frac{9\sqrt{770}}{3080}$ | 0 | $-\frac{\sqrt{770}i}{220}$ | 0 | 0 | 0 | $-\frac{13\sqrt{462}}{1848}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{462}}{462}$ | $-\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{770}i}{220}$ | $-\frac{13\sqrt{462}i}{1848}$ | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{462}}{462}$ | 0 | 0 | $\frac{9\sqrt{770}i}{3080}$ | 0 | 0 | $-\frac{\sqrt{770}i}{220}$ | 0 | 0 | $\frac{13\sqrt{462}i}{1848}$ | 0 | 0 | 0 |
| 898 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|---------------------------|---------------------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|--|
| $\mathbb{Q}_4^{(1,1;a)}(B,4)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{462}}{462}$ | 0 | $-\frac{\sqrt{462i}}{462}$ | 0 | 0 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}}{462}$ | 0 | $-\frac{\sqrt{462i}}{462}$ | 0 | 0 | 0 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{17\sqrt{462i}}{1848}$ | $\frac{\sqrt{770i}}{220}$ | 0 | 0 | 0 | 0 | $\frac{9\sqrt{770i}}{3080}$ | |
| | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{17\sqrt{462i}}{1848}$ | 0 | 0 | $-\frac{\sqrt{770i}}{220}$ | 0 | 0 | $\frac{9\sqrt{770i}}{3080}$ | 0 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{462}}{1848}$ | 0 | 0 | $\frac{\sqrt{770i}}{220}$ | 0 | 0 | $\frac{9\sqrt{770}}{3080}$ | |
| | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{17\sqrt{462}}{1848}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{770i}}{220}$ | $-\frac{9\sqrt{770}}{3080}$ | 0 | |
| | 0 | 0 | 0 | $-\frac{17\sqrt{462i}}{1848}$ | 0 | $\frac{17\sqrt{462}}{1848}$ | 0 | 0 | 0 | $\frac{9\sqrt{770i}}{3080}$ | 0 | $\frac{9\sqrt{770}}{3080}$ | $-\frac{\sqrt{770i}}{110}$ | 0 | |
| | 0 | 0 | $-\frac{17\sqrt{462i}}{1848}$ | 0 | $-\frac{17\sqrt{462}}{1848}$ | 0 | 0 | 0 | $\frac{9\sqrt{770i}}{3080}$ | 0 | $-\frac{9\sqrt{770}}{3080}$ | 0 | 0 | $\frac{\sqrt{770i}}{110}$ | |
| | 0 | $\frac{\sqrt{462}}{462}$ | $-\frac{\sqrt{770i}}{220}$ | 0 | 0 | 0 | 0 | $-\frac{9\sqrt{770i}}{3080}$ | 0 | 0 | 0 | 0 | 0 | $\frac{13\sqrt{462i}}{1848}$ | |
| | $-\frac{\sqrt{462}}{462}$ | 0 | 0 | $\frac{\sqrt{770i}}{220}$ | 0 | 0 | $-\frac{9\sqrt{770i}}{3080}$ | 0 | 0 | 0 | 0 | 0 | $\frac{13\sqrt{462i}}{1848}$ | 0 | |
| | 0 | $\frac{\sqrt{462i}}{462}$ | 0 | 0 | $-\frac{\sqrt{770i}}{220}$ | 0 | 0 | $-\frac{9\sqrt{770}}{3080}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{462}}{1848}$ | |
| | $\frac{\sqrt{462i}}{462}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770i}}{220}$ | $\frac{9\sqrt{770}}{3080}$ | 0 | 0 | 0 | 0 | 0 | $\frac{13\sqrt{462}}{1848}$ | 0 | |
| | 0 | 0 | 0 | $-\frac{9\sqrt{770i}}{3080}$ | 0 | $-\frac{9\sqrt{770}}{3080}$ | $\frac{\sqrt{770i}}{110}$ | 0 | 0 | $-\frac{13\sqrt{462i}}{1848}$ | 0 | $\frac{13\sqrt{462}}{1848}$ | 0 | 0 | |
| | 0 | 0 | $-\frac{9\sqrt{770i}}{3080}$ | 0 | $\frac{9\sqrt{770}}{3080}$ | 0 | 0 | $-\frac{\sqrt{770i}}{110}$ | $-\frac{13\sqrt{462i}}{1848}$ | 0 | $-\frac{13\sqrt{462}}{1848}$ | 0 | 0 | 0 | |
| 899 | symmetry | y | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----------------------------|-----------|-------------------------|------------------------|--------------------------|--------------------------|---------------------------|--------------------------|---------------------------|---------------------------|------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|
| $\mathbb{G}_1^{(1,0;a)}(A)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ |
| | | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 |
| 900 | symmetry | x | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|------------------------|-------------------------|--------------------------|---------------------------|-------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|---------------------------|--------------------------|
| $\mathbb{G}_1^{(1,0;a)}(B,1)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{7}}{14}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{7}}{14}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | $-\frac{\sqrt{105}i}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{56}$ |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | $-\frac{\sqrt{7}i}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ |
| | | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{14}$ | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{7}}{14}$ | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 |
| 901 | symmetry | z | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-------------------------|-------------------------|---------------------------|---------------------------|--------------------------|-------------------------|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|
| $\mathbb{G}_1^{(1,0;a)}(B, 2)$ | | 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 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ |
| | | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 |
| | | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 |
| 902 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | | |
|-------------------------------|-----------|--------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|----------------|----------------|---------------|----------------|---|---|
| $\mathbb{G}_3^{(1,0;a)}(A,1)$ | | 0 | 0 | 0 | $-\frac{i}{6}$ | 0 | $-\frac{1}{6}$ | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{i}{6}$ | 0 | $\frac{1}{6}$ | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | $-\frac{1}{6}$ | | |
| | | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | $\frac{1}{6}$ | 0 | | |
| | | 0 | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | | |
| | | $-\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | $\frac{i}{6}$ | 0 | | |
| | | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{1}{6}$ | 0 | $-\frac{i}{6}$ | 0 | 0 | | |
| | | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{6}$ | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | | |
| | | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | $-\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | | 0 | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | | 0 | 0 | 0 | $\frac{1}{6}$ | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | | 0 | 0 | $-\frac{1}{6}$ | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 903 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-----------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|
| $\mathbb{G}_3^{(1,0;a)}(A, 2)$ | | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{i}{8}$ | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| | | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 |
| | | 0 | $-\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $-\frac{i}{8}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ |
| | | 0 | $-\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 |
| | | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 |
| 904 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|-------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| $\mathbb{G}_3^{(1,0;a)}(A,3)$ | | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | $\frac{i}{24}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ |
| | | 0 | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 |
| | | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | $\frac{1}{6}$ | 0 | $-\frac{i}{24}$ | 0 | 0 |
| | | 0 | $-\frac{i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | $-\frac{1}{6}$ | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{i}{24}$ | 0 | $\frac{1}{6}$ | $\frac{i}{24}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | $\frac{i}{24}$ | 0 | $-\frac{1}{6}$ | 0 | 0 | $-\frac{i}{24}$ |
| | | 0 | $-\frac{i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | $\frac{1}{6}$ |
| | | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{24}$ | $-\frac{1}{6}$ | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{1}{6}$ | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | $\frac{1}{6}$ | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{i}{24}$ | 0 | $-\frac{1}{6}$ | $\frac{i}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | 0 | $\frac{i}{24}$ | 0 | $\frac{1}{6}$ | 0 | 0 | $-\frac{i}{24}$ | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | $-\frac{1}{6}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{i}{24}$ | $\frac{1}{6}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| 905 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|--------------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|-------------------------|-------------------------|--------------------------|-------------------------|------------------------|--------------------------|-------------------------|
| $\mathbb{G}_3^{(1,0;a)}(B,1)$ | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $-\frac{1}{8}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | $\frac{1}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | $-\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{24}$ | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | $-\frac{i}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $\frac{i}{8}$ |
| | | $-\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{i}{8}$ | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{1}{8}$ | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{1}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 |
| 906 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-------------------------------|-----------|----------------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|------------------------|-------------------------|--------------------------|--------------------------|--|
| $\mathbb{G}_3^{(1,0;a)}(B,2)$ | | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | |
| | | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | |
| | | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | |
| | | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | |
| | | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | |
| | | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | |
| | | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | |
| 907 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|----------------------------------|--------------------------|-------------------------|--------------------------|-------------------------|------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|-------------------------|--------------------------|
| $\mathbb{G}_3^{(1,0;a)}(B,3)$ | | 0 | 0 | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | $-\frac{1}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{24}$ | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | $\frac{\sqrt{15}}{24}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $\frac{i}{6}$ | 0 | $\frac{1}{24}$ | $\frac{i}{24}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | $\frac{i}{6}$ | 0 | $-\frac{1}{24}$ | 0 | 0 | $-\frac{i}{24}$ |
| | | $-\frac{i}{24}$ | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{24}$ | 0 | $\frac{i}{6}$ | 0 | 0 |
| | | 0 | $\frac{i}{24}$ | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{24}$ | 0 | $\frac{i}{6}$ | 0 | 0 | 0 |
| | | 0 | $\frac{1}{24}$ | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | $\frac{i}{6}$ |
| | | $-\frac{1}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | $\frac{i}{6}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{i}{6}$ | 0 | $\frac{1}{24}$ | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | $\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | 0 | $-\frac{i}{6}$ | 0 | $-\frac{1}{24}$ | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{1}{24}$ | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{24}$ | $\frac{1}{24}$ | 0 | $-\frac{i}{6}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{24}$ | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{i}{24}$ | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 |
| 908 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|-------------------------------------|-------------------------|-------------------------|-------------------------|------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|
| $\mathbb{G}_3^{(1,0;a)}(B,4)$ | | 0 | 0 | 0 | $\frac{1}{24}$ | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{1}{24}$ | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | $\frac{i}{6}$ | 0 | 0 | 0 | 0 | $-\frac{i}{24}$ |
| | | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | $-\frac{i}{24}$ | 0 |
| | | 0 | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | $-\frac{1}{24}$ |
| | | $\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | 0 | $-\frac{i}{6}$ | $\frac{1}{24}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $\frac{i}{24}$ | 0 | $\frac{1}{24}$ | $\frac{i}{6}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 | $\frac{i}{24}$ | 0 | $-\frac{1}{24}$ | 0 | 0 | $-\frac{i}{6}$ |
| | | 0 | $\frac{\sqrt{15}}{24}$ | $-\frac{i}{6}$ | 0 | 0 | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ |
| | | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | $\frac{i}{6}$ | 0 | 0 | $-\frac{i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{24}$ | 0 |
| | | 0 | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | $-\frac{i}{6}$ | 0 | 0 | $-\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{24}$ |
| | | $\frac{\sqrt{15}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{i}{6}$ | $\frac{1}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{24}$ | 0 |
| | | 0 | 0 | 0 | $\frac{i}{24}$ | 0 | $\frac{1}{24}$ | $-\frac{i}{6}$ | 0 | 0 | $-\frac{\sqrt{15}i}{24}$ | 0 | $\frac{\sqrt{15}}{24}$ | 0 | 0 |
| | | 0 | 0 | $\frac{i}{24}$ | 0 | $-\frac{1}{24}$ | 0 | 0 | $\frac{i}{6}$ | $-\frac{\sqrt{15}i}{24}$ | 0 | $-\frac{\sqrt{15}}{24}$ | 0 | 0 | 0 |
| 909 | symmetry | $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|-------------------------|---------------------------|---------------------------|
| $\mathbb{G}_5^{(1,0;a)}(A, 1)$ | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | $\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{60}$ | 0 | 0 | $-\frac{\sqrt{15}}{120}$ |
| | | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | $-\frac{i}{4}$ | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{60}$ | $\frac{\sqrt{15}}{120}$ | 0 |
| | | 0 | $-\frac{\sqrt{15}}{30}$ | $-\frac{i}{4}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | $-\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ |
| | | $\frac{\sqrt{15}}{30}$ | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{60}$ | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 |
| | | 0 | 0 | $\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{60}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | $\frac{1}{8}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{60}$ | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | $-\frac{i}{4}$ | $-\frac{1}{8}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}i}{60}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | $-\frac{i}{4}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{60}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{i}{4}$ | 0 | 0 | $-\frac{i}{8}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}}{120}$ | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $\frac{i}{8}$ | 0 | 0 | 0 |
| 910 | symmetry | $\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|------------------------|-------------------------|-------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|------------------------|--------------------------|--------------------------|-------------------------|-------------------------|
| $\mathbb{G}_5^{(1,0;a)}(A, 2)$ | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | $-\frac{\sqrt{5}}{30}$ | $\frac{\sqrt{5}i}{15}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | $\frac{\sqrt{5}}{30}$ | 0 | 0 | $-\frac{\sqrt{5}i}{15}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{8}$ | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | $\frac{\sqrt{5}}{24}$ |
| | | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | $-\frac{\sqrt{5}}{24}$ | 0 |
| | | 0 | $\frac{\sqrt{5}}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{8}$ | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{24}$ |
| | | $-\frac{\sqrt{5}}{30}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{8}$ | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | $-\frac{\sqrt{5}i}{24}$ | 0 |
| | | $-\frac{\sqrt{5}i}{15}$ | 0 | 0 | $-\frac{\sqrt{3}}{8}$ | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | $\frac{\sqrt{5}}{120}$ | 0 | $-\frac{\sqrt{5}i}{120}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{5}i}{15}$ | $\frac{\sqrt{3}}{8}$ | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 | $-\frac{\sqrt{5}}{120}$ | 0 | $-\frac{\sqrt{5}i}{120}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | $-\frac{\sqrt{5}}{120}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{8}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | $\frac{\sqrt{5}}{120}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{8}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{120}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{8}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | $\frac{\sqrt{5}i}{120}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{8}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}}{24}$ | 0 | $\frac{\sqrt{5}i}{24}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}}{8}$ | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{5}}{24}$ | 0 | $\frac{\sqrt{5}i}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{8}$ | 0 | $-\frac{\sqrt{3}i}{8}$ | 0 | 0 | 0 |
| 911 | symmetry | $\frac{y(15x^4 - 40x^2y^2 + 30x^2z^2 + 8y^4 - 40y^2z^2 + 15z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|--------------------------|--------------------------|--------------------------|----------------------------|---------------------------|--------------------------|----------------------------|--------------------------|----------------------------|--------------------------|--------------------------|---------------------------|----------------------------|
| $\mathbb{G}_5^{(1,0;a)}(A, 3)$ | | 0 | 0 | $\frac{\sqrt{21}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{24}$ | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{24}$ | 0 | 0 | $\frac{\sqrt{21}i}{24}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 |
| | | $-\frac{\sqrt{21}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}i}{24}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ |
| | | 0 | $-\frac{\sqrt{21}i}{24}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{21}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 |
| | | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ |
| | | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 |
| | | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 |
| 912 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|
| $\mathbb{G}_5^{(1,0;a)}(A, 4)$ | | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{i}{8}$ | 0 |
| | | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | $-\frac{\sqrt{15}}{15}$ | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | $\frac{\sqrt{15}}{15}$ | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 |
| | | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ |
| | | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | $\frac{\sqrt{15}}{15}$ |
| | | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | $-\frac{\sqrt{15}}{15}$ | 0 |
| | | $\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}}{15}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{i}{8}$ | $-\frac{\sqrt{15}}{15}$ | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $-\frac{\sqrt{15}}{15}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | $\frac{\sqrt{15}}{15}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 913 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|-------------------------|--------------------------|--------------------------|----------------------------|----------------------------|--------------------------|---------------------------|-------------------------|---------------------------|-------------------------|--------------------------|----------------------------|-------------------------|
| $\mathbb{G}_5^{(1,0;a)}(A, 5)$ | | 0 | 0 | $\frac{\sqrt{5}i}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{12}$ | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{12}$ | 0 | 0 | $-\frac{\sqrt{5}i}{12}$ | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 |
| | | $-\frac{\sqrt{5}i}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | $-\frac{\sqrt{5}}{30}$ | 0 | $\frac{\sqrt{5}i}{120}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{5}i}{12}$ | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{5}}{30}$ | 0 | $\frac{\sqrt{5}i}{120}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | $\frac{11\sqrt{5}i}{120}$ | 0 | $\frac{\sqrt{5}}{15}$ | $\frac{11\sqrt{5}i}{120}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | $\frac{11\sqrt{5}i}{120}$ | 0 | $-\frac{\sqrt{5}}{15}$ | 0 | 0 | $-\frac{11\sqrt{5}i}{120}$ | 0 |
| | | 0 | $\frac{\sqrt{5}i}{12}$ | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{120}$ | 0 | 0 | $-\frac{\sqrt{5}}{30}$ | 0 |
| | | $\frac{\sqrt{5}i}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{120}$ | $\frac{\sqrt{5}}{30}$ | 0 |
| | | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $\frac{\sqrt{5}}{30}$ | 0 | $-\frac{11\sqrt{5}i}{120}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{3}i}{12}$ | $-\frac{\sqrt{5}}{30}$ | 0 | $-\frac{11\sqrt{5}i}{120}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{120}$ | 0 | $-\frac{\sqrt{5}}{15}$ | $-\frac{\sqrt{5}i}{120}$ | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{120}$ | 0 | $\frac{\sqrt{5}}{15}$ | 0 | 0 | $\frac{\sqrt{5}i}{120}$ | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ |
| | | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $-\frac{11\sqrt{5}i}{120}$ | 0 | 0 | $\frac{\sqrt{5}}{30}$ | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | $\frac{11\sqrt{5}i}{120}$ | $-\frac{\sqrt{5}}{30}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 |
| 914 | symmetry | $\frac{x(8x^4 - 40x^2y^2 - 40x^2z^2 + 15y^4 + 30y^2z^2 + 15z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|-------------------------------|-----------|--|-------------------------|---------------------------|----------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---|---------------------------|----------------------------|---------------------------|
| $\mathbb{G}_5^{(1,0;a)}(B,1)$ | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{24}$ | 0 | 0 | $\frac{\sqrt{21}}{24}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $-\frac{\sqrt{35}}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{24}$ | $-\frac{\sqrt{21}}{24}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | $\frac{\sqrt{35}}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | $-\frac{5\sqrt{21}i}{168}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | $\frac{5\sqrt{21}i}{168}$ |
| | | $-\frac{\sqrt{21}i}{24}$ | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{21}i}{24}$ | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{24}$ | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{21}}{24}$ | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ | $-\frac{\sqrt{21}i}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ | $\frac{\sqrt{35}i}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | $-\frac{\sqrt{35}i}{28}$ |
| | | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}i}{56}$ | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{56}$ | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | 0 | 0 | 0 |
| 915 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|--------------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------------------------|----------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|--------------------------|
| $\mathbb{G}_5^{(1,0;a)}(B, 2)$ | | 0 | 0 | 0 | $\frac{\sqrt{21}}{24}$ | 0 | $\frac{\sqrt{21}i}{24}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{24}$ | 0 | $\frac{\sqrt{21}i}{24}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{21}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ |
| | | $\frac{\sqrt{21}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}i}{84}$ | 0 |
| | | 0 | $-\frac{\sqrt{21}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{84}$ |
| | | $-\frac{\sqrt{21}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ |
| | | $\frac{\sqrt{35}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{28}$ | 0 |
| | | 0 | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{28}$ |
| | | $\frac{\sqrt{35}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{28}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | $\frac{\sqrt{35}}{28}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}i}{84}$ | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{28}$ | 0 | $-\frac{\sqrt{35}}{28}$ | 0 | 0 | 0 |
| 916 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|---|---------------------------|-------------------------|--------------------------|---------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| $\mathbb{G}_5^{(1,0;a)}(B,3)$ | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $-\frac{1}{8}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{120}$ | $\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | 0 | $-\frac{i}{8}$ | $\frac{1}{8}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{40}$ | $-\frac{\sqrt{15}i}{40}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{40}$ |
| | | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{30}$ | 0 | $\frac{\sqrt{15}i}{15}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15}i}{120}$ | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | $\frac{\sqrt{15}i}{15}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{120}$ | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{15}$ |
| | | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | $-\frac{\sqrt{15}i}{15}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}}{30}$ | $\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}}{30}$ | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{15}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{i}{8}$ | $\frac{\sqrt{15}}{40}$ | 0 | $-\frac{\sqrt{15}i}{15}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{1}{8}$ | $\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{15}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{1}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | $\frac{\sqrt{15}i}{15}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 917 | symmetry | $\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|---|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| $\mathbb{G}_5^{(1,0;a)}(B,4)$ | | 0 | 0 | 0 | $-\frac{\sqrt{15}}{120}$ | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{15}}{120}$ | 0 | $-\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | $-\frac{i}{8}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | $\frac{\sqrt{15}i}{15}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{30}$ |
| | | $-\frac{\sqrt{15}}{120}$ | 0 | 0 | 0 | 0 | 0 | $\frac{i}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{15}$ | 0 | 0 | $\frac{\sqrt{15}i}{30}$ | 0 |
| | | 0 | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | 0 | 0 | $\frac{1}{8}$ | 0 | 0 | $-\frac{\sqrt{15}i}{15}$ | 0 | 0 | $-\frac{\sqrt{15}}{30}$ |
| | | $\frac{\sqrt{15}i}{120}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15}i}{15}$ | $\frac{\sqrt{15}}{30}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{i}{8}$ | 0 | $-\frac{1}{8}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $-\frac{\sqrt{15}}{40}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{i}{8}$ | 0 | $\frac{1}{8}$ | 0 | 0 | 0 | $\frac{\sqrt{15}i}{40}$ | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{1}{8}$ | $-\frac{\sqrt{15}i}{15}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{1}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{15}$ | 0 | 0 | $-\frac{\sqrt{15}i}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{i}{8}$ | 0 | 0 | $\frac{\sqrt{15}i}{15}$ | 0 | 0 | $\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{i}{8}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{15}$ | $-\frac{\sqrt{15}}{40}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | $\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{15}i}{30}$ | 0 | $-\frac{\sqrt{15}}{30}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 918 | symmetry | $\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|-------------------------|----------------------------|---------------------------|-------------------------|-------------------------|--------------------------|-------------------------|-------------------------|--------------------------|---------------------------|--------------------------|---------------------------|----------------------------|
| $\mathbb{G}_5^{(1,0;a)}(B, 5)$ | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{12}$ | 0 | 0 | $\frac{\sqrt{5}}{12}$ | 0 | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | $-\frac{\sqrt{3}}{12}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{12}$ | $-\frac{\sqrt{5}}{12}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{12}$ | $\frac{\sqrt{3}}{12}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | $\frac{\sqrt{5}i}{15}$ | 0 | $\frac{11\sqrt{5}}{120}$ | $\frac{11\sqrt{5}i}{120}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | $\frac{\sqrt{5}i}{15}$ | 0 | $-\frac{11\sqrt{5}}{120}$ | 0 | 0 | $-\frac{11\sqrt{5}i}{120}$ |
| | | $\frac{\sqrt{5}i}{12}$ | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}}{120}$ | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{5}i}{12}$ | $-\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}}{120}$ | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{5}}{12}$ | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{120}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ |
| | | $\frac{\sqrt{5}}{12}$ | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{120}$ | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{15}$ | 0 | $-\frac{\sqrt{5}}{120}$ | $-\frac{\sqrt{5}i}{120}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ | $-\frac{\sqrt{3}i}{24}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{15}$ | 0 | $\frac{\sqrt{5}}{120}$ | 0 | 0 | $\frac{\sqrt{5}i}{120}$ | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 | $\frac{\sqrt{3}i}{24}$ |
| | | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $-\frac{11\sqrt{5}}{120}$ | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{3}i}{12}$ | $\frac{11\sqrt{5}}{120}$ | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{3}}{12}$ | $-\frac{11\sqrt{5}i}{120}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | $\frac{11\sqrt{5}i}{120}$ | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | 0 | 0 | 0 |
| 919 | symmetry | $-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|--|-------------------------|--------------------------|--------------------------|------------------------|-------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|--------------------------|-------------------------|-------------------------|
| $\mathbb{G}_5^{(1,0;a)}(B,6)$ | | 0 | 0 | 0 | $-\frac{\sqrt{5}}{12}$ | 0 | $\frac{\sqrt{5}i}{12}$ | 0 | 0 | 0 | $-\frac{\sqrt{3}}{12}$ | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{5}}{12}$ | 0 | $\frac{\sqrt{5}i}{12}$ | 0 | 0 | 0 | $\frac{\sqrt{3}}{12}$ | 0 | $-\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{5}}{12}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{120}$ |
| | | $-\frac{\sqrt{5}}{12}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | $\frac{\sqrt{5}i}{120}$ | 0 |
| | | 0 | $-\frac{\sqrt{5}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | $\frac{\sqrt{5}}{120}$ |
| | | $-\frac{\sqrt{5}i}{12}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | $-\frac{\sqrt{5}}{120}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | $\frac{11\sqrt{5}i}{120}$ | 0 | $\frac{11\sqrt{5}}{120}$ | $\frac{\sqrt{5}i}{15}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 | $\frac{11\sqrt{5}i}{120}$ | 0 | $-\frac{11\sqrt{5}}{120}$ | 0 | 0 | $-\frac{\sqrt{5}i}{15}$ |
| | | 0 | $\frac{\sqrt{3}}{12}$ | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{5}i}{120}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ |
| | | $-\frac{\sqrt{3}}{12}$ | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | 0 | 0 | $-\frac{11\sqrt{5}i}{120}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{24}$ | 0 |
| | | 0 | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | $\frac{\sqrt{5}i}{30}$ | 0 | 0 | $-\frac{11\sqrt{5}}{120}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}}{24}$ |
| | | $\frac{\sqrt{3}i}{12}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{30}$ | $\frac{11\sqrt{5}}{120}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}}{24}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{5}i}{120}$ | 0 | $-\frac{\sqrt{5}}{120}$ | $-\frac{\sqrt{5}i}{15}$ | 0 | 0 | $\frac{\sqrt{3}i}{24}$ | 0 | $-\frac{\sqrt{3}}{24}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{5}i}{120}$ | 0 | $\frac{\sqrt{5}}{120}$ | 0 | 0 | $\frac{\sqrt{5}i}{15}$ | $\frac{\sqrt{3}i}{24}$ | 0 | $\frac{\sqrt{3}}{24}$ | 0 | 0 | 0 |
| 920 | symmetry | $-\frac{x^2}{2} - \frac{y^2}{2} + z^2$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--------------------------------|---------------------------|----------------------------|---------------------------|---------------------------|---------------------------|----------------------------|-------------------------|---------------------------|----------------------------|--------------------------|--------------------------|----------------------------|---------------------------|
| $\mathbb{T}_2^{(1,0;a)}(A, 1)$ | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{42}$ | 0 | $-\frac{\sqrt{105}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{42}$ | 0 | $\frac{\sqrt{105}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ |
| | | $-\frac{\sqrt{105}}{42}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ |
| | | $\frac{\sqrt{105}i}{42}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{168}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 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 | $\frac{\sqrt{105}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{7}i}{56}$ | 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 | $\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{56}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | $-\frac{5\sqrt{7}i}{56}$ | 0 | $-\frac{5\sqrt{7}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{168}$ | 0 | $-\frac{\sqrt{105}}{168}$ | 0 | 0 | 0 | $\frac{5\sqrt{7}i}{56}$ | 0 | $-\frac{5\sqrt{7}}{56}$ | 0 | 0 | 0 |
| 921 | symmetry | $\frac{\sqrt{3}(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--------------------------|-------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---------------------------|---------------------------|----------------------------|---------------------------|---------------------------|---------------------------|----------------------------|---------------------------|
| $\mathbb{T}_2^{(1,0;a)}(A, 2)$ | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{35}}{21}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{21}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{84}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}i}{168}$ |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | $\frac{\sqrt{35}i}{168}$ | 0 |
| | | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{168}$ |
| | | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{84}$ | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 |
| | | $\frac{\sqrt{35}}{21}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{168}$ | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}}{21}$ | $-\frac{\sqrt{21}i}{168}$ | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}i}{168}$ | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | $\frac{\sqrt{35}i}{168}$ | 0 | 0 | $\frac{5\sqrt{21}}{84}$ | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{84}$ | $-\frac{\sqrt{35}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{84}$ | $-\frac{5\sqrt{21}i}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{168}$ | $\frac{5\sqrt{21}}{84}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{84}$ | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | $-\frac{5\sqrt{21}}{84}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{168}$ | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{168}$ | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 |
| 922 | symmetry | $\sqrt{3}xz$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|---------------------------|
| $\mathbb{T}_2^{(1,0;a)}(A, 3)$ | | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}i}{21}$ | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{21}i}{21}$ | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | $\frac{\sqrt{35}i}{21}$ | $\frac{\sqrt{35}}{168}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | $\frac{\sqrt{35}}{168}$ | 0 | $-\frac{\sqrt{35}i}{21}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}}{168}$ |
| | | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{21}$ | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21}}{168}$ | $\frac{\sqrt{21}i}{21}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{168}$ | $\frac{\sqrt{35}i}{42}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | $\frac{\sqrt{35}i}{21}$ | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | $-\frac{\sqrt{35}i}{21}$ | 0 | 0 | $\frac{\sqrt{35}}{168}$ | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | $\frac{\sqrt{35}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 |
| 923 | symmetry | $\sqrt{3}yz$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|--------------------------|
| $\mathbb{T}_2^{(1,0;a)}(B, 1)$ | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{35i}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{35i}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{21i}}{168}$ | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}}{21}$ | 0 | $-\frac{\sqrt{35i}}{168}$ | $\frac{\sqrt{35}}{168}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{21i}}{168}$ | 0 | 0 | $\frac{\sqrt{21}}{168}$ | $-\frac{\sqrt{35}}{21}$ | 0 | $\frac{\sqrt{35i}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}}{168}$ |
| | | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21i}}{168}$ | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | $\frac{\sqrt{35i}}{168}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{21i}}{168}$ | 0 | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | $-\frac{\sqrt{35i}}{168}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{35i}}{42}$ | $-\frac{\sqrt{21}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ |
| | | $\frac{\sqrt{35i}}{42}$ | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{21}$ | 0 | $\frac{\sqrt{35i}}{168}$ | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21i}}{168}$ | $-\frac{5\sqrt{21}}{168}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}}{21}$ | 0 | $-\frac{\sqrt{35i}}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | $\frac{5\sqrt{21i}}{168}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35i}}{168}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | $-\frac{5\sqrt{21i}}{168}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35i}}{168}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | $\frac{5\sqrt{21i}}{168}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | $-\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | |
|-----|----------|--------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 924 | symmetry | $\sqrt{3}xy$ | | | | | | | | | | | | | |
|-----|----------|--------------|--|--|--|--|--|--|--|--|--|--|--|--|--|

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|-------------------------|--------------------------|--------------------------|---------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|----------------------------|---------------------------|----------------------------|---------------------------|
| $\mathbb{T}_2^{(1,0;a)}(B, 2)$ | | 0 | 0 | 0 | $\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}i}{42}$ | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{35}i}{42}$ | $\frac{\sqrt{21}}{21}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{168}$ | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{168}$ |
| | | $-\frac{\sqrt{35}i}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 |
| | | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{21}}{21}$ | 0 | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}i}{168}$ |
| | | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{21}}{21}$ | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | $-\frac{\sqrt{35}i}{168}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | $-\frac{\sqrt{35}i}{168}$ | $-\frac{\sqrt{35}}{21}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{21}}{168}$ | 0 | $-\frac{\sqrt{21}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | $\frac{\sqrt{35}i}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{21}$ |
| | | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}}{168}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | 0 | 0 | $\frac{\sqrt{35}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{35}}{42}$ | 0 | 0 | $-\frac{\sqrt{35}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{21}i}{168}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{35}}{42}$ | $\frac{\sqrt{35}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | $\frac{\sqrt{35}i}{168}$ | $-\frac{\sqrt{35}}{21}$ | 0 | 0 | $\frac{5\sqrt{21}}{168}$ | 0 | $\frac{5\sqrt{21}i}{168}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{35}}{168}$ | 0 | $-\frac{\sqrt{35}i}{168}$ | 0 | 0 | $\frac{\sqrt{35}}{21}$ | $\frac{5\sqrt{21}}{168}$ | 0 | $-\frac{5\sqrt{21}i}{168}$ | 0 | 0 | 0 |
| 925 | symmetry | $\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|--------------------------|-------------------------|--------------------------|------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|
| $\mathbb{T}_4^{(1,0;a)}(A, 1)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{66}$ | 0 | $\frac{\sqrt{165}i}{66}$ | $-\frac{\sqrt{165}}{66}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{66}$ | 0 | $-\frac{\sqrt{165}i}{66}$ | 0 | 0 | $\frac{\sqrt{165}}{66}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{22}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{22}$ | $\frac{\sqrt{11}i}{22}$ | $\frac{\sqrt{11}}{22}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{22}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | $\frac{\sqrt{11}}{22}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{22}$ | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}i}{22}$ | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{165}}{66}$ | 0 | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | $-\frac{\sqrt{11}i}{22}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{165}}{66}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{22}$ | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{165}i}{66}$ | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{165}i}{66}$ | 0 | 0 | $-\frac{\sqrt{11}}{22}$ | 0 | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{165}}{66}$ | 0 | 0 | $-\frac{\sqrt{11}i}{22}$ | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{165}}{66}$ | $\frac{\sqrt{11}i}{22}$ | 0 | $\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 926 | symmetry | $-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|------------------------------|--|------------------------------|-------------------------------|------------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|---------------------------|------------------------------|-------------------------------|--|
| $\mathbb{T}_4^{(1,0;a)}(A, 2)$ | 0 | 0 | 0 | $\frac{3\sqrt{385}}{1540}$ | 0 | $\frac{3\sqrt{385}i}{1540}$ | 0 | 0 | 0 | $-\frac{\sqrt{231}}{132}$ | 0 | $\frac{\sqrt{231}i}{132}$ | $\frac{\sqrt{231}}{66}$ | 0 | |
| | 0 | 0 | $\frac{3\sqrt{385}}{1540}$ | 0 | $-\frac{3\sqrt{385}i}{1540}$ | 0 | 0 | 0 | $-\frac{\sqrt{231}}{132}$ | 0 | $-\frac{\sqrt{231}i}{132}$ | 0 | 0 | $-\frac{\sqrt{231}}{66}$ | |
| | 0 | $\frac{3\sqrt{385}}{1540}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{231}i}{308}$ | 0 | 0 | $-\frac{\sqrt{385}}{110}$ | 0 | 0 | $-\frac{13\sqrt{385}i}{1540}$ | |
| | $\frac{3\sqrt{385}}{1540}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{231}i}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{110}$ | $\frac{13\sqrt{385}i}{1540}$ | 0 | |
| | 0 | $\frac{3\sqrt{385}i}{1540}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{231}}{308}$ | $-\frac{\sqrt{385}}{110}$ | 0 | 0 | 0 | 0 | $\frac{13\sqrt{385}}{1540}$ | |
| | $-\frac{3\sqrt{385}i}{1540}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{231}}{308}$ | 0 | 0 | $\frac{\sqrt{385}}{110}$ | 0 | 0 | $\frac{13\sqrt{385}}{1540}$ | 0 | |
| | 0 | 0 | 0 | $-\frac{3\sqrt{231}i}{308}$ | 0 | $-\frac{3\sqrt{231}}{308}$ | 0 | 0 | 0 | $-\frac{\sqrt{385}i}{1540}$ | 0 | $\frac{\sqrt{385}}{1540}$ | 0 | 0 | |
| | 0 | 0 | $\frac{3\sqrt{231}i}{308}$ | 0 | $-\frac{3\sqrt{231}}{308}$ | 0 | 0 | 0 | $\frac{\sqrt{385}i}{1540}$ | 0 | $\frac{\sqrt{385}}{1540}$ | 0 | 0 | 0 | |
| | 0 | $-\frac{\sqrt{231}}{132}$ | 0 | 0 | $-\frac{\sqrt{385}}{110}$ | 0 | 0 | $-\frac{\sqrt{385}i}{1540}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}i}{308}$ | |
| | $-\frac{\sqrt{231}}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{110}$ | $\frac{\sqrt{385}i}{1540}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{231}i}{308}$ | 0 | |
| | 0 | $\frac{\sqrt{231}i}{132}$ | $-\frac{\sqrt{385}}{110}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{1540}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{308}$ | |
| | $-\frac{\sqrt{231}i}{132}$ | 0 | 0 | $\frac{\sqrt{385}}{110}$ | 0 | 0 | $\frac{\sqrt{385}}{1540}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{308}$ | 0 | |
| | $\frac{\sqrt{231}}{66}$ | 0 | 0 | $-\frac{13\sqrt{385}i}{1540}$ | 0 | $\frac{13\sqrt{385}}{1540}$ | 0 | 0 | 0 | $-\frac{\sqrt{231}i}{308}$ | 0 | $-\frac{\sqrt{231}}{308}$ | 0 | 0 | |
| | 0 | $-\frac{\sqrt{231}}{66}$ | $\frac{13\sqrt{385}i}{1540}$ | 0 | $\frac{13\sqrt{385}}{1540}$ | 0 | 0 | 0 | $\frac{\sqrt{231}i}{308}$ | 0 | $-\frac{\sqrt{231}}{308}$ | 0 | 0 | 0 | |
| 927 | symmetry | $\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|------------------------------------|------------------------------|----------------------------|-----------------------------|-----------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|-----------------------------|-----------------------------|
| $\mathbb{T}_4^{(1,0;a)}(A, 3)$ | | 0 | 0 | 0 | $\frac{\sqrt{1155}}{1540}$ | 0 | $-\frac{\sqrt{1155i}}{1540}$ | $-\frac{\sqrt{1155}}{770}$ | 0 | 0 | $\frac{\sqrt{77}}{44}$ | 0 | $\frac{\sqrt{77i}}{44}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{1155}}{1540}$ | 0 | $\frac{\sqrt{1155i}}{1540}$ | 0 | 0 | $\frac{\sqrt{1155}}{770}$ | $\frac{\sqrt{77}}{44}$ | 0 | $-\frac{\sqrt{77i}}{44}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{1155}}{1540}$ | 0 | 0 | $\frac{3\sqrt{77}}{154}$ | 0 | 0 | $\frac{3\sqrt{77i}}{308}$ | 0 | 0 | $-\frac{\sqrt{1155}}{385}$ | 0 | 0 | $-\frac{\sqrt{1155i}}{308}$ |
| | | $\frac{\sqrt{1155}}{1540}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{77}}{154}$ | $-\frac{3\sqrt{77i}}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{385}$ | $\frac{\sqrt{1155i}}{308}$ | 0 |
| | | 0 | $-\frac{\sqrt{1155i}}{1540}$ | $\frac{3\sqrt{77}}{154}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{77}}{308}$ | $\frac{\sqrt{1155}}{385}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{308}$ |
| | | $\frac{\sqrt{1155i}}{1540}$ | 0 | 0 | $-\frac{3\sqrt{77}}{154}$ | 0 | 0 | $-\frac{3\sqrt{77i}}{308}$ | 0 | 0 | $-\frac{\sqrt{1155}}{385}$ | 0 | 0 | $-\frac{\sqrt{1155i}}{308}$ | 0 |
| | | $-\frac{\sqrt{1155}}{770}$ | 0 | 0 | $\frac{3\sqrt{77i}}{308}$ | 0 | $-\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | $-\frac{9\sqrt{1155i}}{1540}$ | 0 | $-\frac{9\sqrt{1155}}{1540}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{1155}}{770}$ | $-\frac{3\sqrt{77i}}{308}$ | 0 | $-\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | $\frac{9\sqrt{1155i}}{1540}$ | 0 | $-\frac{9\sqrt{1155}}{1540}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{77}}{44}$ | 0 | 0 | $\frac{\sqrt{1155}}{385}$ | 0 | 0 | $-\frac{9\sqrt{1155i}}{1540}$ | 0 | 0 | $\frac{\sqrt{77}}{154}$ | 0 | 0 | $\frac{\sqrt{77i}}{308}$ |
| | | $\frac{\sqrt{77}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{385}$ | $\frac{9\sqrt{1155i}}{1540}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{77}}{154}$ | $-\frac{\sqrt{77i}}{308}$ | 0 |
| | | 0 | $\frac{\sqrt{77i}}{44}$ | $-\frac{\sqrt{1155}}{385}$ | 0 | 0 | 0 | 0 | $-\frac{9\sqrt{1155i}}{1540}$ | $\frac{\sqrt{77}}{154}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{77}}{308}$ |
| | | $-\frac{\sqrt{77i}}{44}$ | 0 | 0 | $\frac{\sqrt{1155}}{385}$ | 0 | 0 | $-\frac{9\sqrt{1155i}}{1540}$ | 0 | 0 | $-\frac{\sqrt{77}}{154}$ | 0 | 0 | $-\frac{\sqrt{77i}}{308}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{1155i}}{308}$ | 0 | $-\frac{\sqrt{1155}}{308}$ | 0 | 0 | 0 | $\frac{\sqrt{77i}}{308}$ | 0 | $-\frac{\sqrt{77}}{308}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{1155i}}{308}$ | 0 | $-\frac{\sqrt{1155}}{308}$ | 0 | 0 | 0 | $-\frac{\sqrt{77i}}{308}$ | 0 | $-\frac{\sqrt{77}}{308}$ | 0 | 0 | 0 |
| 928 | symmetry | $-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---------------------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|---------------------------|----------------------------|----------------------------|---------------------------|---------------------------|---------------------------|----------------------------|----------------------------|
| $\mathbb{T}_4^{(1,0;a)}(A, 4)$ | | 0 | $\frac{\sqrt{11}i}{11}$ | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | $\frac{\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{88}$ |
| | | $-\frac{\sqrt{11}i}{11}$ | 0 | 0 | $\frac{\sqrt{165}}{440}$ | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $-\frac{\sqrt{11}}{88}$ | 0 | 0 | $-\frac{\sqrt{11}}{88}$ | 0 |
| | | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $-\frac{3\sqrt{11}i}{44}$ | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 | $\frac{\sqrt{165}i}{220}$ | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{165}}{440}$ | $\frac{3\sqrt{11}i}{44}$ | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{220}$ | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | $\frac{3\sqrt{165}}{440}$ | 0 | 0 | $-\frac{3\sqrt{165}}{440}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | $\frac{3\sqrt{165}}{440}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{165}}{440}$ |
| | | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | $-\frac{3\sqrt{11}i}{44}$ | 0 | 0 | $\frac{\sqrt{165}}{440}$ | 0 | 0 | $-\frac{\sqrt{165}i}{220}$ |
| | | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | $\frac{3\sqrt{11}i}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | $\frac{\sqrt{165}i}{220}$ | 0 |
| | | $\frac{\sqrt{11}}{88}$ | 0 | 0 | $\frac{\sqrt{165}i}{220}$ | 0 | $\frac{3\sqrt{165}}{440}$ | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{44}$ | 0 | $\frac{\sqrt{11}}{88}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}}{88}$ | $-\frac{\sqrt{165}i}{220}$ | 0 | $\frac{3\sqrt{165}}{440}$ | 0 | 0 | 0 | $-\frac{3\sqrt{11}i}{44}$ | 0 | $\frac{\sqrt{11}}{88}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $\frac{\sqrt{165}}{440}$ | 0 | 0 | $\frac{\sqrt{11}}{88}$ | 0 | $-\frac{\sqrt{11}i}{11}$ | $\frac{\sqrt{11}}{88}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | $\frac{\sqrt{11}}{88}$ | 0 | $\frac{\sqrt{11}i}{11}$ | 0 | 0 | $-\frac{\sqrt{11}}{88}$ |
| | | 0 | $-\frac{\sqrt{11}}{88}$ | 0 | 0 | $-\frac{3\sqrt{165}}{440}$ | 0 | 0 | $-\frac{\sqrt{165}i}{220}$ | 0 | 0 | $\frac{\sqrt{11}}{88}$ | 0 | 0 | $\frac{3\sqrt{11}i}{44}$ |
| | | $-\frac{\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{165}}{440}$ | $\frac{\sqrt{165}i}{220}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{88}$ | $-\frac{3\sqrt{11}i}{44}$ | 0 |
| 929 | symmetry | $-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-----------------------------------|---------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|
| $\mathbb{T}_4^{(1,0;a)}(A, 5)$ | | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | $-\frac{\sqrt{77}}{88}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{77}}{88}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | $\frac{\sqrt{77}}{88}$ | 0 | 0 | $-\frac{\sqrt{77}}{88}$ | 0 |
| | | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{3\sqrt{77}i}{308}$ | 0 | $-\frac{15\sqrt{77}}{616}$ | 0 | 0 | 0 | $-\frac{\sqrt{1155}i}{1540}$ | 0 | $\frac{17\sqrt{1155}}{3080}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{1155}}{616}$ | $\frac{3\sqrt{77}i}{308}$ | 0 | $-\frac{15\sqrt{77}}{616}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}i}{1540}$ | 0 | $\frac{17\sqrt{1155}}{3080}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{15\sqrt{77}}{616}$ | 0 | 0 | $\frac{15\sqrt{77}}{616}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{3080}$ | 0 | $\frac{\sqrt{1155}i}{770}$ | $-\frac{3\sqrt{1155}}{3080}$ | 0 |
| | | 0 | 0 | $-\frac{15\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{15\sqrt{77}}{616}$ | $-\frac{3\sqrt{1155}}{3080}$ | 0 | $-\frac{\sqrt{1155}i}{770}$ | 0 | 0 | $\frac{3\sqrt{1155}}{3080}$ |
| | | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | $\frac{15\sqrt{77}}{616}$ | 0 | 0 | $\frac{3\sqrt{77}i}{308}$ | 0 | 0 | $\frac{17\sqrt{1155}}{3080}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{1540}$ |
| | | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{15\sqrt{77}}{616}$ | $-\frac{3\sqrt{77}i}{308}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{1155}}{3080}$ | $\frac{\sqrt{1155}i}{1540}$ | 0 |
| | | $-\frac{\sqrt{77}}{88}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{1540}$ | 0 | $-\frac{3\sqrt{1155}}{3080}$ | 0 | 0 | 0 | $\frac{\sqrt{77}i}{44}$ | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{77}}{88}$ | $\frac{\sqrt{1155}i}{1540}$ | 0 | $-\frac{3\sqrt{1155}}{3080}$ | 0 | 0 | 0 | $-\frac{\sqrt{77}i}{44}$ | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{17\sqrt{1155}}{3080}$ | 0 | $\frac{\sqrt{1155}i}{770}$ | $\frac{17\sqrt{1155}}{3080}$ | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | 0 |
| | | 0 | 0 | $\frac{17\sqrt{1155}}{3080}$ | 0 | $-\frac{\sqrt{1155}i}{770}$ | 0 | 0 | $-\frac{17\sqrt{1155}}{3080}$ | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ |
| | | 0 | $-\frac{\sqrt{77}}{88}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{3080}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{1540}$ | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | 0 | 0 | $-\frac{\sqrt{77}i}{44}$ |
| | | $-\frac{\sqrt{77}}{88}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{1155}}{3080}$ | $\frac{\sqrt{1155}i}{1540}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | $\frac{\sqrt{77}i}{44}$ | 0 |
| 930 | symmetry | $\frac{\sqrt{35}yz(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-----------------------------------|---------------------------|-----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|-----------------------------|----------------------------|---------------------------|----------------------------|
| $\mathbb{T}_4^{(1,0;a)}(B, 1)$ | | 0 | $-\frac{\sqrt{11}}{11}$ | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $\frac{\sqrt{165}i}{440}$ | 0 | 0 | $-\frac{\sqrt{11}}{88}$ | 0 | 0 | $-\frac{\sqrt{11}i}{88}$ |
| | | $-\frac{\sqrt{11}}{11}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{440}$ | $-\frac{\sqrt{165}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{88}$ | $\frac{\sqrt{11}i}{88}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{165}i}{440}$ | $\frac{3\sqrt{165}}{440}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | 0 | 0 | $-\frac{3\sqrt{165}i}{440}$ | 0 | 0 | $-\frac{3\sqrt{165}}{440}$ |
| | | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{440}$ | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{165}}{440}$ | $\frac{3\sqrt{11}i}{88}$ | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | $\frac{\sqrt{165}i}{440}$ | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{165}i}{440}$ | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{220}$ |
| | | $-\frac{\sqrt{165}i}{440}$ | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | $\frac{\sqrt{165}}{440}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{440}$ | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $\frac{\sqrt{11}}{11}$ | 0 | $-\frac{\sqrt{11}i}{88}$ | $\frac{\sqrt{11}}{88}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{440}$ | 0 | 0 | $\frac{\sqrt{165}}{440}$ | $\frac{\sqrt{11}}{11}$ | 0 | $\frac{\sqrt{11}i}{88}$ | 0 | 0 | $-\frac{\sqrt{11}}{88}$ |
| | | $-\frac{\sqrt{11}}{88}$ | 0 | 0 | $\frac{3\sqrt{165}i}{440}$ | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{88}$ | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}}{88}$ | $-\frac{3\sqrt{165}i}{440}$ | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | $\frac{\sqrt{11}i}{88}$ | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}i}{88}$ | $\frac{3\sqrt{165}}{440}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | $\frac{\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ |
| | | $\frac{\sqrt{11}i}{88}$ | 0 | 0 | $-\frac{3\sqrt{165}}{440}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | $-\frac{\sqrt{11}}{88}$ | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 |
| 931 | symmetry | $\frac{\sqrt{35}xy(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|---------------------------|
| $\mathbb{T}_4^{(1,0;a)}(B, 2)$ | | $-\frac{\sqrt{11}}{11}$ | 0 | 0 | $\frac{\sqrt{165}i}{440}$ | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 | $\frac{\sqrt{11}i}{88}$ | 0 | $\frac{\sqrt{11}}{88}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}}{11}$ | $-\frac{\sqrt{165}i}{440}$ | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{88}$ | 0 | $\frac{\sqrt{11}}{88}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{165}i}{440}$ | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{440}$ |
| | | $-\frac{\sqrt{165}i}{440}$ | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | $\frac{\sqrt{165}}{440}$ | 0 |
| | | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | $\frac{\sqrt{165}i}{440}$ |
| | | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | $\frac{3\sqrt{11}i}{88}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{220}$ | $-\frac{\sqrt{165}i}{440}$ | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | 0 | 0 | $-\frac{3\sqrt{165}}{440}$ | 0 | $-\frac{3\sqrt{165}i}{440}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | $\frac{3\sqrt{11}i}{88}$ | 0 | 0 | 0 | $-\frac{3\sqrt{165}}{440}$ | 0 | $\frac{3\sqrt{165}i}{440}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}i}{88}$ | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{165}}{440}$ | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{88}$ |
| | | $-\frac{\sqrt{11}i}{88}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | $-\frac{3\sqrt{165}}{440}$ | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | $\frac{\sqrt{11}}{88}$ | 0 |
| | | 0 | $\frac{\sqrt{11}}{88}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | $-\frac{3\sqrt{165}i}{440}$ | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | $-\frac{\sqrt{11}i}{88}$ |
| | | $\frac{\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{220}$ | $\frac{3\sqrt{165}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | $\frac{\sqrt{11}i}{88}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{165}}{440}$ | 0 | $\frac{\sqrt{165}i}{440}$ | 0 | 0 | 0 | $\frac{\sqrt{11}}{88}$ | 0 | $-\frac{\sqrt{11}i}{88}$ | $\frac{\sqrt{11}}{11}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{165}}{440}$ | 0 | $-\frac{\sqrt{165}i}{440}$ | 0 | 0 | 0 | $\frac{\sqrt{11}}{88}$ | 0 | $\frac{\sqrt{11}i}{88}$ | 0 | 0 | $-\frac{\sqrt{11}}{11}$ |
| 932 | symmetry | $\frac{\sqrt{5}yz(6x^2 - y^2 - z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---------------------------------------|----------------------------|-------------------------------|------------------------------|-------------------------------|--------------------------------|------------------------------|-------------------------------|-------------------------------|--------------------------------|-------------------------------|------------------------------|------------------------------|-----------------------------|
| $\mathbb{T}_4^{(1,0;a)}(B, 3)$ | | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}i}{616}$ | 0 | 0 | $-\frac{\sqrt{77}}{88}$ | 0 | 0 | $\frac{\sqrt{77}i}{88}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ | $-\frac{\sqrt{1155}i}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{77}}{88}$ | $-\frac{\sqrt{77}i}{88}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{15\sqrt{77}i}{616}$ | $-\frac{15\sqrt{77}}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}}{770}$ | 0 | $\frac{3\sqrt{1155}i}{3080}$ | $-\frac{3\sqrt{1155}}{3080}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{15\sqrt{77}i}{616}$ | 0 | 0 | $\frac{15\sqrt{77}}{616}$ | $-\frac{\sqrt{1155}}{770}$ | 0 | $-\frac{3\sqrt{1155}i}{3080}$ | 0 | 0 | $\frac{3\sqrt{1155}}{3080}$ |
| | | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{15\sqrt{77}i}{616}$ | 0 | $-\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | $-\frac{17\sqrt{1155}i}{3080}$ | 0 | $\frac{\sqrt{1155}}{1540}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{1155}}{616}$ | $\frac{15\sqrt{77}i}{616}$ | 0 | $-\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | $\frac{17\sqrt{1155}i}{3080}$ | 0 | $\frac{\sqrt{1155}}{1540}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{1155}i}{616}$ | $-\frac{15\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{77}}{308}$ | $\frac{17\sqrt{1155}}{3080}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{1540}$ |
| | | $-\frac{\sqrt{1155}i}{616}$ | 0 | 0 | $\frac{15\sqrt{77}}{616}$ | 0 | 0 | $\frac{3\sqrt{77}}{308}$ | 0 | 0 | $-\frac{17\sqrt{1155}}{3080}$ | 0 | 0 | $\frac{\sqrt{1155}}{1540}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{770}$ | 0 | $-\frac{17\sqrt{1155}i}{3080}$ | $\frac{17\sqrt{1155}}{3080}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{77}i}{616}$ | $-\frac{5\sqrt{77}}{616}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{1155}}{770}$ | 0 | $\frac{17\sqrt{1155}i}{3080}$ | 0 | 0 | $-\frac{17\sqrt{1155}}{3080}$ | 0 | 0 | $\frac{5\sqrt{77}i}{616}$ | 0 | 0 | $\frac{5\sqrt{77}}{616}$ |
| | | $-\frac{\sqrt{77}}{88}$ | 0 | 0 | $\frac{3\sqrt{1155}i}{3080}$ | 0 | $\frac{\sqrt{1155}}{1540}$ | 0 | 0 | 0 | $-\frac{5\sqrt{77}i}{616}$ | 0 | $\frac{\sqrt{77}}{44}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{77}}{88}$ | $-\frac{3\sqrt{1155}i}{3080}$ | 0 | $\frac{\sqrt{1155}}{1540}$ | 0 | 0 | 0 | $\frac{5\sqrt{77}i}{616}$ | 0 | $\frac{\sqrt{77}}{44}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{77}i}{88}$ | $-\frac{3\sqrt{1155}}{3080}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{1540}$ | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{77}}{44}$ |
| | | $-\frac{\sqrt{77}i}{88}$ | 0 | 0 | $\frac{3\sqrt{1155}}{3080}$ | 0 | 0 | $\frac{\sqrt{1155}}{1540}$ | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | 0 | 0 | $-\frac{\sqrt{77}}{44}$ | 0 |
| 933 | symmetry | $-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|-----------------------------|------------------------------|------------------------------|-------------------------------|--------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|------------------------------|-------------------------------|--------------------------------|
| $\mathbb{T}_4^{(1,0;a)}(B, 4)$ | | 0 | 0 | 0 | $-\frac{\sqrt{1155}i}{616}$ | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 | $\frac{\sqrt{77}i}{88}$ | 0 | $-\frac{\sqrt{77}}{88}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{1155}i}{616}$ | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 | $-\frac{\sqrt{77}i}{88}$ | 0 | $-\frac{\sqrt{77}}{88}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{1155}i}{616}$ | $-\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $\frac{15\sqrt{77}}{616}$ | $\frac{\sqrt{1155}}{1540}$ | 0 | 0 | 0 | 0 | $\frac{17\sqrt{1155}}{3080}$ |
| | | $\frac{\sqrt{1155}i}{616}$ | 0 | 0 | $\frac{3\sqrt{77}}{308}$ | 0 | 0 | $\frac{15\sqrt{77}}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}}{1540}$ | 0 | 0 | $\frac{17\sqrt{1155}}{3080}$ | 0 |
| | | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | $\frac{3\sqrt{77}}{308}$ | 0 | 0 | $\frac{15\sqrt{77}i}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{1540}$ | 0 | 0 | $-\frac{17\sqrt{1155}i}{3080}$ |
| | | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{77}}{308}$ | $-\frac{15\sqrt{77}i}{616}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{1540}$ | $\frac{17\sqrt{1155}i}{3080}$ | 0 |
| | | 0 | 0 | 0 | $\frac{15\sqrt{77}}{616}$ | 0 | $\frac{15\sqrt{77}i}{616}$ | 0 | 0 | 0 | $-\frac{3\sqrt{1155}}{3080}$ | 0 | $\frac{3\sqrt{1155}i}{3080}$ | $-\frac{\sqrt{1155}}{770}$ | 0 |
| | | 0 | 0 | $\frac{15\sqrt{77}}{616}$ | 0 | $-\frac{15\sqrt{77}i}{616}$ | 0 | 0 | 0 | $-\frac{3\sqrt{1155}}{3080}$ | 0 | $-\frac{3\sqrt{1155}i}{3080}$ | 0 | 0 | $\frac{\sqrt{1155}}{770}$ |
| | | 0 | $\frac{\sqrt{77}i}{88}$ | $\frac{\sqrt{1155}}{1540}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{1155}}{3080}$ | $\frac{\sqrt{77}}{44}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{77}}{616}$ |
| | | $-\frac{\sqrt{77}i}{88}$ | 0 | 0 | $-\frac{\sqrt{1155}}{1540}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{3080}$ | 0 | 0 | $-\frac{\sqrt{77}}{44}$ | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | 0 |
| | | 0 | $-\frac{\sqrt{77}}{88}$ | 0 | 0 | $\frac{\sqrt{1155}}{1540}$ | 0 | 0 | $\frac{3\sqrt{1155}i}{3080}$ | 0 | 0 | $-\frac{\sqrt{77}}{44}$ | 0 | 0 | $\frac{5\sqrt{77}i}{616}$ |
| | | $-\frac{\sqrt{77}}{88}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{1540}$ | $-\frac{3\sqrt{1155}i}{3080}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{77}}{44}$ | $-\frac{5\sqrt{77}i}{616}$ | 0 |
| | | 0 | 0 | 0 | $\frac{17\sqrt{1155}}{3080}$ | 0 | $-\frac{17\sqrt{1155}i}{3080}$ | $-\frac{\sqrt{1155}}{770}$ | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | 0 | $\frac{5\sqrt{77}i}{616}$ | 0 | 0 |
| | | 0 | 0 | $\frac{17\sqrt{1155}}{3080}$ | 0 | $\frac{17\sqrt{1155}i}{3080}$ | 0 | 0 | $\frac{\sqrt{1155}}{770}$ | $\frac{5\sqrt{77}}{616}$ | 0 | $-\frac{5\sqrt{77}i}{616}$ | 0 | 0 | 0 |
| 934 | symmetry | $\frac{\sqrt{2}(2x^6-15x^4y^2-15x^4z^2-15x^2y^4+180x^2y^2z^2-15x^2z^4+2y^6-15y^4z^2-15y^2z^4+2z^6)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-------------------------|--------------------------|--|----------------------------|--------------------------|---------------------------|---------------------------|----------------------------|---------------------------|----------------------------|--------------------------|---------------------------|---------------------------|----------------------------|---|
| $\mathbb{T}_6^{(1,0;a)}(A,1)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}}{22}$ | 0 | $-\frac{\sqrt{22}i}{22}$ | $\frac{\sqrt{22}}{22}$ | 0 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{22}}{22}$ | 0 | $\frac{\sqrt{22}i}{22}$ | 0 | 0 | $-\frac{\sqrt{22}}{22}$ | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | $\frac{\sqrt{330}i}{132}$ | 0 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{132}$ | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}i}{132}$ | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | |
| | 0 | $\frac{\sqrt{22}}{22}$ | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | $\frac{\sqrt{22}}{22}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | $\frac{\sqrt{330}i}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 0 | $-\frac{\sqrt{22}i}{22}$ | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | |
| | $\frac{\sqrt{22}i}{22}$ | 0 | 0 | $-\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | |
| | $\frac{\sqrt{22}}{22}$ | 0 | 0 | $-\frac{\sqrt{330}i}{132}$ | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 0 | $-\frac{\sqrt{22}}{22}$ | $\frac{\sqrt{330}i}{132}$ | 0 | $\frac{\sqrt{330}}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 935 | symmetry | $-\frac{\sqrt{2310}(x-y)(x+y)(x-z)(x+z)(y-z)(y+z)}{8}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|--------------------------|--------------------------|---------------------------|-------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|
| $\mathbb{T}_6^{(1,0;a)}(A, 2)$ | | 0 | 0 | 0 | $\frac{\sqrt{14}}{42}$ | 0 | $-\frac{\sqrt{14}i}{42}$ | $\frac{\sqrt{14}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{14}}{42}$ | 0 | $\frac{\sqrt{14}i}{42}$ | 0 | 0 | $-\frac{\sqrt{14}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{14}}{42}$ | 0 | 0 | $\frac{\sqrt{210}}{84}$ | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ | 0 | 0 | $\frac{\sqrt{14}}{42}$ | 0 | 0 | $\frac{\sqrt{14}i}{42}$ |
| | | $\frac{\sqrt{14}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{84}$ | $\frac{\sqrt{210}i}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{42}$ | $-\frac{\sqrt{14}i}{42}$ | 0 |
| | | 0 | $-\frac{\sqrt{14}i}{42}$ | $\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{84}$ | $-\frac{\sqrt{14}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{42}$ |
| | | $\frac{\sqrt{14}i}{42}$ | 0 | 0 | $-\frac{\sqrt{210}}{84}$ | 0 | 0 | $\frac{\sqrt{210}i}{84}$ | 0 | 0 | $\frac{\sqrt{14}}{42}$ | 0 | 0 | $\frac{\sqrt{14}}{42}$ | 0 |
| | | $\frac{\sqrt{14}}{42}$ | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ | 0 | $\frac{\sqrt{210}}{84}$ | 0 | 0 | $-\frac{\sqrt{14}i}{42}$ | 0 | $-\frac{\sqrt{14}}{42}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{14}}{42}$ | $\frac{\sqrt{210}i}{84}$ | 0 | $\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 | $\frac{\sqrt{14}i}{42}$ | 0 | $-\frac{\sqrt{14}}{42}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{42}$ | 0 | 0 | $-\frac{\sqrt{14}i}{42}$ | 0 | 0 | $-\frac{\sqrt{210}}{84}$ | 0 | 0 | $\frac{\sqrt{210}i}{84}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{42}$ | $\frac{\sqrt{14}i}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}}{84}$ | $-\frac{\sqrt{210}i}{84}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{14}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}}{42}$ | $-\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}}{84}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{14}}{42}$ | 0 | 0 | $-\frac{\sqrt{14}}{42}$ | 0 | 0 | $\frac{\sqrt{210}}{84}$ | 0 | 0 | $-\frac{\sqrt{210}}{84}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{14}i}{42}$ | 0 | $\frac{\sqrt{14}}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{210}i}{84}$ | 0 | $-\frac{\sqrt{210}}{84}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{14}i}{42}$ | 0 | $\frac{\sqrt{14}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{84}$ | 0 | $-\frac{\sqrt{210}}{84}$ | 0 | 0 | 0 |
| 936 | symmetry | $-\frac{\sqrt{14}(x^6-15x^4z^2+15x^2z^4+y^6-15y^4z^2+15y^2z^4-2z^6)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|-------------------------------|-----------------------------|---|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|
| $\mathbb{T}_6^{(1,0;a)}(A,3)$ | 0 | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | $\frac{\sqrt{2310i}}{924}$ | 0 | 0 | 0 | $\frac{\sqrt{154}}{308}$ | 0 | $-\frac{\sqrt{154i}}{308}$ | $-\frac{\sqrt{154}}{154}$ | 0 |
| | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | $-\frac{\sqrt{2310i}}{924}$ | 0 | 0 | 0 | $\frac{\sqrt{154}}{308}$ | 0 | $\frac{\sqrt{154i}}{308}$ | 0 | 0 | $\frac{\sqrt{154}}{154}$ |
| | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{154i}}{308}$ | 0 | 0 | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | $\frac{\sqrt{2310i}}{308}$ |
| | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{154i}}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | $-\frac{\sqrt{2310i}}{308}$ | 0 |
| | 0 | $\frac{\sqrt{2310i}}{924}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{154}}{308}$ | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2310}}{308}$ |
| | $-\frac{\sqrt{2310i}}{924}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{154}}{308}$ | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | $-\frac{\sqrt{2310}}{308}$ | 0 |
| | 0 | 0 | 0 | $-\frac{5\sqrt{154i}}{308}$ | 0 | $-\frac{5\sqrt{154}}{308}$ | 0 | 0 | 0 | $-\frac{\sqrt{2310i}}{231}$ | 0 | $\frac{\sqrt{2310}}{231}$ | 0 | 0 |
| | 0 | 0 | $\frac{5\sqrt{154i}}{308}$ | 0 | $-\frac{5\sqrt{154}}{308}$ | 0 | 0 | 0 | $\frac{\sqrt{2310i}}{231}$ | 0 | $\frac{\sqrt{2310}}{231}$ | 0 | 0 | 0 |
| | 0 | $\frac{\sqrt{154}}{308}$ | 0 | 0 | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | $-\frac{\sqrt{2310i}}{231}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{154i}}{154}$ |
| | $\frac{\sqrt{154}}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | $\frac{\sqrt{2310i}}{231}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{154i}}{154}$ | 0 |
| | 0 | $-\frac{\sqrt{154i}}{308}$ | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}}{231}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{154}}{154}$ |
| | $\frac{\sqrt{154i}}{308}$ | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | $\frac{\sqrt{2310i}}{231}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{154}}{154}$ | 0 |
| | $-\frac{\sqrt{154}}{154}$ | 0 | 0 | $\frac{\sqrt{2310i}}{308}$ | 0 | $-\frac{\sqrt{2310}}{308}$ | 0 | 0 | 0 | $\frac{\sqrt{154i}}{154}$ | 0 | $\frac{\sqrt{154}}{154}$ | 0 | 0 |
| | 0 | $\frac{\sqrt{154}}{154}$ | $-\frac{\sqrt{2310i}}{308}$ | 0 | $-\frac{\sqrt{2310}}{308}$ | 0 | 0 | 0 | $-\frac{\sqrt{154i}}{154}$ | 0 | $\frac{\sqrt{154}}{154}$ | 0 | 0 | 0 |
| 937 | symmetry | $\frac{\sqrt{42}(x-y)(x+y)(x^4-9x^2y^2-5x^2z^2+y^4-5y^2z^2+5z^4)}{8}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|---------------------------|--|-----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|--|
| $\mathbb{T}_6^{(1,0;a)}(A,4)$ | 0 | 0 | 0 | $\frac{\sqrt{770}}{924}$ | 0 | $-\frac{\sqrt{770}i}{924}$ | $-\frac{\sqrt{770}}{462}$ | 0 | 0 | $-\frac{\sqrt{462}}{308}$ | 0 | $-\frac{\sqrt{462}i}{308}$ | 0 | 0 | |
| | 0 | 0 | $\frac{\sqrt{770}}{924}$ | 0 | $\frac{\sqrt{770}i}{924}$ | 0 | 0 | $\frac{\sqrt{770}}{462}$ | $-\frac{\sqrt{462}}{308}$ | 0 | $\frac{\sqrt{462}i}{308}$ | 0 | 0 | 0 | |
| | 0 | $\frac{\sqrt{770}}{924}$ | 0 | 0 | $\frac{5\sqrt{462}}{462}$ | 0 | 0 | $\frac{5\sqrt{462}i}{924}$ | 0 | 0 | $\frac{\sqrt{770}}{132}$ | 0 | 0 | $-\frac{5\sqrt{770}i}{924}$ | |
| | $\frac{\sqrt{770}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{462}}{462}$ | $-\frac{5\sqrt{462}i}{924}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{770}}{132}$ | $\frac{5\sqrt{770}i}{924}$ | 0 | |
| | 0 | $-\frac{\sqrt{770}i}{924}$ | $\frac{5\sqrt{462}}{462}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{462}}{924}$ | $-\frac{\sqrt{770}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{770}}{924}$ | |
| | $\frac{\sqrt{770}i}{924}$ | 0 | 0 | $-\frac{5\sqrt{462}}{462}$ | 0 | 0 | $-\frac{5\sqrt{462}i}{924}$ | 0 | 0 | $\frac{\sqrt{770}}{132}$ | 0 | 0 | $-\frac{5\sqrt{770}}{924}$ | 0 | |
| | $-\frac{\sqrt{770}}{462}$ | 0 | 0 | $\frac{5\sqrt{462}i}{924}$ | 0 | $-\frac{5\sqrt{462}}{924}$ | 0 | 0 | 0 | $\frac{\sqrt{770}i}{462}$ | 0 | $\frac{\sqrt{770}}{462}$ | 0 | 0 | |
| | 0 | $\frac{\sqrt{770}}{462}$ | $-\frac{5\sqrt{462}i}{924}$ | 0 | $-\frac{5\sqrt{462}}{924}$ | 0 | 0 | 0 | $-\frac{\sqrt{770}i}{462}$ | 0 | $\frac{\sqrt{770}}{462}$ | 0 | 0 | 0 | |
| | 0 | $-\frac{\sqrt{462}}{308}$ | 0 | 0 | $-\frac{\sqrt{770}}{132}$ | 0 | 0 | $\frac{\sqrt{770}i}{462}$ | 0 | 0 | $-\frac{\sqrt{462}i}{231}$ | 0 | 0 | $-\frac{\sqrt{462}i}{462}$ | |
| | $-\frac{\sqrt{462}}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}}{132}$ | $-\frac{\sqrt{770}i}{462}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}}{231}$ | $\frac{\sqrt{462}i}{462}$ | 0 | |
| | 0 | $-\frac{\sqrt{462}i}{308}$ | $\frac{\sqrt{770}}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{770}}{462}$ | $-\frac{\sqrt{462}}{231}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{462}}{462}$ | |
| | $\frac{\sqrt{462}i}{308}$ | 0 | 0 | $-\frac{\sqrt{770}}{132}$ | 0 | 0 | $\frac{\sqrt{770}}{462}$ | 0 | 0 | $\frac{\sqrt{462}}{231}$ | 0 | 0 | $\frac{\sqrt{462}}{462}$ | 0 | |
| | 0 | 0 | 0 | $-\frac{5\sqrt{770}i}{924}$ | 0 | $-\frac{5\sqrt{770}}{924}$ | 0 | 0 | 0 | $-\frac{\sqrt{462}i}{462}$ | 0 | $\frac{\sqrt{462}}{462}$ | 0 | 0 | |
| | 0 | 0 | $\frac{5\sqrt{770}i}{924}$ | 0 | $-\frac{5\sqrt{770}}{924}$ | 0 | 0 | 0 | $\frac{\sqrt{462}i}{462}$ | 0 | $\frac{\sqrt{462}}{462}$ | 0 | 0 | 0 | |
| 938 | symmetry | $\frac{3\sqrt{7}xz(x-z)(x+z)(x^2-10y^2+z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|
| $\mathbb{T}_6^{(1,0;a)}(A, 5)$ | | 0 | $\frac{2\sqrt{77}i}{77}$ | $-\frac{5\sqrt{1155}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{1155}}{924}$ | $\frac{\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{77}}{308}$ |
| | | $-\frac{2\sqrt{77}i}{77}$ | 0 | 0 | $\frac{5\sqrt{1155}}{924}$ | 0 | 0 | $-\frac{5\sqrt{1155}}{924}$ | 0 | 0 | $-\frac{\sqrt{77}}{308}$ | 0 | 0 | $-\frac{\sqrt{77}}{308}$ | 0 |
| | | $-\frac{5\sqrt{1155}}{924}$ | 0 | 0 | $\frac{5\sqrt{77}i}{308}$ | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 | $-\frac{\sqrt{1155}i}{924}$ | 0 | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 |
| | | 0 | $\frac{5\sqrt{1155}}{924}$ | $-\frac{5\sqrt{77}i}{308}$ | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}i}{924}$ | 0 | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ |
| | | 0 | $-\frac{5\sqrt{1155}}{924}$ | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | $\frac{5\sqrt{77}i}{308}$ | 0 | 0 | $-\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $\frac{\sqrt{1155}i}{924}$ |
| | | $-\frac{5\sqrt{1155}}{924}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | $-\frac{5\sqrt{77}i}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{1848}$ | $-\frac{\sqrt{1155}i}{924}$ | 0 |
| | | $\frac{\sqrt{77}}{308}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{924}$ | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 | $-\frac{5\sqrt{77}i}{308}$ | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{77}}{308}$ | $\frac{\sqrt{1155}i}{924}$ | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 | $\frac{5\sqrt{77}i}{308}$ | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $-\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | $-\frac{2\sqrt{77}i}{77}$ | $\frac{13\sqrt{77}}{616}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{1848}$ | $\frac{13\sqrt{77}}{616}$ | 0 | $\frac{2\sqrt{77}i}{77}$ | 0 | 0 | $-\frac{13\sqrt{77}}{616}$ |
| | | 0 | $-\frac{\sqrt{77}}{308}$ | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}i}{924}$ | 0 | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | 0 | $-\frac{5\sqrt{77}i}{308}$ |
| | | $-\frac{\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ | $-\frac{\sqrt{1155}i}{924}$ | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{77}}{616}$ | $\frac{5\sqrt{77}i}{308}$ | 0 |
| 939 | symmetry | $\frac{\sqrt{462}xz(x^2-3z^2)(3x^2-z^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|--------------------------|----------------------------|---------------------------|---|---|----------------------------|----------------------------|----------------------------|---------------------------|--------------------------|--------------------------|----------------------------|----------------------------|
| $\mathbb{T}_6^{(1,0;a)}(A, 6)$ | | 0 | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{112}$ | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{112}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{112}$ | 0 | 0 | $\frac{\sqrt{70}}{112}$ | 0 | 0 | $\frac{\sqrt{42}}{112}$ | 0 | 0 | $-\frac{\sqrt{42}}{112}$ | 0 |
| | | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | $\frac{5\sqrt{42}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{70}}{112}$ | $-\frac{5\sqrt{42}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{112}$ | 0 | $-\frac{\sqrt{70}}{112}$ | 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 | $\frac{\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}i}{112}$ | 0 | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ |
| | | $\frac{\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{112}$ | $-\frac{3\sqrt{70}i}{112}$ | 0 |
| | | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{42}i}{112}$ | 0 | $-\frac{\sqrt{42}}{112}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{42}}{112}$ | $-\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{42}i}{112}$ | 0 | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | $\frac{\sqrt{42}}{112}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{112}$ | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{112}$ |
| | | 0 | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ | 0 | 0 | $\frac{\sqrt{42}}{112}$ | 0 | 0 | $-\frac{3\sqrt{42}i}{112}$ |
| | | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{112}$ | $\frac{3\sqrt{42}i}{112}$ | 0 |
| 940 | symmetry | $\frac{\sqrt{210}xz(x^4-16x^2y^2+2x^2z^2+16y^4-16y^2z^2+z^4)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----------------------|-----------|--|------------------------------|-------------------------------|-------------------------------|----------------------------|-----------------------------|------------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|
| $T_6^{(1,0;a)}(A, 7)$ | | 0 | 0 | $-\frac{37\sqrt{154}}{3696}$ | 0 | 0 | 0 | 0 | $\frac{37\sqrt{154}}{3696}$ | $\frac{5\sqrt{2310}}{1232}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{2310}}{1232}$ |
| | | 0 | 0 | 0 | $\frac{37\sqrt{154}}{3696}$ | 0 | 0 | $\frac{37\sqrt{154}}{3696}$ | 0 | 0 | $-\frac{5\sqrt{2310}}{1232}$ | 0 | 0 | $\frac{5\sqrt{2310}}{1232}$ | 0 |
| | | $-\frac{37\sqrt{154}}{3696}$ | 0 | 0 | $\frac{5\sqrt{2310}i}{3696}$ | 0 | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | $-\frac{17\sqrt{154}i}{3696}$ | 0 | $\frac{\sqrt{154}}{528}$ | 0 | 0 |
| | | 0 | $\frac{37\sqrt{154}}{3696}$ | $-\frac{5\sqrt{2310}i}{3696}$ | 0 | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | $\frac{17\sqrt{154}i}{3696}$ | 0 | $\frac{\sqrt{154}}{528}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | $\frac{17\sqrt{154}}{924}$ | 0 | $-\frac{2\sqrt{154}i}{231}$ | $\frac{17\sqrt{154}}{924}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2310}}{924}$ | $\frac{17\sqrt{154}}{924}$ | 0 | $\frac{2\sqrt{154}i}{231}$ | 0 | 0 | $-\frac{17\sqrt{154}}{924}$ |
| | | 0 | $\frac{37\sqrt{154}}{3696}$ | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | $-\frac{5\sqrt{2310}i}{3696}$ | 0 | 0 | $\frac{\sqrt{154}}{528}$ | 0 | 0 | $-\frac{17\sqrt{154}i}{3696}$ |
| | | $\frac{37\sqrt{154}}{3696}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2310}}{924}$ | $\frac{5\sqrt{2310}i}{3696}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{154}}{528}$ | $\frac{17\sqrt{154}i}{3696}$ | 0 |
| | | $\frac{5\sqrt{2310}}{1232}$ | 0 | 0 | $-\frac{17\sqrt{154}i}{3696}$ | 0 | $\frac{17\sqrt{154}}{924}$ | 0 | 0 | 0 | $\frac{\sqrt{2310}i}{1232}$ | 0 | $-\frac{5\sqrt{2310}}{3696}$ | 0 | 0 |
| | | 0 | $-\frac{5\sqrt{2310}}{1232}$ | $\frac{17\sqrt{154}i}{3696}$ | 0 | $\frac{17\sqrt{154}}{924}$ | 0 | 0 | 0 | $-\frac{\sqrt{2310}i}{1232}$ | 0 | $-\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{154}}{528}$ | 0 | $-\frac{2\sqrt{154}i}{231}$ | $\frac{\sqrt{154}}{528}$ | 0 | 0 | $-\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | $\frac{5\sqrt{2310}}{3696}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{154}}{528}$ | 0 | $\frac{2\sqrt{154}i}{231}$ | 0 | 0 | $-\frac{\sqrt{154}}{528}$ | $-\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{2310}}{3696}$ |
| | | 0 | $\frac{5\sqrt{2310}}{1232}$ | 0 | 0 | $\frac{17\sqrt{154}}{924}$ | 0 | 0 | $-\frac{17\sqrt{154}i}{3696}$ | 0 | 0 | $\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{1232}$ |
| | | $\frac{5\sqrt{2310}}{1232}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{154}}{924}$ | $\frac{17\sqrt{154}i}{3696}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{2310}}{3696}$ | $\frac{\sqrt{2310}i}{1232}$ | 0 |
| 941 | symmetry | $\frac{3\sqrt{7}yz(y-z)(y+z)(10x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|-----------------------------|----------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|
| $\mathbb{T}_6^{(1,0;a)}(B, 1)$ | | 0 | $-\frac{2\sqrt{77}}{77}$ | 0 | 0 | $-\frac{5\sqrt{1155}}{924}$ | 0 | 0 | $\frac{5\sqrt{1155}i}{924}$ | 0 | 0 | $-\frac{\sqrt{77}}{308}$ | 0 | 0 | $-\frac{\sqrt{77}i}{308}$ |
| | | $-\frac{2\sqrt{77}}{77}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{1155}}{924}$ | $-\frac{5\sqrt{1155}i}{924}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{77}}{308}$ | $\frac{\sqrt{77}i}{308}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{77}i}{616}$ | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}i}{616}$ | $-\frac{\sqrt{1155}}{616}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{77}i}{616}$ | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}i}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{616}$ |
| | | $-\frac{5\sqrt{1155}}{924}$ | 0 | 0 | $\frac{5\sqrt{77}i}{616}$ | 0 | $-\frac{5\sqrt{77}}{308}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}i}{1848}$ | 0 | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 |
| | | 0 | $\frac{5\sqrt{1155}}{924}$ | $-\frac{5\sqrt{77}i}{616}$ | 0 | $-\frac{5\sqrt{77}}{308}$ | 0 | 0 | 0 | $-\frac{\sqrt{1155}i}{1848}$ | 0 | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 | 0 |
| | | 0 | $\frac{5\sqrt{1155}i}{924}$ | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{308}$ | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{924}$ |
| | | $-\frac{5\sqrt{1155}i}{924}$ | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | 0 | 0 | $-\frac{5\sqrt{77}}{308}$ | 0 | 0 | $-\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}i}{1848}$ | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $\frac{2\sqrt{77}}{77}$ | 0 | $-\frac{13\sqrt{77}i}{616}$ | $\frac{13\sqrt{77}}{616}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}i}{1848}$ | 0 | 0 | $-\frac{\sqrt{1155}}{1848}$ | $\frac{2\sqrt{77}}{77}$ | 0 | $\frac{13\sqrt{77}i}{616}$ | 0 | 0 | $-\frac{13\sqrt{77}}{616}$ |
| | | $-\frac{\sqrt{77}}{308}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{616}$ | 0 | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 | 0 | $-\frac{13\sqrt{77}i}{616}$ | 0 | $\frac{5\sqrt{77}}{308}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{77}}{308}$ | $\frac{\sqrt{1155}i}{616}$ | 0 | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 | 0 | $\frac{13\sqrt{77}i}{616}$ | 0 | $\frac{5\sqrt{77}}{308}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{77}i}{308}$ | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | $\frac{13\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{77}}{308}$ |
| | | $\frac{\sqrt{77}i}{308}$ | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 | 0 | $-\frac{13\sqrt{77}}{616}$ | 0 | 0 | $\frac{5\sqrt{77}}{308}$ | 0 |
| 942 | symmetry | $-\frac{3\sqrt{7}xy(x-y)(x+y)(x^2+y^2-10z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|-----------------------------|------------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|----------------------------|----------------------------|---------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|
| $\mathbb{T}_6^{(1,0;a)}(B, 2)$ | | $-\frac{2\sqrt{77}}{77}$ | 0 | 0 | $\frac{5\sqrt{1155}i}{924}$ | 0 | $-\frac{5\sqrt{1155}}{924}$ | 0 | 0 | 0 | $\frac{\sqrt{77}i}{308}$ | 0 | $\frac{\sqrt{77}}{308}$ | 0 | 0 |
| | | 0 | $\frac{2\sqrt{77}}{77}$ | $-\frac{5\sqrt{1155}i}{924}$ | 0 | $-\frac{5\sqrt{1155}}{924}$ | 0 | 0 | 0 | $-\frac{\sqrt{77}i}{308}$ | 0 | $\frac{\sqrt{77}}{308}$ | 0 | 0 | 0 |
| | | 0 | $\frac{5\sqrt{1155}i}{924}$ | $-\frac{5\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{1848}$ |
| | | $-\frac{5\sqrt{1155}i}{924}$ | 0 | 0 | $\frac{5\sqrt{77}}{308}$ | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 | 0 | $-\frac{\sqrt{1155}}{1848}$ | 0 |
| | | 0 | $-\frac{5\sqrt{1155}}{924}$ | 0 | 0 | $-\frac{5\sqrt{77}}{308}$ | 0 | 0 | $\frac{5\sqrt{77}i}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{1848}$ |
| | | $-\frac{5\sqrt{1155}}{924}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{77}}{308}$ | $-\frac{5\sqrt{77}i}{616}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{924}$ | $\frac{\sqrt{1155}i}{1848}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | $\frac{5\sqrt{77}i}{616}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | $\frac{\sqrt{1155}i}{616}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | $-\frac{5\sqrt{77}i}{616}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | $-\frac{\sqrt{1155}i}{616}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{77}i}{308}$ | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | $\frac{5\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $\frac{13\sqrt{77}}{616}$ |
| | | $-\frac{\sqrt{77}i}{308}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{5\sqrt{77}}{308}$ | 0 | 0 | $\frac{13\sqrt{77}}{616}$ | 0 |
| | | 0 | $\frac{\sqrt{77}}{308}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 | 0 | $\frac{\sqrt{1155}i}{616}$ | 0 | 0 | $\frac{5\sqrt{77}}{308}$ | 0 | 0 | $-\frac{13\sqrt{77}i}{616}$ |
| | | $\frac{\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{924}$ | $-\frac{\sqrt{1155}i}{616}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{308}$ | $\frac{13\sqrt{77}i}{616}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{1848}$ | 0 | $-\frac{\sqrt{1155}i}{1848}$ | 0 | 0 | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | $-\frac{13\sqrt{77}i}{616}$ | $\frac{2\sqrt{77}}{77}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{1155}}{1848}$ | 0 | $\frac{\sqrt{1155}i}{1848}$ | 0 | 0 | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | $\frac{13\sqrt{77}i}{616}$ | 0 | 0 | $-\frac{2\sqrt{77}}{77}$ |
| 943 | symmetry | $\frac{\sqrt{462}yz(y^2-3z^2)(3y^2-z^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|---|--------------------------|---|---|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| $\mathbb{T}_6^{(1,0;a)}(B,3)$ | | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{112}$ | 0 | 0 | $\frac{\sqrt{70}i}{112}$ | 0 | 0 | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | $\frac{\sqrt{42}i}{112}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{112}$ | $-\frac{\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{112}$ | $-\frac{\sqrt{42}i}{112}$ | 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 |
| | | $\frac{\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{70}i}{112}$ | 0 | $-\frac{3\sqrt{70}}{112}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | $\frac{5\sqrt{42}}{112}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{112}$ | 0 | $-\frac{3\sqrt{70}}{112}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}}{112}$ | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{112}$ |
| | | $-\frac{\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}}{112}$ | 0 | 0 | $\frac{\sqrt{70}}{112}$ | 0 | 0 | $-\frac{3\sqrt{70}}{112}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{112}$ | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{112}$ | $-\frac{\sqrt{42}}{112}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{112}$ | 0 | 0 | $\frac{\sqrt{70}}{112}$ | 0 | 0 | $\frac{\sqrt{42}i}{112}$ | 0 | 0 | $\frac{\sqrt{42}}{112}$ |
| | | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{112}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{112}$ | 0 | $\frac{3\sqrt{42}}{112}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{42}}{112}$ | 0 | 0 | $-\frac{3\sqrt{70}}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{42}i}{112}$ | 0 | $\frac{3\sqrt{42}}{112}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{42}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{112}$ | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{42}}{112}$ |
| | | $-\frac{\sqrt{42}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{112}$ | 0 | 0 | $\frac{\sqrt{42}}{112}$ | 0 | 0 | $-\frac{3\sqrt{42}}{112}$ | 0 |
| 944 | symmetry | $\frac{\sqrt{462}xy(x^2-3y^2)(3x^2-y^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----|-------------------------------|--|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---|---|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
| 945 | $\mathbb{T}_6^{(1,0;a)}(B,4)$ | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{112}$ | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{42}i}{112}$ | 0 | $-\frac{\sqrt{42}}{112}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}i}{112}$ | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{112}$ | 0 | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{70}i}{112}$ | $\frac{5\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{112}$ |
| | | $\frac{\sqrt{70}i}{112}$ | 0 | 0 | $-\frac{5\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{112}$ | 0 | 0 | $-\frac{\sqrt{70}}{112}$ | 0 |
| | | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | $-\frac{5\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}}{112}$ | 0 | 0 | $\frac{\sqrt{70}i}{112}$ |
| | | $-\frac{\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{112}$ | $-\frac{\sqrt{70}i}{112}$ | 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 | $\frac{\sqrt{42}i}{112}$ | $-\frac{3\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{112}$ |
| | | $-\frac{\sqrt{42}i}{112}$ | 0 | 0 | $\frac{3\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{42}}{112}$ | 0 | 0 | $\frac{\sqrt{42}}{112}$ | 0 |
| | | 0 | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | $-\frac{3\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{42}}{112}$ | 0 | 0 | $\frac{\sqrt{42}i}{112}$ |
| | | $-\frac{\sqrt{42}}{112}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{42}}{112}$ | $-\frac{\sqrt{42}i}{112}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | $\frac{\sqrt{70}i}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{42}}{112}$ | 0 | $\frac{\sqrt{42}i}{112}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70}}{112}$ | 0 | $-\frac{\sqrt{70}i}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{42}}{112}$ | 0 | $-\frac{\sqrt{42}i}{112}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{210}yz(16x^4-16x^2y^2-16x^2z^2+y^4+2y^2z^2+z^4)}{16}$ | | | | | | | | | | | | | |
| 945 | symmetry | | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|--------------------------------|-----------|--|-------------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|
| $\mathbb{T}_6^{(1,0;a)}(B, 5)$ | | 0 | 0 | 0 | 0 | $\frac{37\sqrt{154}}{3696}$ | 0 | 0 | $\frac{37\sqrt{154}i}{3696}$ | 0 | 0 | $\frac{5\sqrt{2310}}{1232}$ | 0 | $-\frac{5\sqrt{2310}i}{1232}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{37\sqrt{154}}{3696}$ | $-\frac{37\sqrt{154}i}{3696}$ | 0 | 0 | 0 | $-\frac{5\sqrt{2310}}{1232}$ | $\frac{5\sqrt{2310}i}{1232}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2310}i}{924}$ | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | $\frac{2\sqrt{154}}{231}$ | 0 | $-\frac{17\sqrt{154}i}{924}$ | $\frac{17\sqrt{154}}{924}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}i}{924}$ | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | $\frac{2\sqrt{154}}{231}$ | 0 | $\frac{17\sqrt{154}i}{924}$ | 0 | $-\frac{17\sqrt{154}}{924}$ |
| | | $\frac{37\sqrt{154}}{3696}$ | 0 | 0 | $-\frac{\sqrt{2310}i}{924}$ | 0 | $\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | 0 | $-\frac{\sqrt{154}i}{528}$ | 0 | $\frac{17\sqrt{154}}{3696}$ | 0 |
| | | 0 | $-\frac{37\sqrt{154}}{3696}$ | $\frac{\sqrt{2310}i}{924}$ | 0 | $\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | 0 | $\frac{\sqrt{154}i}{528}$ | 0 | $\frac{17\sqrt{154}}{3696}$ | 0 | 0 |
| | | 0 | $\frac{37\sqrt{154}i}{3696}$ | $-\frac{\sqrt{2310}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{2310}}{3696}$ | $\frac{\sqrt{154}}{528}$ | 0 | 0 | 0 | $\frac{17\sqrt{154}i}{3696}$ |
| | | $-\frac{37\sqrt{154}i}{3696}$ | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | $-\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | $-\frac{\sqrt{154}}{528}$ | 0 | 0 | $\frac{17\sqrt{154}}{3696}$ |
| | | 0 | 0 | 0 | $\frac{2\sqrt{154}}{231}$ | 0 | $-\frac{\sqrt{154}i}{528}$ | $\frac{\sqrt{154}}{528}$ | 0 | 0 | 0 | $-\frac{5\sqrt{2310}i}{3696}$ | $-\frac{5\sqrt{2310}}{3696}$ | 0 |
| | | 0 | 0 | $\frac{2\sqrt{154}}{231}$ | 0 | $\frac{\sqrt{154}i}{528}$ | 0 | 0 | $-\frac{\sqrt{154}}{528}$ | 0 | 0 | $\frac{5\sqrt{2310}i}{3696}$ | 0 | $\frac{5\sqrt{2310}}{3696}$ |
| | | $\frac{5\sqrt{2310}}{1232}$ | 0 | 0 | $-\frac{17\sqrt{154}i}{924}$ | 0 | $\frac{17\sqrt{154}}{3696}$ | 0 | 0 | 0 | $-\frac{5\sqrt{2310}i}{3696}$ | 0 | $\frac{\sqrt{2310}}{1232}$ | 0 |
| | | 0 | $-\frac{5\sqrt{2310}}{1232}$ | $\frac{17\sqrt{154}i}{924}$ | 0 | $\frac{17\sqrt{154}}{3696}$ | 0 | 0 | 0 | $\frac{5\sqrt{2310}i}{3696}$ | 0 | $\frac{\sqrt{2310}}{1232}$ | 0 | 0 |
| | | 0 | $-\frac{5\sqrt{2310}i}{1232}$ | $\frac{17\sqrt{154}}{924}$ | 0 | 0 | 0 | 0 | $\frac{17\sqrt{154}}{3696}$ | $-\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | 0 | $-\frac{\sqrt{2310}}{1232}$ |
| | | $\frac{5\sqrt{2310}i}{1232}$ | 0 | 0 | $-\frac{17\sqrt{154}}{924}$ | 0 | 0 | $\frac{17\sqrt{154}}{3696}$ | 0 | 0 | $\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | $-\frac{\sqrt{2310}}{1232}$ |
| 946 | symmetry | $\frac{\sqrt{210}xy(x^4+2x^2y^2-16x^2z^2+y^4-16y^2z^2+16z^4)}{16}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----------------------|-----------|------------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------|
| $T_6^{(1,0;a)}(B, 6)$ | | 0 | 0 | 0 | $-\frac{37\sqrt{154}i}{3696}$ | 0 | $-\frac{37\sqrt{154}}{3696}$ | 0 | 0 | 0 | $-\frac{5\sqrt{2310}i}{1232}$ | 0 | $\frac{5\sqrt{2310}}{1232}$ | 0 | 0 |
| | | 0 | 0 | $\frac{37\sqrt{154}i}{3696}$ | 0 | $-\frac{37\sqrt{154}}{3696}$ | 0 | 0 | 0 | $\frac{5\sqrt{2310}i}{1232}$ | 0 | $\frac{5\sqrt{2310}}{1232}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{37\sqrt{154}i}{3696}$ | $\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | $\frac{17\sqrt{154}}{3696}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{154}}{528}$ |
| | | $\frac{37\sqrt{154}i}{3696}$ | 0 | 0 | $-\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | 0 | $-\frac{17\sqrt{154}}{3696}$ | 0 | 0 | $\frac{\sqrt{154}}{528}$ | 0 |
| | | 0 | $-\frac{37\sqrt{154}}{3696}$ | 0 | 0 | $-\frac{5\sqrt{2310}}{3696}$ | 0 | 0 | $\frac{\sqrt{2310}i}{924}$ | 0 | 0 | $\frac{17\sqrt{154}}{3696}$ | 0 | 0 | $-\frac{\sqrt{154}i}{528}$ |
| | | $-\frac{37\sqrt{154}}{3696}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{2310}}{3696}$ | $-\frac{\sqrt{2310}i}{924}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{154}}{3696}$ | $\frac{\sqrt{154}i}{528}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | $\frac{\sqrt{2310}i}{924}$ | 0 | 0 | 0 | $\frac{17\sqrt{154}}{924}$ | 0 | $-\frac{17\sqrt{154}i}{924}$ | $\frac{2\sqrt{154}}{231}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{2310}}{924}$ | 0 | $-\frac{\sqrt{2310}i}{924}$ | 0 | 0 | 0 | $\frac{17\sqrt{154}}{924}$ | 0 | $\frac{17\sqrt{154}i}{924}$ | 0 | 0 | $-\frac{2\sqrt{154}}{231}$ |
| | | 0 | $-\frac{5\sqrt{2310}i}{1232}$ | $\frac{17\sqrt{154}}{3696}$ | 0 | 0 | 0 | 0 | $\frac{17\sqrt{154}}{924}$ | $\frac{\sqrt{2310}}{1232}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{2310}}{3696}$ |
| | | $\frac{5\sqrt{2310}i}{1232}$ | 0 | 0 | $-\frac{17\sqrt{154}}{3696}$ | 0 | 0 | $\frac{17\sqrt{154}}{924}$ | 0 | 0 | $-\frac{\sqrt{2310}}{1232}$ | 0 | 0 | $\frac{5\sqrt{2310}}{3696}$ | 0 |
| | | 0 | $\frac{5\sqrt{2310}}{1232}$ | 0 | 0 | $\frac{17\sqrt{154}}{3696}$ | 0 | 0 | $-\frac{17\sqrt{154}i}{924}$ | 0 | 0 | $-\frac{\sqrt{2310}}{1232}$ | 0 | 0 | $\frac{5\sqrt{2310}i}{3696}$ |
| | | $\frac{5\sqrt{2310}}{1232}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{154}}{3696}$ | $\frac{17\sqrt{154}i}{924}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2310}}{1232}$ | $-\frac{5\sqrt{2310}i}{3696}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{154}}{528}$ | 0 | $-\frac{\sqrt{154}i}{528}$ | $\frac{2\sqrt{154}}{231}$ | 0 | 0 | $\frac{5\sqrt{2310}}{3696}$ | 0 | $\frac{5\sqrt{2310}i}{3696}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{154}}{528}$ | 0 | $\frac{\sqrt{154}i}{528}$ | 0 | 0 | $-\frac{2\sqrt{154}}{231}$ | $\frac{5\sqrt{2310}}{3696}$ | 0 | $-\frac{5\sqrt{2310}i}{3696}$ | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | |
|-----|----------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 947 | symmetry | y | | | | | | | | | | | | | |
|-----|----------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-----|-----------|----------------|--------------------------|--------------------------|---------------------------|---------------------------|---|---|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|---|
| 948 | symmetry | $M_1^{(a)}(A)$ | 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 | $\frac{\sqrt{14}i}{14}$ | 0 | 0 | |
| | | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | |
| | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | |
| | | | 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 | $\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | | 0 | 0 | 0 | $\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 |
| | | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | |
| | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | |
| | | | $-\frac{\sqrt{14}i}{14}$ | 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 | $-\frac{\sqrt{210}i}{56}$ | 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 | $-\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | |
| | | | x | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | |
|----------|-------------------|--------------------------|--------------------------|---|---|---------------------------|---------------------------|---------------------------|---------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---|
| 949 | $M_1^{(a)}(B, 1)$ | 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 | 0 | 0 | $\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | 0 | |
| | | $-\frac{\sqrt{14}i}{14}$ | 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 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{14}i}{56}$ | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | |
| symmetry | | z | | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------|-----------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--|
| $M_1^{(a)}(B, 2)$ | | 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 | $\frac{\sqrt{14}i}{14}$ | |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | 0 | |
| | | 0 | 0 | $-\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{210}i}{56}$ | 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 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{56}$ | 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 | $-\frac{\sqrt{14}i}{56}$ | 0 | |
| | | 0 | 0 | $-\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{210}i}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{56}$ | 0 | 0 | 0 | 0 | |
| | | $-\frac{\sqrt{14}i}{14}$ | 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 | |
| 950 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |

continued ...

Table 10

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

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-------------------|-----------|-----------------------------------|------------------------|------------------------|------------------------|---|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|------------------------|------------------------|--|
| $M_3^{(a)}(A, 2)$ | | 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 | $\frac{\sqrt{3}i}{6}$ | 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 | $-\frac{\sqrt{3}i}{6}$ | 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 | $-\frac{\sqrt{3}i}{6}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{6}$ | |
| | | $-\frac{\sqrt{3}i}{6}$ | 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 | $\frac{\sqrt{3}i}{6}$ | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{3}i}{6}$ | 0 | 0 | 0 | 0 | 0 | |
| 952 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------|-----------|-------------------------------|-----------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|-----------------------|---|------------------------|------------------------|---|
| $M_3^{(a)}(A, 3)$ | | 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 | $-\frac{\sqrt{3}i}{6}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{6}$ | 0 |
| | | $\frac{\sqrt{3}i}{6}$ | 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 | $\frac{\sqrt{3}i}{6}$ | 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 | $\frac{\sqrt{3}i}{6}$ | 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 |
| 953 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | |
|------------------|-----------|--------------------------------|------------------------|---|---|-----------------------|-----------------------|------------------------|------------------------|-----------------------|-----------------------|------------------------|------------------------|-----------------------|-----------------------|---|
| $M_3^{(a)}(B,1)$ | | 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 | $\frac{\sqrt{3}i}{6}$ | 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 | $-\frac{\sqrt{3}i}{6}$ | 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 | $\frac{\sqrt{3}i}{6}$ | 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 |
| | | $-\frac{\sqrt{3}i}{6}$ | 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 | 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 | $\frac{\sqrt{3}i}{6}$ | 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 | $-\frac{\sqrt{3}i}{6}$ | 0 | 0 | 0 |
| 954 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | | |
|-------------------|------------------------|----------------------------------|---|-----------------------|-----------------------|------------------------|------------------------|---|------------------------|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|--|--|
| $M_3^{(a)}(B, 2)$ | | 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 | $\frac{\sqrt{3}i}{6}$ | | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{3}i}{6}$ | 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 | $\frac{\sqrt{3}i}{6}$ | 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 | $\frac{\sqrt{3}i}{6}$ | 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 | $-\frac{\sqrt{3}i}{6}$ | 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 | | |
| 955 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------|-----------|----------------------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|---|---|------------------------|------------------------|-----------------------|-----------------------|---|
| $M_3^{(a)}(B, 3)$ | | 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 | $\frac{\sqrt{3}i}{6}$ | 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 | $\frac{\sqrt{3}i}{6}$ | 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 | $-\frac{\sqrt{3}i}{6}$ | 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 |
| 956 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------|-----------|-------------------------------------|-----------------------|------------------------|------------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|-----------------------|---|---|
| $M_3^{(a)}(B, 4)$ | | 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 | $\frac{\sqrt{3}i}{6}$ | 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 |
| | | $\frac{\sqrt{3}i}{6}$ | 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 | $\frac{\sqrt{3}i}{6}$ | 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 |
| 957 | symmetry | $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|-------------------|-----------|---|---|-----------------------|-----------------------|------------------------|------------------------|---|------------------------|------------------------|-----------------------|-----------------------|---|---|
| $M_5^{(a)}(A, 1)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 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 | $-\frac{\sqrt{2}i}{4}$ | 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 | $\frac{\sqrt{2}i}{4}$ | 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 | $\frac{\sqrt{2}i}{4}$ | 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 | $-\frac{\sqrt{2}i}{4}$ | 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 |
| 958 | symmetry | $\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|
| $\mathbb{M}_5^{(a)}(A, 2)$ | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>$-\frac{\sqrt{6}i}{12}$</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>$-\frac{\sqrt{6}i}{12}$</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>$-\frac{\sqrt{6}i}{12}$</div><div>0</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>$-\frac{\sqrt{6}i}{12}$</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>$\frac{\sqrt{6}i}{6}$</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>$\frac{\sqrt{6}i}{6}$</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>$\frac{\sqrt{6}i}{12}$</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>$\frac{\sqrt{6}i}{12}$</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>$\frac{\sqrt{6}i}{12}$</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>$\frac{\sqrt{6}i}{12}$</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>$-\frac{\sqrt{6}i}{6}$</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| | <div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>$-\frac{\sqrt{6}i}{6}$</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div><div>0</div></div> | | | | | | | | | | | | | | |
| 959 | 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 | | | | | | | | | | | | |
|-------------------|-----------|---|-------------------------|----------------------------|----------------------------|---|---|----------------------------|----------------------------|---------------------------|--------------------------|--------------------------|-----------------------------|-----------------------------|
| $M_5^{(a)}(A, 3)$ | | 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 | $-\frac{\sqrt{42}i}{21}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{336}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{336}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ |
| | | 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 | $-\frac{5\sqrt{42}i}{336}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{42}i}{336}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{42}i}{336}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{42}i}{336}$ |
| | | $\frac{\sqrt{42}i}{21}$ | 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 | $-\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | $\frac{11\sqrt{42}i}{336}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | $\frac{11\sqrt{42}i}{336}$ | 0 | 0 | 0 | 0 | 0 |
| 960 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------|-----------|---|---|-------------------------|-------------------------|---|---|--------------------------|-------------------------|-------------------------|---|---|--------------------------|--------------------------|---|
| $M_5^{(a)}(A, 4)$ | | 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 | $-\frac{\sqrt{30}i}{16}$ | 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 | $-\frac{\sqrt{2}i}{16}$ | 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 | $\frac{\sqrt{30}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{30}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{16}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{16}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{16}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{16}$ | 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 | $\frac{\sqrt{2}i}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{16}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{2}i}{16}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{16}$ | 0 | 0 | 0 | 0 | 0 |
| 961 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------|-----------|--|-----------------------|-------------------------|-------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|---|------------------------|------------------------|---|
| $M_5^{(a)}(A, 5)$ | | 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 | $\frac{\sqrt{6}i}{12}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{12}$ | 0 |
| | | $\frac{\sqrt{6}i}{6}$ | 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 | $-\frac{\sqrt{6}i}{12}$ | 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 | $-\frac{\sqrt{6}i}{12}$ | 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 |
| 962 | symmetry | $\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|-------------------|-----------|--|-------------------------|---|---|----------------------------|----------------------------|----------------------------|---|--------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|
| $M_5^{(a)}(B, 1)$ | | 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 | $-\frac{\sqrt{42}i}{21}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}i}{336}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}i}{336}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ |
| | | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{336}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{336}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70}i}{112}$ | 0 | 0 |
| | | $\frac{\sqrt{42}i}{21}$ | 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 | $-\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{11\sqrt{42}i}{336}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{11\sqrt{42}i}{336}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{42}i}{336}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{42}i}{336}$ | 0 | 0 |
| 963 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------------------------|-----------|---|-------------------------|----------------------------|----------------------------|----------------------------|---|---|-----------------------------|-----------------------------|----------------------------|----------------------------|--------------------------|--------------------------|--|
| $\mathbb{M}_5^{(a)}(B, 2)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42i}}{21}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42i}}{21}$ | |
| | | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42i}}{336}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70i}}{112}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42i}}{336}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70i}}{112}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{5\sqrt{42i}}{336}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70i}}{112}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $\frac{5\sqrt{42i}}{336}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{70i}}{112}$ | 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 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70i}}{112}$ | 0 | 0 | 0 | 0 | $\frac{11\sqrt{42i}}{336}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{70i}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{11\sqrt{42i}}{336}$ | 0 | 0 | |
| | | 0 | 0 | $-\frac{3\sqrt{70i}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{42i}}{336}$ | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{70i}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{11\sqrt{42i}}{336}$ | 0 | 0 | 0 | 0 | |
| | | $\frac{\sqrt{42i}}{21}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | | 0 | $\frac{\sqrt{42i}}{21}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 964 | 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 | | | | | | | | | | | | | |
|-------------------|-----------|---|---|---|---|--------------------------|--------------------------|-------------------------|---|---|--------------------------|--------------------------|-------------------------|-------------------------|-------------------------|
| $M_5^{(a)}(B, 3)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 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 | $-\frac{\sqrt{2}i}{16}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{30}i}{16}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{16}$ | |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{16}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2}i}{16}$ | 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 | $\frac{\sqrt{2}i}{16}$ | 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 | $\frac{\sqrt{2}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{16}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{16}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{30}i}{16}$ | 0 | 0 | |
| 965 | symmetry | $\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | |
|-------------------|-----------|---|---|--------------------------|--------------------------|-------------------------|-------------------------|---|--------------------------|--------------------------|-------------------------|-------------------------|---|
| $M_5^{(a)}(B, 4)$ | | 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 | $\frac{\sqrt{30}i}{16}$ | 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 | $-\frac{\sqrt{2}i}{16}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{30}i}{16}$ | 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 | $-\frac{\sqrt{2}i}{16}$ | 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 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{2}i}{16}$ | 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 | $\frac{\sqrt{30}i}{16}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{2}i}{16}$ | 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 | $-\frac{\sqrt{30}i}{16}$ | 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 |
| 966 | symmetry | $\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$ | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------|-----------|--|-----------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|---|------------------------|------------------------|-------------------------|-------------------------|---|
| $M_5^{(a)}(B, 5)$ | | 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 |
| | | $\frac{\sqrt{6}i}{6}$ | 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 | $-\frac{\sqrt{6}i}{12}$ | 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 | $\frac{\sqrt{6}i}{12}$ | 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 | $-\frac{\sqrt{6}i}{12}$ | 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 | $\frac{\sqrt{6}i}{12}$ | 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 | |
| 967 | symmetry | $-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------|-----------|-----------------------|-----------------------|------------------------|------------------------|-------------------------|-------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|---|---|---|
| $M_5^{(a)}(B, 6)$ | | 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 | $-\frac{\sqrt{6}i}{12}$ | 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 | $\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{6}i}{12}$ | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{6}i}{6}$ | 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 | $-\frac{\sqrt{6}i}{12}$ | 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 |
| 968 | symmetry | y | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|------------------------------|-----------|-------------------------|--------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|-------------------------|--------------------------|--------------------------|---|--------------------------|---|---|
| $\mathbb{M}_1^{(1,-1;a)}(A)$ | | 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 | $-\frac{\sqrt{14}i}{14}$ | 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 | $-\frac{\sqrt{14}i}{14}$ | 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 | $-\frac{\sqrt{14}i}{14}$ | 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 | $-\frac{\sqrt{14}i}{14}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}i}{14}$ | 0 | 0 |
| 969 | symmetry | x | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|---|---|
| $\mathbb{M}_1^{(1,-1;a)}(B,1)$ | | 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 | $\frac{\sqrt{14}}{14}$ | 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 | $\frac{\sqrt{14}}{14}$ | 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 | $\frac{\sqrt{14}}{14}$ | 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 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{14}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{14}}{14}$ | 0 | 0 |
| 970 | symmetry | z | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|------------------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|------------------------|-------------------------|
| $\mathbb{M}_1^{(1,-1;a)}(B,2)$ | | $\frac{\sqrt{14}}{14}$ | 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 | $-\frac{\sqrt{14}}{14}$ |
| 971 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|----------|--------------------------------|--------------------------------|-------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---------------------------|--------------------------|----------------------------|---------------------------|---------------------------|---------------------------|----------------------------|---------------------------|
| 972 | $\mathbb{M}_3^{(1,-1;a)}(A,1)$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{42}$ | 0 | $\frac{\sqrt{70}i}{42}$ | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70}}{42}$ | 0 | $-\frac{\sqrt{70}i}{42}$ | 0 | 0 | $\frac{\sqrt{70}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | $-\frac{\sqrt{70}i}{168}$ |
| | | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{70}}{168}$ | $\frac{\sqrt{70}i}{168}$ | 0 | |
| | | 0 | $\frac{\sqrt{70}i}{42}$ | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | $\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{168}$ |
| | | $-\frac{\sqrt{70}i}{42}$ | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 |
| | | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $\frac{\sqrt{70}i}{168}$ | 0 | $\frac{\sqrt{70}}{168}$ | 0 | 0 | |
| | | 0 | $\frac{\sqrt{70}}{42}$ | $-\frac{\sqrt{42}i}{168}$ | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{168}$ | 0 | $\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{168}$ | 0 | 0 | $\frac{\sqrt{70}i}{168}$ | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ | 0 | 0 | $\frac{5\sqrt{42}i}{168}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | $-\frac{\sqrt{70}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}}{168}$ | $-\frac{5\sqrt{42}i}{168}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{168}$ | $-\frac{5\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{168}$ | 0 | 0 | $\frac{\sqrt{70}}{168}$ | 0 | 0 | $\frac{5\sqrt{42}}{168}$ | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{168}$ | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{168}$ | 0 | $-\frac{5\sqrt{42}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}i}{168}$ | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 | $-\frac{5\sqrt{42}i}{168}$ | 0 | $-\frac{5\sqrt{42}}{168}$ | 0 | 0 | 0 |
| symmetry | | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-----------------------------------|-------------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|
| $\mathbb{M}_3^{(1,-1;a)}(A,2)$ | | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | $\frac{\sqrt{70}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{42}i}{28}$ | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{42}}{42}$ | $-\frac{\sqrt{70}i}{70}$ | 0 | $\frac{\sqrt{70}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{28}$ | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{280}$ | 0 | $-\frac{\sqrt{70}i}{35}$ | $\frac{\sqrt{70}}{280}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}}{280}$ | 0 | $\frac{\sqrt{70}i}{35}$ | 0 | 0 | $-\frac{\sqrt{70}}{280}$ | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ |
| | | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $\frac{\sqrt{70}}{280}$ | 0 | 0 | $\frac{\sqrt{70}i}{70}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}i}{28}$ |
| | | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{280}$ | $-\frac{\sqrt{70}i}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | $\frac{\sqrt{42}i}{28}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}i}{28}$ | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}i}{28}$ | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}i}{28}$ | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | $\frac{\sqrt{42}i}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 |
| 973 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-------------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
| $\mathbb{M}_3^{(1,-1;a)}(A,3)$ | | 0 | 0 | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{42}$ | 0 | 0 | $\frac{\sqrt{70}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 | $\frac{\sqrt{70}}{168}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{70}}{42}$ | $-\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | $\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | $\frac{\sqrt{70}i}{42}$ | $-\frac{\sqrt{70}}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | $-\frac{\sqrt{70}}{168}$ | 0 | $-\frac{\sqrt{70}i}{42}$ | 0 | 0 | $\frac{\sqrt{70}}{168}$ |
| | | 0 | $\frac{\sqrt{70}}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | 0 | $\frac{\sqrt{70}}{168}$ | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ |
| | | $\frac{\sqrt{70}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | $\frac{\sqrt{70}i}{84}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}i}{84}$ | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{168}$ | 0 | $\frac{\sqrt{70}i}{42}$ | $\frac{\sqrt{70}}{168}$ | 0 | 0 | $\frac{5\sqrt{42}}{168}$ | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}}{168}$ | 0 | $-\frac{\sqrt{70}i}{42}$ | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | $\frac{5\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}}{168}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | $-\frac{\sqrt{70}i}{84}$ | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{168}$ | $\frac{\sqrt{70}i}{84}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}}{168}$ | 0 | 0 |
| 974 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--------------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|-------------------------|--------------------------|---------------------------|--------------------------|--------------------------|---------------------------|--------------------------|-------------------------|
| $\mathbb{M}_3^{(1,-1;a)}(B,1)$ | | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{42i}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | $\frac{\sqrt{42i}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{35}$ | 0 | $-\frac{\sqrt{70i}}{280}$ | $\frac{\sqrt{70}}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42i}}{168}$ | $-\frac{\sqrt{42}}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}}{35}$ | 0 | $\frac{\sqrt{70i}}{280}$ | 0 | 0 | $-\frac{\sqrt{70}}{280}$ | 0 | 0 | $\frac{\sqrt{42i}}{168}$ | 0 | 0 | $\frac{\sqrt{42}}{168}$ |
| | | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{70i}}{280}$ | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | $\frac{\sqrt{42i}}{168}$ | 0 | $\frac{\sqrt{42}}{28}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{42}}{42}$ | $\frac{\sqrt{70i}}{280}$ | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | $-\frac{\sqrt{42i}}{168}$ | 0 | $\frac{\sqrt{42}}{28}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{42i}}{42}$ | $\frac{\sqrt{70}}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{28}$ |
| | | $\frac{\sqrt{42i}}{42}$ | 0 | 0 | $-\frac{\sqrt{70}}{280}$ | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42i}}{168}$ | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70i}}{56}$ | $\frac{\sqrt{70}}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42i}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $\frac{\sqrt{70i}}{56}$ | 0 | 0 | $-\frac{\sqrt{70}}{56}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42i}}{168}$ | 0 | $\frac{\sqrt{42}}{28}$ | 0 | 0 | 0 | $-\frac{\sqrt{70i}}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42i}}{168}$ | 0 | $\frac{\sqrt{42}}{28}$ | 0 | 0 | 0 | $\frac{\sqrt{70i}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | $\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | 0 | 0 | $-\frac{\sqrt{70}}{56}$ | 0 | 0 | 0 | 0 |
| 975 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|----------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|-------------------------|-------------------------|---------------------------|--------------------------|--------------------------|---------------------------|
| $\mathbb{M}_3^{(1,-1;a)}(B,2)$ | | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}i}{42}$ | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{42}i}{42}$ | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{280}$ | $\frac{\sqrt{42}}{28}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ |
| | | $\frac{\sqrt{42}i}{42}$ | 0 | 0 | $\frac{\sqrt{70}}{70}$ | 0 | 0 | $\frac{\sqrt{70}}{280}$ | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 |
| | | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{70}}{70}$ | 0 | 0 | $-\frac{\sqrt{70}i}{280}$ | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ |
| | | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{70}$ | $\frac{\sqrt{70}i}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{28}$ | $\frac{\sqrt{42}i}{168}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{280}$ | 0 | $-\frac{\sqrt{70}i}{280}$ | $\frac{\sqrt{70}}{35}$ | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}}{280}$ | 0 | $\frac{\sqrt{70}i}{280}$ | 0 | 0 | $-\frac{\sqrt{70}}{35}$ | $\frac{\sqrt{42}}{168}$ | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{42}}{28}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | 0 | 0 | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{28}$ | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{28}$ | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}i}{56}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | $-\frac{\sqrt{70}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | $\frac{\sqrt{70}}{56}$ | 0 | $\frac{\sqrt{70}i}{56}$ | 0 | 0 | 0 |
| 976 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--------------------------|-------------------------|---------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|----------------------------|---------------------------|----------------------------|---------------------------|--------------------------|---------------------------|
| $\mathbb{M}_3^{(1,-1;a)}(B,3)$ | | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{42}$ | 0 | 0 | $\frac{\sqrt{70}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{42}$ | $-\frac{\sqrt{70}i}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | $\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{70}}{42}$ | 0 | $\frac{\sqrt{70}i}{168}$ | $-\frac{\sqrt{70}}{168}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | $-\frac{\sqrt{70}}{42}$ | 0 | $-\frac{\sqrt{70}i}{168}$ | 0 | 0 | $\frac{\sqrt{70}}{168}$ |
| | | $\frac{\sqrt{70}}{42}$ | 0 | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{168}$ | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{70}}{42}$ | $-\frac{\sqrt{42}i}{168}$ | 0 | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | $\frac{\sqrt{70}i}{168}$ | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{70}i}{42}$ | $\frac{\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | $\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{84}$ |
| | | $-\frac{\sqrt{70}i}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | $\frac{\sqrt{70}}{84}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{70}}{42}$ | 0 | $-\frac{\sqrt{70}i}{168}$ | $\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{168}$ | $\frac{5\sqrt{42}}{168}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70}}{42}$ | 0 | $\frac{\sqrt{70}i}{168}$ | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | $-\frac{5\sqrt{42}i}{168}$ | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}i}{168}$ | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70}i}{168}$ | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 | 0 | $-\frac{5\sqrt{42}i}{168}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{84}$ | $\frac{5\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{168}$ | 0 | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | |
|-----|----------|----------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 977 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |
|-----|----------|----------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|--------------------------------|-----------|-------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|----------------------------|----------------------------|
| $\mathbb{M}_3^{(1,-1;a)}(B,4)$ | | 0 | 0 | 0 | $-\frac{\sqrt{70}i}{42}$ | 0 | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}i}{42}$ | 0 | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{70}i}{42}$ | $\frac{\sqrt{42}}{42}$ | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | $\frac{\sqrt{70}}{84}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{168}$ |
| | | $\frac{\sqrt{70}i}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | 0 | $\frac{\sqrt{70}}{168}$ | 0 |
| | | 0 | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | $-\frac{\sqrt{42}}{42}$ | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 | $-\frac{\sqrt{70}i}{168}$ |
| | | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{42}}{42}$ | $\frac{\sqrt{42}i}{168}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{84}$ | $\frac{\sqrt{70}i}{168}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | $-\frac{\sqrt{42}i}{168}$ | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | $\frac{\sqrt{70}i}{168}$ | $-\frac{\sqrt{70}}{42}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{42}}{168}$ | 0 | $\frac{\sqrt{42}i}{168}$ | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | $-\frac{\sqrt{70}i}{168}$ | 0 | 0 | $\frac{\sqrt{70}}{42}$ |
| | | 0 | 0 | $\frac{\sqrt{70}}{84}$ | 0 | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{70}}{84}$ | 0 | 0 | $-\frac{\sqrt{70}}{168}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{70}}{84}$ | 0 | $\frac{\sqrt{70}i}{168}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{42}i}{168}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{70}}{84}$ | $-\frac{\sqrt{70}i}{168}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{42}i}{168}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{70}}{168}$ | 0 | $-\frac{\sqrt{70}i}{168}$ | $-\frac{\sqrt{70}}{42}$ | 0 | 0 | $-\frac{5\sqrt{42}}{168}$ | 0 | $-\frac{5\sqrt{42}i}{168}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{70}}{168}$ | 0 | $\frac{\sqrt{70}i}{168}$ | 0 | $\frac{\sqrt{70}}{42}$ | $-\frac{5\sqrt{42}}{168}$ | 0 | $\frac{5\sqrt{42}i}{168}$ | 0 | 0 | 0 |
| 978 | symmetry | $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|---------------------------------|-----------|---|----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|---------------------------|---------------------------|----------------------------|---------------------------|
| $\mathbb{M}_5^{(1,-1;a)}(A, 1)$ | | 0 | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | $-\frac{\sqrt{165}i}{220}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | $\frac{\sqrt{11}i}{44}$ | $\frac{\sqrt{11}}{22}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | $\frac{\sqrt{165}i}{220}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{11}}{22}$ |
| | | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{165}}{110}$ | 0 | 0 | $\frac{\sqrt{165}i}{220}$ |
| | | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}i}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{110}$ | $-\frac{\sqrt{165}i}{220}$ | 0 |
| | | 0 | $-\frac{\sqrt{165}i}{220}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | $-\frac{\sqrt{165}}{110}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{220}$ |
| | | $\frac{\sqrt{165}i}{220}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | $\frac{\sqrt{165}}{110}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ |
| | | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{44}$ | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | $-\frac{3\sqrt{165}i}{220}$ | 0 | $\frac{3\sqrt{165}}{220}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{11}i}{44}$ | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | $\frac{3\sqrt{165}i}{220}$ | 0 | $\frac{3\sqrt{165}}{220}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | $-\frac{\sqrt{165}}{110}$ | 0 | 0 | $-\frac{3\sqrt{165}i}{220}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}i}{44}$ |
| | | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{110}$ | $\frac{3\sqrt{165}i}{220}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 |
| | | 0 | $\frac{\sqrt{11}i}{44}$ | $-\frac{\sqrt{165}}{110}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{44}$ |
| | | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $\frac{\sqrt{165}}{110}$ | 0 | 0 | $\frac{3\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{44}$ | 0 |
| | | $\frac{\sqrt{11}}{22}$ | 0 | 0 | $\frac{\sqrt{165}i}{220}$ | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | $\frac{\sqrt{11}i}{44}$ | 0 | $\frac{\sqrt{11}}{44}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}}{22}$ | $-\frac{\sqrt{165}i}{220}$ | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | $\frac{\sqrt{11}}{44}$ | 0 | 0 | 0 |
| 979 | symmetry | $\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|--------------------------|--------------------------|--------------------------|---------------------------|--------------------------|--------------------------|---------------------------|--------------------------|---------------------------|--------------------------|--------------------------|--------------------------|---------------------------|
| $\mathbb{M}_5^{(1,-1;a)}(A,2)$ | | 0 | 0 | 0 | $-\frac{\sqrt{55}}{220}$ | 0 | $\frac{\sqrt{55}i}{220}$ | $\frac{\sqrt{55}}{110}$ | 0 | 0 | $\frac{\sqrt{33}}{44}$ | 0 | $\frac{\sqrt{33}i}{44}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{55}}{220}$ | 0 | $-\frac{\sqrt{55}i}{220}$ | 0 | 0 | $-\frac{\sqrt{55}}{110}$ | $\frac{\sqrt{33}}{44}$ | 0 | $-\frac{\sqrt{33}i}{44}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{55}}{220}$ | 0 | 0 | $-\frac{\sqrt{33}}{22}$ | 0 | 0 | $-\frac{\sqrt{33}i}{44}$ | 0 | 0 | $\frac{\sqrt{55}}{55}$ | 0 | 0 | $-\frac{\sqrt{55}i}{44}$ |
| | | $-\frac{\sqrt{55}}{220}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}}{22}$ | $\frac{\sqrt{33}i}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | $\frac{\sqrt{55}i}{44}$ | 0 |
| | | 0 | $\frac{\sqrt{55}i}{220}$ | $-\frac{\sqrt{33}}{22}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}}{44}$ | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{44}$ |
| | | $-\frac{\sqrt{55}i}{220}$ | 0 | 0 | $\frac{\sqrt{33}}{22}$ | 0 | 0 | $\frac{\sqrt{33}}{44}$ | 0 | 0 | $\frac{\sqrt{55}}{55}$ | 0 | 0 | $-\frac{\sqrt{55}}{44}$ | 0 |
| | | $\frac{\sqrt{55}}{110}$ | 0 | 0 | $-\frac{\sqrt{33}i}{44}$ | 0 | $\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | $-\frac{\sqrt{55}i}{220}$ | 0 | $-\frac{\sqrt{55}}{220}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{55}}{110}$ | $\frac{\sqrt{33}i}{44}$ | 0 | $\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | $\frac{\sqrt{55}i}{220}$ | 0 | $-\frac{\sqrt{55}}{220}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{33}}{44}$ | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | $-\frac{\sqrt{55}i}{220}$ | 0 | 0 | $-\frac{\sqrt{33}}{66}$ | 0 | 0 | $-\frac{\sqrt{33}i}{132}$ |
| | | $\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{55}$ | $\frac{\sqrt{55}i}{220}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}}{66}$ | $\frac{\sqrt{33}i}{132}$ | 0 |
| | | 0 | $\frac{\sqrt{33}i}{44}$ | $\frac{\sqrt{55}}{55}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{220}$ | $-\frac{\sqrt{33}}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}}{132}$ |
| | | $-\frac{\sqrt{33}i}{44}$ | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | $-\frac{\sqrt{55}}{220}$ | 0 | 0 | $\frac{\sqrt{33}}{66}$ | 0 | 0 | $\frac{\sqrt{33}}{132}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{55}i}{44}$ | 0 | $-\frac{\sqrt{55}}{44}$ | 0 | 0 | 0 | $-\frac{\sqrt{33}i}{132}$ | 0 | $\frac{\sqrt{33}}{132}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{55}i}{44}$ | 0 | $-\frac{\sqrt{55}}{44}$ | 0 | 0 | 0 | $\frac{\sqrt{33}i}{132}$ | 0 | $\frac{\sqrt{33}}{132}$ | 0 | 0 | 0 |
| 980 | symmetry | $\frac{y(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|---------------------------|-----------------------------|------------------------------|----------------------------|----------------------------|------------------------------|-----------------------------|-----------------------------|------------------------------|----------------------------|----------------------------|------------------------------|-----------------------------|
| $\mathbb{M}_5^{(1,-1;a)}(A,3)$ | | 0 | $\frac{\sqrt{385}i}{66}$ | $-\frac{\sqrt{231}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{231}}{924}$ | $-\frac{\sqrt{385}}{132}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{132}$ |
| | | $-\frac{\sqrt{385}i}{66}$ | 0 | 0 | $\frac{\sqrt{231}}{924}$ | 0 | 0 | $-\frac{\sqrt{231}}{924}$ | 0 | 0 | $\frac{\sqrt{385}}{132}$ | 0 | 0 | $\frac{\sqrt{385}}{132}$ | 0 |
| | | $-\frac{\sqrt{231}}{924}$ | 0 | 0 | $-\frac{3\sqrt{385}i}{616}$ | 0 | $\frac{\sqrt{385}}{308}$ | 0 | 0 | 0 | $-\frac{5\sqrt{231}i}{1848}$ | 0 | $-\frac{3\sqrt{231}}{308}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{231}}{924}$ | $\frac{3\sqrt{385}i}{616}$ | 0 | $\frac{\sqrt{385}}{308}$ | 0 | 0 | 0 | $\frac{5\sqrt{231}i}{1848}$ | 0 | $-\frac{3\sqrt{231}}{308}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{385}}{308}$ | 0 | $-\frac{\sqrt{385}i}{77}$ | $\frac{\sqrt{385}}{308}$ | 0 | 0 | $-\frac{5\sqrt{231}}{924}$ | 0 | 0 | $\frac{5\sqrt{231}}{924}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{385}}{308}$ | 0 | $\frac{\sqrt{385}i}{77}$ | 0 | 0 | $-\frac{\sqrt{385}}{308}$ | $-\frac{5\sqrt{231}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{231}}{924}$ |
| | | 0 | $-\frac{\sqrt{231}}{924}$ | 0 | 0 | $\frac{\sqrt{385}}{308}$ | 0 | 0 | $-\frac{3\sqrt{385}i}{616}$ | 0 | 0 | $\frac{3\sqrt{231}}{308}$ | 0 | 0 | $\frac{5\sqrt{231}i}{1848}$ |
| | | $-\frac{\sqrt{231}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{385}}{308}$ | $\frac{3\sqrt{385}i}{616}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{231}}{308}$ | $-\frac{5\sqrt{231}i}{1848}$ | 0 |
| | | $-\frac{\sqrt{385}}{132}$ | 0 | 0 | $-\frac{5\sqrt{231}i}{1848}$ | 0 | $-\frac{5\sqrt{231}}{924}$ | 0 | 0 | 0 | $-\frac{\sqrt{385}i}{264}$ | 0 | $\frac{\sqrt{385}}{924}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{385}}{132}$ | $\frac{5\sqrt{231}i}{1848}$ | 0 | $-\frac{5\sqrt{231}}{924}$ | 0 | 0 | 0 | $\frac{\sqrt{385}i}{264}$ | 0 | $\frac{\sqrt{385}}{924}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{231}}{308}$ | 0 | 0 | $\frac{3\sqrt{231}}{308}$ | 0 | 0 | $\frac{\sqrt{385}}{924}$ | 0 | $\frac{\sqrt{385}i}{66}$ | $\frac{\sqrt{385}}{924}$ | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{231}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{231}}{308}$ | $\frac{\sqrt{385}}{924}$ | 0 | $-\frac{\sqrt{385}i}{66}$ | 0 | 0 | $-\frac{\sqrt{385}}{924}$ |
| | | 0 | $\frac{\sqrt{385}}{132}$ | 0 | 0 | $\frac{5\sqrt{231}}{924}$ | 0 | 0 | $\frac{5\sqrt{231}i}{1848}$ | 0 | 0 | $\frac{\sqrt{385}}{924}$ | 0 | 0 | $-\frac{\sqrt{385}i}{264}$ |
| | | $\frac{\sqrt{385}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{231}}{924}$ | $-\frac{5\sqrt{231}i}{1848}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{385}}{924}$ | $\frac{\sqrt{385}i}{264}$ | 0 |
| 981 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|---------------------------|----------------------------|---------------------------|----------------------------|----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|---------------------------|--------------------------|---------------------------|----------------------------|
| $\mathbb{M}_5^{(1,-1;a)}(A,4)$ | | 0 | $\frac{\sqrt{11}i}{22}$ | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{220}$ | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{44}$ |
| | | $-\frac{\sqrt{11}i}{22}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | $\frac{\sqrt{11}}{44}$ | 0 | 0 | $\frac{\sqrt{11}}{44}$ | 0 |
| | | $\frac{\sqrt{165}}{220}$ | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | $\frac{\sqrt{165}i}{440}$ | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{165}}{220}$ | $\frac{3\sqrt{11}i}{88}$ | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{440}$ | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | $-\frac{3\sqrt{165}}{220}$ | 0 | 0 | $\frac{3\sqrt{165}}{220}$ | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | $-\frac{3\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{165}}{220}$ |
| | | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | $-\frac{\sqrt{165}i}{440}$ |
| | | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | $\frac{3\sqrt{11}i}{88}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{220}$ | $\frac{\sqrt{165}i}{440}$ | 0 |
| | | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | $\frac{\sqrt{165}i}{440}$ | 0 | $-\frac{3\sqrt{165}}{220}$ | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}}{44}$ | $-\frac{\sqrt{165}i}{440}$ | 0 | $-\frac{3\sqrt{165}}{220}$ | 0 | 0 | 0 | $-\frac{3\sqrt{11}i}{88}$ | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | $-\frac{\sqrt{11}i}{22}$ | $-\frac{\sqrt{11}}{44}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{220}$ | $-\frac{\sqrt{11}}{44}$ | 0 | $\frac{\sqrt{11}i}{22}$ | 0 | 0 | $\frac{\sqrt{11}}{44}$ |
| | | 0 | $\frac{\sqrt{11}}{44}$ | 0 | 0 | $\frac{3\sqrt{165}}{220}$ | 0 | 0 | $-\frac{\sqrt{165}i}{440}$ | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | $\frac{3\sqrt{11}i}{88}$ |
| | | $\frac{\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{165}}{220}$ | $\frac{\sqrt{165}i}{440}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{11}}{44}$ | $-\frac{3\sqrt{11}i}{88}$ | 0 |
| 982 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|-------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|----------------------------|---------------------------|---------------------------|--------------------------|--------------------------|---------------------------|----------------------------|
| $\mathbb{M}_5^{(1,-1;a)}(A,5)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}}{33}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}}{33}$ |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{33}$ | 0 | 0 | $\frac{\sqrt{33}}{33}$ | 0 | |
| | | 0 | 0 | 0 | $-\frac{\sqrt{33}i}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}i}{220}$ | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | |
| | | 0 | 0 | $\frac{\sqrt{33}i}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}i}{220}$ | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | $\frac{\sqrt{55}i}{110}$ | $-\frac{\sqrt{55}}{55}$ | 0 | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | $-\frac{\sqrt{55}i}{110}$ | 0 | 0 | $\frac{\sqrt{55}}{55}$ | |
| | | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}i}{44}$ | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | $-\frac{\sqrt{55}i}{220}$ | |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}i}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{55}$ | $\frac{\sqrt{55}i}{220}$ | 0 | |
| | | $\frac{\sqrt{33}}{33}$ | 0 | 0 | $-\frac{\sqrt{55}i}{220}$ | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | 0 | $\frac{7\sqrt{33}i}{132}$ | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{33}}{33}$ | $\frac{\sqrt{55}i}{220}$ | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | $-\frac{7\sqrt{33}i}{132}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | $\frac{\sqrt{55}i}{110}$ | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | $-\frac{\sqrt{55}i}{110}$ | 0 | 0 | $\frac{\sqrt{55}}{55}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{33}}{33}$ | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | $-\frac{\sqrt{55}i}{220}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{33}i}{132}$ |
| | | $\frac{\sqrt{33}}{33}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{55}$ | $\frac{\sqrt{55}i}{220}$ | 0 | 0 | 0 | 0 | 0 | $\frac{7\sqrt{33}i}{132}$ | 0 |
| 983 | symmetry | $\frac{x(8x^4-40x^2y^2-40x^2z^2+15y^4+30y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|------------------------|-----------|--|---------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|
| $M_5^{(1,-1;a)}(B, 1)$ | | 0 | $-\frac{\sqrt{385}}{66}$ | 0 | 0 | $-\frac{\sqrt{231}}{924}$ | 0 | 0 | $\frac{\sqrt{231}i}{924}$ | 0 | 0 | $\frac{\sqrt{385}}{132}$ | 0 | 0 | $\frac{\sqrt{385}i}{132}$ |
| | | $-\frac{\sqrt{385}}{66}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{231}}{924}$ | $-\frac{\sqrt{231}i}{924}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{385}}{132}$ | $-\frac{\sqrt{385}i}{132}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{385}}{77}$ | 0 | $-\frac{\sqrt{385}i}{308}$ | $\frac{\sqrt{385}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{231}i}{924}$ | $-\frac{5\sqrt{231}}{924}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{385}}{77}$ | 0 | $\frac{\sqrt{385}i}{308}$ | 0 | 0 | $-\frac{\sqrt{385}}{308}$ | 0 | 0 | $\frac{5\sqrt{231}i}{924}$ | 0 | 0 | $\frac{5\sqrt{231}}{924}$ |
| | | $-\frac{\sqrt{231}}{924}$ | 0 | 0 | $-\frac{\sqrt{385}i}{308}$ | 0 | $\frac{3\sqrt{385}}{616}$ | 0 | 0 | 0 | $-\frac{3\sqrt{231}i}{308}$ | 0 | $-\frac{5\sqrt{231}}{1848}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{231}}{924}$ | $\frac{\sqrt{385}i}{308}$ | 0 | $\frac{3\sqrt{385}}{616}$ | 0 | 0 | 0 | $\frac{3\sqrt{231}i}{308}$ | 0 | $-\frac{5\sqrt{231}}{1848}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{231}i}{924}$ | $\frac{\sqrt{385}}{308}$ | 0 | 0 | 0 | $\frac{3\sqrt{385}}{616}$ | $-\frac{3\sqrt{231}}{308}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{231}}{1848}$ |
| | | $-\frac{\sqrt{231}i}{924}$ | 0 | 0 | $-\frac{\sqrt{385}}{308}$ | 0 | 0 | $\frac{3\sqrt{385}}{616}$ | 0 | 0 | $\frac{3\sqrt{231}}{308}$ | 0 | 0 | $\frac{5\sqrt{231}}{1848}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{231}i}{308}$ | $-\frac{3\sqrt{231}}{308}$ | 0 | 0 | $-\frac{\sqrt{385}}{66}$ | 0 | $-\frac{\sqrt{385}i}{924}$ | $\frac{\sqrt{385}}{924}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{231}i}{308}$ | 0 | 0 | $\frac{3\sqrt{231}}{308}$ | $-\frac{\sqrt{385}}{66}$ | 0 | $\frac{\sqrt{385}i}{924}$ | 0 | 0 | $-\frac{\sqrt{385}}{924}$ |
| | | $\frac{\sqrt{385}}{132}$ | 0 | 0 | $-\frac{5\sqrt{231}i}{924}$ | 0 | $-\frac{5\sqrt{231}}{1848}$ | 0 | 0 | 0 | $-\frac{\sqrt{385}i}{924}$ | 0 | $\frac{\sqrt{385}}{264}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{385}}{132}$ | $\frac{5\sqrt{231}i}{924}$ | 0 | $-\frac{5\sqrt{231}}{1848}$ | 0 | 0 | 0 | $\frac{\sqrt{385}i}{924}$ | 0 | $\frac{\sqrt{385}}{264}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{385}i}{132}$ | $-\frac{5\sqrt{231}}{924}$ | 0 | 0 | 0 | $\frac{5\sqrt{231}}{1848}$ | $\frac{\sqrt{385}}{924}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{264}$ |
| | | $-\frac{\sqrt{385}i}{132}$ | 0 | 0 | $\frac{5\sqrt{231}}{924}$ | 0 | 0 | $\frac{5\sqrt{231}}{1848}$ | 0 | 0 | $-\frac{\sqrt{385}}{924}$ | 0 | 0 | $\frac{\sqrt{385}}{264}$ | 0 |
| 984 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----------------------|-----------|---|----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|
| $M_5^{(1,-1;a)}(B,2)$ | | $-\frac{\sqrt{385}}{66}$ | 0 | 0 | $\frac{\sqrt{231}i}{924}$ | 0 | $-\frac{\sqrt{231}}{924}$ | 0 | 0 | 0 | $-\frac{\sqrt{385}i}{132}$ | 0 | $-\frac{\sqrt{385}}{132}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{385}}{66}$ | $-\frac{\sqrt{231}i}{924}$ | 0 | $-\frac{\sqrt{231}}{924}$ | 0 | 0 | 0 | $\frac{\sqrt{385}i}{132}$ | 0 | $-\frac{\sqrt{385}}{132}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{231}i}{924}$ | $\frac{3\sqrt{385}}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{308}$ | $-\frac{5\sqrt{231}}{1848}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{231}}{308}$ |
| | | $-\frac{\sqrt{231}i}{924}$ | 0 | 0 | $-\frac{3\sqrt{385}}{616}$ | 0 | 0 | 0 | $\frac{\sqrt{385}}{308}$ | 0 | 0 | $\frac{5\sqrt{231}}{1848}$ | 0 | 0 | $\frac{3\sqrt{231}}{308}$ |
| | | 0 | $-\frac{\sqrt{231}}{924}$ | 0 | 0 | $\frac{3\sqrt{385}}{616}$ | 0 | 0 | $-\frac{\sqrt{385}i}{308}$ | 0 | 0 | $\frac{5\sqrt{231}}{1848}$ | 0 | 0 | $\frac{3\sqrt{231}i}{308}$ |
| | | $-\frac{\sqrt{231}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{385}}{616}$ | $\frac{\sqrt{385}i}{308}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{231}}{1848}$ | $-\frac{3\sqrt{231}i}{308}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{385}}{308}$ | 0 | $-\frac{\sqrt{385}i}{308}$ | $\frac{\sqrt{385}}{77}$ | 0 | 0 | $\frac{5\sqrt{231}}{924}$ | 0 | $\frac{5\sqrt{231}i}{924}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{385}}{308}$ | 0 | $\frac{\sqrt{385}i}{308}$ | 0 | 0 | $-\frac{\sqrt{385}}{77}$ | $\frac{5\sqrt{231}}{924}$ | 0 | $-\frac{5\sqrt{231}i}{924}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{385}i}{132}$ | $-\frac{5\sqrt{231}}{1848}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{231}}{924}$ | $\frac{\sqrt{385}}{264}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{385}}{924}$ |
| | | $\frac{\sqrt{385}i}{132}$ | 0 | 0 | $\frac{5\sqrt{231}}{1848}$ | 0 | 0 | 0 | $\frac{5\sqrt{231}}{924}$ | 0 | 0 | $-\frac{\sqrt{385}}{264}$ | 0 | 0 | $\frac{\sqrt{385}}{924}$ |
| | | 0 | $-\frac{\sqrt{385}}{132}$ | 0 | 0 | $\frac{5\sqrt{231}}{1848}$ | 0 | 0 | $\frac{5\sqrt{231}i}{924}$ | 0 | 0 | $\frac{\sqrt{385}}{264}$ | 0 | 0 | $-\frac{\sqrt{385}i}{924}$ |
| | | $-\frac{\sqrt{385}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{231}}{1848}$ | $-\frac{5\sqrt{231}i}{924}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{385}}{264}$ | $\frac{\sqrt{385}i}{924}$ | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{231}}{308}$ | 0 | $\frac{3\sqrt{231}i}{308}$ | 0 | 0 | 0 | $\frac{\sqrt{385}}{924}$ | 0 | $-\frac{\sqrt{385}i}{924}$ | $-\frac{\sqrt{385}}{66}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{231}}{308}$ | 0 | $-\frac{3\sqrt{231}i}{308}$ | 0 | 0 | 0 | $\frac{\sqrt{385}}{924}$ | 0 | $\frac{\sqrt{385}i}{924}$ | 0 | 0 | $\frac{\sqrt{385}}{66}$ |
| 985 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|----------------------------|----------------------------|-----------------------------|----------------------------|---------------------------|---------------------------|----------------------------|----------------------------|---------------------------|----------------------------|-----------------------------|----------------------------|---------------------------|
| $\mathbb{M}_5^{(1,-1;a)}(B,3)$ | | 0 | $-\frac{\sqrt{11}}{22}$ | 0 | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | $-\frac{\sqrt{165}i}{220}$ | 0 | 0 | $\frac{\sqrt{11}}{44}$ | 0 | 0 | $\frac{\sqrt{11}i}{44}$ |
| | | $-\frac{\sqrt{11}}{22}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | $\frac{\sqrt{165}i}{220}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | $-\frac{\sqrt{11}i}{44}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}i}{44}$ | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{165}i}{220}$ | $-\frac{3\sqrt{165}}{220}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}i}{44}$ | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | $\frac{3\sqrt{165}i}{220}$ | 0 | 0 | $\frac{3\sqrt{165}}{220}$ |
| | | $\frac{\sqrt{165}}{220}$ | 0 | 0 | $\frac{3\sqrt{11}i}{44}$ | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 | $\frac{\sqrt{165}i}{220}$ | 0 | $\frac{\sqrt{165}}{440}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{165}}{220}$ | $-\frac{3\sqrt{11}i}{44}$ | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{220}$ | 0 | $\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{165}i}{220}$ | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{440}$ |
| | | $\frac{\sqrt{165}i}{220}$ | 0 | 0 | $\frac{3\sqrt{11}}{44}$ | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}i}{220}$ | $\frac{\sqrt{165}}{220}$ | 0 | 0 | $\frac{\sqrt{11}}{22}$ | 0 | $\frac{\sqrt{11}i}{44}$ | $-\frac{\sqrt{11}}{44}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}i}{220}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | $\frac{\sqrt{11}}{22}$ | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $\frac{\sqrt{11}}{44}$ |
| | | $\frac{\sqrt{11}}{44}$ | 0 | 0 | $-\frac{3\sqrt{165}i}{220}$ | 0 | $\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 | $\frac{\sqrt{11}i}{44}$ | 0 | $-\frac{3\sqrt{11}}{88}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}}{44}$ | $\frac{3\sqrt{165}i}{220}$ | 0 | $\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | $-\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}i}{44}$ | $-\frac{3\sqrt{165}}{220}$ | 0 | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ |
| | | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $\frac{3\sqrt{165}}{220}$ | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $\frac{\sqrt{11}}{44}$ | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | 0 |
| 986 | symmetry | $\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----------------------|-----------|---|----------------------------|---------------------------|----------------------------|---------------------------|----------------------------|-----------------------------|----------------------------|---------------------------|---------------------------|-----------------------------|----------------------------|---------------------------|----------------------------|
| $M_5^{(1,-1;a)}(B,4)$ | | $-\frac{\sqrt{11}}{22}$ | 0 | 0 | $-\frac{\sqrt{165}i}{220}$ | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{11}}{22}$ | $\frac{\sqrt{165}i}{220}$ | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | $\frac{\sqrt{11}i}{44}$ | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{165}i}{220}$ | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | $\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{165}}{220}$ |
| | | $\frac{\sqrt{165}i}{220}$ | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 |
| | | 0 | $\frac{\sqrt{165}}{220}$ | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | $\frac{3\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $-\frac{\sqrt{165}i}{220}$ |
| | | $\frac{\sqrt{165}}{220}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | $-\frac{3\sqrt{11}i}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{440}$ | $\frac{\sqrt{165}i}{220}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | $\frac{3\sqrt{11}i}{44}$ | 0 | 0 | 0 | $\frac{3\sqrt{165}}{220}$ | 0 | $\frac{3\sqrt{165}i}{220}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{11}}{44}$ | 0 | $-\frac{3\sqrt{11}i}{44}$ | 0 | 0 | 0 | $\frac{3\sqrt{165}}{220}$ | 0 | $-\frac{3\sqrt{165}i}{220}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{11}i}{44}$ | $\frac{\sqrt{165}}{440}$ | 0 | 0 | 0 | $\frac{3\sqrt{165}}{220}$ | $-\frac{3\sqrt{11}}{88}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ |
| | | $\frac{\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $\frac{3\sqrt{165}}{220}$ | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 |
| | | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | $-\frac{\sqrt{165}}{440}$ | 0 | 0 | $\frac{3\sqrt{165}i}{220}$ | 0 | 0 | $-\frac{3\sqrt{11}}{88}$ | 0 | 0 | $\frac{\sqrt{11}i}{44}$ |
| | | $-\frac{\sqrt{11}}{44}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{165}}{440}$ | $-\frac{3\sqrt{165}i}{220}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{11}}{88}$ | $-\frac{\sqrt{11}i}{44}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | $-\frac{\sqrt{165}i}{220}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | $\frac{\sqrt{11}i}{44}$ | $\frac{\sqrt{11}}{22}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{165}}{220}$ | 0 | $\frac{\sqrt{165}i}{220}$ | 0 | 0 | 0 | $-\frac{\sqrt{11}}{44}$ | 0 | $-\frac{\sqrt{11}i}{44}$ | 0 | 0 | $-\frac{\sqrt{11}}{22}$ |
| 987 | symmetry | $\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-------------------------|--------------------------|--|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|---------------------------|--|
| $\mathbb{M}_5^{(1,-1;a)}(B,5)$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}}{33}$ | 0 | 0 | $-\frac{\sqrt{33}i}{33}$ | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{33}$ | $\frac{\sqrt{33}i}{33}$ | 0 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{110}$ | 0 | $\frac{\sqrt{55}i}{55}$ | $-\frac{\sqrt{55}}{55}$ | 0 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{110}$ | 0 | $-\frac{\sqrt{55}i}{55}$ | 0 | 0 | $\frac{\sqrt{55}}{55}$ | 0 | |
| | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | $\frac{\sqrt{55}i}{55}$ | 0 | $\frac{\sqrt{55}}{220}$ | 0 | 0 | |
| | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | $-\frac{\sqrt{55}i}{55}$ | 0 | $\frac{\sqrt{55}}{220}$ | 0 | 0 | 0 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}}{44}$ | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{220}$ | 0 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}}{44}$ | 0 | 0 | $\frac{\sqrt{55}}{55}$ | 0 | 0 | $\frac{\sqrt{55}}{220}$ | 0 | |
| | 0 | 0 | 0 | $-\frac{\sqrt{55}}{110}$ | 0 | $\frac{\sqrt{55}i}{55}$ | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 0 | 0 | $-\frac{\sqrt{55}}{110}$ | 0 | $-\frac{\sqrt{55}i}{55}$ | 0 | 0 | $\frac{\sqrt{55}}{55}$ | 0 | 0 | 0 | 0 | 0 | 0 | |
| | $\frac{\sqrt{33}}{33}$ | 0 | 0 | $\frac{\sqrt{55}i}{55}$ | 0 | $\frac{\sqrt{55}}{220}$ | 0 | 0 | 0 | 0 | 0 | $\frac{7\sqrt{33}}{132}$ | 0 | 0 | |
| | 0 | $-\frac{\sqrt{33}}{33}$ | $-\frac{\sqrt{55}i}{55}$ | 0 | $\frac{\sqrt{55}}{220}$ | 0 | 0 | 0 | 0 | 0 | $\frac{7\sqrt{33}}{132}$ | 0 | 0 | 0 | |
| | 0 | $-\frac{\sqrt{33}i}{33}$ | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{220}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{33}}{132}$ | |
| | $\frac{\sqrt{33}i}{33}$ | 0 | 0 | $\frac{\sqrt{55}}{55}$ | 0 | 0 | $\frac{\sqrt{55}}{220}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{33}}{132}$ | 0 | |
| | 988 | symmetry | $-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-----------------------|-----------|--|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|--------------------------|---------------------------|---------------------------|--------------------------|--------------------------|-------------------------|
| $M_5^{(1,-1;a)}(B,6)$ | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}i}{33}$ | 0 | $\frac{\sqrt{33}}{33}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}i}{33}$ | 0 | $\frac{\sqrt{33}}{33}$ | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{220}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{55}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{220}$ | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{55}}{220}$ | 0 | 0 | $\frac{\sqrt{55}i}{55}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{33}}{44}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{220}$ | $-\frac{\sqrt{55}i}{55}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | $\frac{\sqrt{55}i}{55}$ | $-\frac{\sqrt{55}}{110}$ | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | $-\frac{\sqrt{55}i}{55}$ | 0 | 0 | $\frac{\sqrt{55}}{110}$ |
| | | 0 | $-\frac{\sqrt{33}i}{33}$ | $\frac{\sqrt{55}}{220}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | $\frac{7\sqrt{33}}{132}$ | 0 | 0 | 0 | 0 | 0 |
| | | $\frac{\sqrt{33}i}{33}$ | 0 | 0 | $-\frac{\sqrt{55}}{220}$ | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | 0 | $-\frac{7\sqrt{33}}{132}$ | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{33}}{33}$ | 0 | 0 | $\frac{\sqrt{55}}{220}$ | 0 | 0 | $\frac{\sqrt{55}i}{55}$ | 0 | 0 | $-\frac{7\sqrt{33}}{132}$ | 0 | 0 | 0 |
| | | $\frac{\sqrt{33}}{33}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{55}}{220}$ | $-\frac{\sqrt{55}i}{55}$ | 0 | 0 | 0 | 0 | $\frac{7\sqrt{33}}{132}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | $\frac{\sqrt{55}i}{55}$ | $-\frac{\sqrt{55}}{110}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{55}}{55}$ | 0 | $-\frac{\sqrt{55}i}{55}$ | 0 | 0 | $\frac{\sqrt{55}}{110}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| 989 | symmetry | $\frac{\sqrt{91}xyz(3x^4-5x^2y^2-5x^2z^2+3y^4-5y^2z^2+3z^4)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|----------------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(A,1)$ | | 0 | 0 | 0 | $\frac{\sqrt{770}}{154}$ | 0 | $-\frac{\sqrt{770}i}{154}$ | $\frac{\sqrt{770}}{154}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{770}}{154}$ | 0 | $\frac{\sqrt{770}i}{154}$ | 0 | 0 | $-\frac{\sqrt{770}}{154}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{770}}{154}$ | 0 | 0 | $-\frac{5\sqrt{462}}{1848}$ | 0 | 0 | $\frac{5\sqrt{462}i}{1848}$ | 0 | 0 | $-\frac{3\sqrt{770}}{616}$ | 0 | 0 | $-\frac{3\sqrt{770}i}{616}$ |
| | | $\frac{\sqrt{770}}{154}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{462}}{1848}$ | $-\frac{5\sqrt{462}i}{1848}$ | 0 | 0 | 0 | $\frac{3\sqrt{770}}{616}$ | $\frac{3\sqrt{770}i}{616}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{770}i}{154}$ | $-\frac{5\sqrt{462}}{1848}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{462}}{1848}$ | $\frac{3\sqrt{770}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{770}}{616}$ |
| | | $\frac{\sqrt{770}i}{154}$ | 0 | 0 | $\frac{5\sqrt{462}}{1848}$ | 0 | 0 | $-\frac{5\sqrt{462}}{1848}$ | 0 | 0 | $-\frac{3\sqrt{770}}{616}$ | 0 | 0 | $-\frac{3\sqrt{770}i}{616}$ | 0 |
| | | $\frac{\sqrt{770}}{154}$ | 0 | 0 | $\frac{5\sqrt{462}i}{1848}$ | 0 | $-\frac{5\sqrt{462}}{1848}$ | 0 | 0 | $\frac{3\sqrt{770}i}{616}$ | 0 | $\frac{3\sqrt{770}}{616}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{770}}{154}$ | $-\frac{5\sqrt{462}i}{1848}$ | 0 | $-\frac{5\sqrt{462}}{1848}$ | 0 | 0 | 0 | $-\frac{3\sqrt{770}i}{616}$ | 0 | $\frac{3\sqrt{770}}{616}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{3\sqrt{770}}{616}$ | 0 | 0 | $\frac{3\sqrt{770}i}{616}$ | 0 | 0 | $-\frac{3\sqrt{462}}{616}$ | 0 | 0 | $\frac{3\sqrt{462}i}{616}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{770}}{616}$ | $-\frac{3\sqrt{770}i}{616}$ | 0 | 0 | 0 | $\frac{3\sqrt{462}}{616}$ | $-\frac{3\sqrt{462}i}{616}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{770}}{616}$ | 0 | 0 | 0 | $\frac{3\sqrt{770}}{616}$ | $-\frac{3\sqrt{462}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{462}}{616}$ | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{770}}{616}$ | 0 | 0 | $\frac{3\sqrt{770}}{616}$ | 0 | 0 | $\frac{3\sqrt{462}}{616}$ | 0 | 0 | $-\frac{3\sqrt{462}}{616}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{770}i}{616}$ | 0 | $-\frac{3\sqrt{770}}{616}$ | 0 | 0 | 0 | $\frac{3\sqrt{462}i}{616}$ | 0 | $-\frac{3\sqrt{462}}{616}$ | 0 | 0 |
| | | 0 | 0 | $\frac{3\sqrt{770}i}{616}$ | 0 | $-\frac{3\sqrt{770}}{616}$ | 0 | 0 | 0 | $-\frac{3\sqrt{462}i}{616}$ | 0 | $-\frac{3\sqrt{462}}{616}$ | 0 | 0 | 0 |
| 990 | symmetry | $-\frac{\sqrt{231}xyz(x-y)(x+y)(3x^2+3y^2-10z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|---------------------------------|-----------|--|-----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(A, 2)$ | | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | 0 | $-\frac{\sqrt{2730}i}{364}$ | 0 | 0 | 0 | $-\frac{3\sqrt{182}}{364}$ | 0 | $\frac{3\sqrt{182}i}{364}$ | $\frac{3\sqrt{182}}{182}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | 0 | $\frac{\sqrt{2730}i}{364}$ | 0 | 0 | 0 | $-\frac{3\sqrt{182}}{364}$ | 0 | $-\frac{3\sqrt{182}i}{364}$ | 0 | 0 | $-\frac{3\sqrt{182}}{182}$ |
| | | 0 | $-\frac{\sqrt{2730}}{364}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{182}i}{728}$ | 0 | 0 | $\frac{\sqrt{2730}}{364}$ | 0 | 0 | $\frac{\sqrt{2730}i}{728}$ |
| | | $-\frac{\sqrt{2730}}{364}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{182}i}{728}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | $-\frac{\sqrt{2730}i}{728}$ | 0 |
| | | 0 | $-\frac{\sqrt{2730}i}{364}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{182}}{728}$ | $\frac{\sqrt{2730}}{364}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2730}i}{728}$ |
| | | $\frac{\sqrt{2730}i}{364}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{182}}{728}$ | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | 0 | 0 | $-\frac{\sqrt{2730}i}{728}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{182}i}{728}$ | 0 | $-\frac{5\sqrt{182}}{728}$ | 0 | 0 | 0 | $\frac{\sqrt{2730}i}{728}$ | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 | 0 |
| | | 0 | 0 | $\frac{5\sqrt{182}i}{728}$ | 0 | $-\frac{5\sqrt{182}}{728}$ | 0 | 0 | 0 | $-\frac{\sqrt{2730}i}{728}$ | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{182}}{364}$ | 0 | 0 | $\frac{\sqrt{2730}}{364}$ | 0 | 0 | $\frac{\sqrt{2730}i}{728}$ | 0 | 0 | 0 | 0 | 0 | $\frac{9\sqrt{182}i}{728}$ |
| | | $-\frac{3\sqrt{182}}{364}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | $-\frac{\sqrt{2730}i}{728}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{9\sqrt{182}i}{728}$ | 0 |
| | | 0 | $\frac{3\sqrt{182}i}{364}$ | $\frac{\sqrt{2730}}{364}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | 0 | 0 | $\frac{9\sqrt{182}}{728}$ |
| | | $-\frac{3\sqrt{182}i}{364}$ | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | 0 | 0 | $-\frac{\sqrt{2730}i}{728}$ | 0 | 0 | 0 | 0 | 0 | $\frac{9\sqrt{182}}{728}$ | 0 |
| | | $\frac{3\sqrt{182}}{182}$ | 0 | 0 | $\frac{\sqrt{2730}i}{728}$ | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | $\frac{9\sqrt{182}i}{728}$ | 0 | $\frac{9\sqrt{182}}{728}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{182}}{182}$ | $-\frac{\sqrt{2730}i}{728}$ | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | $-\frac{9\sqrt{182}i}{728}$ | 0 | $\frac{9\sqrt{182}}{728}$ | 0 | 0 | 0 |
| 991 | symmetry | $-\frac{\sqrt{77}xyz(3x^4-20x^2y^2+10x^2z^2+3y^4+10y^2z^2-6z^4)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|----------------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(A,3)$ | | 0 | 0 | 0 | $-\frac{\sqrt{910}}{364}$ | 0 | $\frac{\sqrt{910}i}{364}$ | $\frac{\sqrt{910}}{182}$ | 0 | 0 | $\frac{3\sqrt{546}}{364}$ | 0 | $\frac{3\sqrt{546}i}{364}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{910}}{364}$ | 0 | $-\frac{\sqrt{910}i}{364}$ | 0 | 0 | $-\frac{\sqrt{910}}{182}$ | $\frac{3\sqrt{546}}{364}$ | 0 | $-\frac{3\sqrt{546}i}{364}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{910}}{364}$ | 0 | 0 | $\frac{5\sqrt{546}}{1092}$ | 0 | 0 | $\frac{5\sqrt{546}i}{2184}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{910}i}{728}$ |
| | | $-\frac{\sqrt{910}}{364}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{546}}{1092}$ | $-\frac{5\sqrt{546}i}{2184}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{910}i}{728}$ | 0 |
| | | 0 | $\frac{\sqrt{910}i}{364}$ | $\frac{5\sqrt{546}}{1092}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{546}}{2184}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{910}}{728}$ |
| | | $-\frac{\sqrt{910}i}{364}$ | 0 | 0 | $-\frac{5\sqrt{546}}{1092}$ | 0 | 0 | 0 | $-\frac{5\sqrt{546}i}{2184}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{910}}{728}$ |
| | | $\frac{\sqrt{910}}{182}$ | 0 | 0 | $\frac{5\sqrt{546}i}{2184}$ | 0 | $-\frac{5\sqrt{546}}{2184}$ | 0 | 0 | 0 | $\frac{3\sqrt{910}i}{728}$ | 0 | $\frac{3\sqrt{910}}{728}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{910}}{182}$ | $-\frac{5\sqrt{546}i}{2184}$ | 0 | $-\frac{5\sqrt{546}}{2184}$ | 0 | 0 | 0 | $-\frac{3\sqrt{910}i}{728}$ | 0 | $\frac{3\sqrt{910}}{728}$ | 0 | 0 | 0 |
| | | 0 | $\frac{3\sqrt{546}}{364}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{910}i}{728}$ | 0 | 0 | $-\frac{3\sqrt{546}i}{364}$ | 0 | 0 | $-\frac{3\sqrt{546}i}{728}$ |
| | | $\frac{3\sqrt{546}}{364}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{910}i}{728}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{546}}{364}$ | $\frac{3\sqrt{546}i}{728}$ | 0 |
| | | 0 | $\frac{3\sqrt{546}i}{364}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{910}}{728}$ | $-\frac{3\sqrt{546}}{364}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{546}}{728}$ |
| | | $-\frac{3\sqrt{546}i}{364}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{910}}{728}$ | 0 | 0 | $\frac{3\sqrt{546}}{364}$ | 0 | 0 | $\frac{3\sqrt{546}i}{728}$ | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{910}i}{728}$ | 0 | $\frac{3\sqrt{910}}{728}$ | 0 | 0 | 0 | $-\frac{3\sqrt{546}i}{728}$ | 0 | $\frac{3\sqrt{546}}{728}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{910}i}{728}$ | 0 | $\frac{3\sqrt{910}}{728}$ | 0 | 0 | 0 | $\frac{3\sqrt{546}i}{728}$ | 0 | $\frac{3\sqrt{546}}{728}$ | 0 | 0 | 0 |
| 992 | symmetry | $-\frac{y(35x^6-210x^4y^2+105x^4z^2+168x^2y^4-420x^2y^2z^2+105x^2z^4-16y^6+168y^4z^2-210y^2z^4+35z^6)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|-----------------------------|-------------------------------|-------------------------------|------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|-------------------------------|----------------------------|----------------------------|-------------------------------|------------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(A,4)$ | | 0 | $-\frac{\sqrt{858}i}{286}$ | $-\frac{\sqrt{1430}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1430}}{1144}$ | $\frac{3\sqrt{858}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{858}}{1144}$ |
| | | $\frac{\sqrt{858}i}{286}$ | 0 | 0 | $\frac{\sqrt{1430}}{1144}$ | 0 | 0 | $-\frac{\sqrt{1430}}{1144}$ | 0 | 0 | $-\frac{3\sqrt{858}}{1144}$ | 0 | 0 | $-\frac{3\sqrt{858}}{1144}$ | 0 |
| | | $-\frac{\sqrt{1430}}{1144}$ | 0 | 0 | $\frac{25\sqrt{858}i}{6864}$ | 0 | $\frac{5\sqrt{858}}{1144}$ | 0 | 0 | 0 | $-\frac{7\sqrt{1430}i}{2288}$ | 0 | $\frac{\sqrt{1430}}{572}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{1430}}{1144}$ | $-\frac{25\sqrt{858}i}{6864}$ | 0 | $\frac{5\sqrt{858}}{1144}$ | 0 | 0 | 0 | $\frac{7\sqrt{1430}i}{2288}$ | 0 | $\frac{\sqrt{1430}}{572}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{858}}{1144}$ | 0 | $-\frac{5\sqrt{858}i}{429}$ | $\frac{5\sqrt{858}}{1144}$ | 0 | 0 | $-\frac{5\sqrt{1430}}{1144}$ | 0 | 0 | $\frac{5\sqrt{1430}}{1144}$ | 0 |
| | | 0 | 0 | $\frac{5\sqrt{858}}{1144}$ | 0 | $\frac{5\sqrt{858}i}{429}$ | 0 | 0 | $-\frac{5\sqrt{858}}{1144}$ | $-\frac{5\sqrt{1430}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{1430}}{1144}$ |
| | | 0 | $-\frac{\sqrt{1430}}{1144}$ | 0 | 0 | $\frac{5\sqrt{858}}{1144}$ | 0 | 0 | $\frac{25\sqrt{858}i}{6864}$ | 0 | 0 | $-\frac{\sqrt{1430}}{572}$ | 0 | 0 | $\frac{7\sqrt{1430}i}{2288}$ |
| | | $-\frac{\sqrt{1430}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{858}}{1144}$ | $-\frac{25\sqrt{858}i}{6864}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1430}}{572}$ | $-\frac{7\sqrt{1430}i}{2288}$ | 0 |
| | | $\frac{3\sqrt{858}}{1144}$ | 0 | 0 | $-\frac{7\sqrt{1430}i}{2288}$ | 0 | $-\frac{5\sqrt{1430}}{1144}$ | 0 | 0 | 0 | $\frac{\sqrt{858}i}{176}$ | 0 | $-\frac{\sqrt{858}}{572}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{858}}{1144}$ | $\frac{7\sqrt{1430}i}{2288}$ | 0 | $-\frac{5\sqrt{1430}}{1144}$ | 0 | 0 | 0 | $-\frac{\sqrt{858}i}{176}$ | 0 | $-\frac{\sqrt{858}}{572}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{1430}}{572}$ | 0 | 0 | $-\frac{\sqrt{1430}}{572}$ | 0 | 0 | $-\frac{\sqrt{858}}{572}$ | 0 | $-\frac{\sqrt{858}i}{286}$ | $-\frac{\sqrt{858}}{572}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{1430}}{572}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1430}}{572}$ | $-\frac{\sqrt{858}}{572}$ | 0 | $\frac{\sqrt{858}i}{286}$ | 0 | 0 | $\frac{\sqrt{858}}{572}$ |
| | | 0 | $-\frac{3\sqrt{858}}{1144}$ | 0 | 0 | $\frac{5\sqrt{1430}}{1144}$ | 0 | 0 | $\frac{7\sqrt{1430}i}{2288}$ | 0 | 0 | $-\frac{\sqrt{858}}{572}$ | 0 | 0 | $\frac{\sqrt{858}i}{176}$ |
| | | $-\frac{3\sqrt{858}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{1430}}{1144}$ | $-\frac{7\sqrt{1430}i}{2288}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{858}}{572}$ | $-\frac{\sqrt{858}i}{176}$ | 0 |
| 993 | symmetry | $-\frac{\sqrt{231}y(x^2-2xz-z^2)(x^2+2xz-z^2)(3x^2-10y^2+3z^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|---------------------------------|-----------|--|----------------------------|-------------------------------|------------------------------|----------------------------|----------------------------|-------------------------------|------------------------------|------------------------------|-------------------------------|----------------------------|-----------------------------|------------------------------|-------------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(A, 5)$ | | 0 | $\frac{3\sqrt{182}i}{182}$ | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2730}}{728}$ | $-\frac{9\sqrt{182}}{728}$ | 0 | 0 | 0 | 0 | $\frac{9\sqrt{182}}{728}$ |
| | | $-\frac{3\sqrt{182}i}{182}$ | 0 | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 | 0 | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | $\frac{9\sqrt{182}}{728}$ | 0 | 0 | $\frac{9\sqrt{182}}{728}$ | 0 |
| | | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | $\frac{15\sqrt{182}i}{1456}$ | 0 | $\frac{5\sqrt{182}}{728}$ | 0 | 0 | 0 | $-\frac{\sqrt{2730}i}{1456}$ | 0 | $\frac{\sqrt{2730}}{364}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{2730}}{728}$ | $-\frac{15\sqrt{182}i}{1456}$ | 0 | $\frac{5\sqrt{182}}{728}$ | 0 | 0 | 0 | $\frac{\sqrt{2730}i}{1456}$ | 0 | $\frac{\sqrt{2730}}{364}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{182}}{728}$ | 0 | 0 | $\frac{5\sqrt{182}}{728}$ | 0 | 0 | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 |
| | | 0 | 0 | $\frac{5\sqrt{182}}{728}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{182}}{728}$ | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2730}}{728}$ |
| | | 0 | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | $\frac{5\sqrt{182}}{728}$ | 0 | 0 | $\frac{15\sqrt{182}i}{1456}$ | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | 0 | 0 | $\frac{\sqrt{2730}i}{1456}$ |
| | | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{182}}{728}$ | $-\frac{15\sqrt{182}i}{1456}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2730}}{364}$ | $-\frac{\sqrt{2730}i}{1456}$ | 0 |
| | | $-\frac{9\sqrt{182}}{728}$ | 0 | 0 | $-\frac{\sqrt{2730}i}{1456}$ | 0 | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | $-\frac{15\sqrt{182}i}{1456}$ | 0 | $-\frac{3\sqrt{182}}{364}$ | 0 | 0 |
| | | 0 | $\frac{9\sqrt{182}}{728}$ | $\frac{\sqrt{2730}i}{1456}$ | 0 | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | $\frac{15\sqrt{182}i}{1456}$ | 0 | $-\frac{3\sqrt{182}}{364}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{2730}}{364}$ | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | 0 | 0 | $-\frac{3\sqrt{182}}{364}$ | 0 | $-\frac{3\sqrt{182}i}{182}$ | $-\frac{3\sqrt{182}}{364}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{2730}}{364}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2730}}{364}$ | $-\frac{3\sqrt{182}}{364}$ | 0 | $\frac{3\sqrt{182}i}{182}$ | 0 | 0 | $\frac{3\sqrt{182}}{364}$ |
| | | 0 | $\frac{9\sqrt{182}}{728}$ | 0 | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 | 0 | $\frac{\sqrt{2730}i}{1456}$ | 0 | 0 | $-\frac{3\sqrt{182}}{364}$ | 0 | 0 | $-\frac{15\sqrt{182}i}{1456}$ |
| | | $\frac{9\sqrt{182}}{728}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2730}}{728}$ | $-\frac{\sqrt{2730}i}{1456}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{182}}{364}$ | $\frac{15\sqrt{182}i}{1456}$ | 0 |
| 994 | symmetry | $-\frac{\sqrt{6006}y(x-z)(x+z)(x^2-4xz+z^2)(x^2+4xz+z^2)}{32}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|--------------------------|----------------------------|---------------------------|---|---|----------------------------|---------------------------|----------------------------|---------------------------|-------------------------|--------------------------|----------------------------|---------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(A,6)$ | | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 |
| | | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{5\sqrt{7}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{112}$ | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{56}$ | $-\frac{5\sqrt{7}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | 0 | $\frac{\sqrt{105}}{56}$ | 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 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{7}i}{112}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{112}$ |
| | | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{7}i}{112}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | $-\frac{\sqrt{105}i}{112}$ | 0 |
| | | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{105}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{112}$ | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{7}}{56}$ | $-\frac{\sqrt{105}i}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{112}$ | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ |
| | | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{112}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{112}$ |
| | | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{112}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | $\frac{3\sqrt{7}i}{112}$ | 0 |
| 995 | symmetry | $-\frac{\sqrt{42}y(x-z)(x+z)(15x^4-80x^2y^2+30x^2z^2+48y^4-80y^2z^2+15z^4)}{32}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|---------------------------------|------------------------------|---|---------------------------------|----------------------------------|-------------------------------|--------------------------------|---------------------------------|----------------------------------|---------------------------------|----------------------------------|-------------------------------|--------------------------------|---------------------------------|----------------------------------|--|
| $\mathbb{M}_7^{(1,-1;a)}(A, 7)$ | 0 | 0 | $-\frac{\sqrt{15015}}{8008}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15015}}{8008}$ | $-\frac{3\sqrt{1001}}{8008}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{1001}}{8008}$ | |
| | 0 | 0 | 0 | $\frac{\sqrt{15015}}{8008}$ | 0 | 0 | $\frac{\sqrt{15015}}{8008}$ | 0 | 0 | $\frac{3\sqrt{1001}}{8008}$ | 0 | 0 | $-\frac{3\sqrt{1001}}{8008}$ | 0 | |
| | $-\frac{\sqrt{15015}}{8008}$ | 0 | 0 | $\frac{75\sqrt{1001}i}{16016}$ | 0 | $\frac{5\sqrt{1001}}{1001}$ | 0 | 0 | 0 | $-\frac{17\sqrt{15015}i}{16016}$ | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | 0 | |
| | 0 | $\frac{\sqrt{15015}}{8008}$ | $-\frac{75\sqrt{1001}i}{16016}$ | 0 | $\frac{5\sqrt{1001}}{1001}$ | 0 | 0 | 0 | $\frac{17\sqrt{15015}i}{16016}$ | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | 0 | 0 | |
| | 0 | 0 | 0 | $\frac{5\sqrt{1001}}{1001}$ | 0 | 0 | $-\frac{5\sqrt{1001}}{1001}$ | 0 | 0 | $-\frac{\sqrt{15015}}{1001}$ | 0 | $-\frac{2\sqrt{15015}i}{1001}$ | $-\frac{\sqrt{15015}}{1001}$ | 0 | |
| | 0 | 0 | $\frac{5\sqrt{1001}}{1001}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{1001}}{1001}$ | $-\frac{\sqrt{15015}}{1001}$ | 0 | $\frac{2\sqrt{15015}i}{1001}$ | 0 | 0 | $\frac{\sqrt{15015}}{1001}$ | |
| | 0 | $\frac{\sqrt{15015}}{8008}$ | 0 | 0 | $-\frac{5\sqrt{1001}}{1001}$ | 0 | 0 | $-\frac{75\sqrt{1001}i}{16016}$ | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | 0 | $-\frac{17\sqrt{15015}i}{16016}$ | |
| | $\frac{\sqrt{15015}}{8008}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{1001}}{1001}$ | $\frac{75\sqrt{1001}i}{16016}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15015}}{1144}$ | $\frac{17\sqrt{15015}i}{16016}$ | 0 | |
| | $-\frac{3\sqrt{1001}}{8008}$ | 0 | 0 | $-\frac{17\sqrt{15015}i}{16016}$ | 0 | $-\frac{\sqrt{15015}}{1001}$ | 0 | 0 | 0 | $\frac{45\sqrt{1001}i}{16016}$ | 0 | $-\frac{27\sqrt{1001}}{8008}$ | 0 | 0 | |
| | 0 | $\frac{3\sqrt{1001}}{8008}$ | $\frac{17\sqrt{15015}i}{16016}$ | 0 | $-\frac{\sqrt{15015}}{1001}$ | 0 | 0 | 0 | $-\frac{45\sqrt{1001}i}{16016}$ | 0 | $-\frac{27\sqrt{1001}}{8008}$ | 0 | 0 | 0 | |
| | 0 | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | $-\frac{2\sqrt{15015}i}{1001}$ | $\frac{\sqrt{15015}}{1144}$ | 0 | 0 | $-\frac{27\sqrt{1001}}{8008}$ | 0 | 0 | $\frac{27\sqrt{1001}}{8008}$ | 0 | |
| | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | $\frac{2\sqrt{15015}i}{1001}$ | 0 | 0 | $-\frac{\sqrt{15015}}{1144}$ | $-\frac{27\sqrt{1001}}{8008}$ | 0 | 0 | 0 | 0 | $-\frac{27\sqrt{1001}}{8008}$ | |
| | 0 | $-\frac{3\sqrt{1001}}{8008}$ | 0 | 0 | $-\frac{\sqrt{15015}}{1001}$ | 0 | 0 | $-\frac{17\sqrt{15015}i}{16016}$ | 0 | 0 | $\frac{27\sqrt{1001}}{8008}$ | 0 | 0 | $-\frac{45\sqrt{1001}i}{16016}$ | |
| | $-\frac{3\sqrt{1001}}{8008}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15015}}{1001}$ | $\frac{17\sqrt{15015}i}{16016}$ | 0 | 0 | 0 | 0 | $-\frac{27\sqrt{1001}}{8008}$ | $\frac{45\sqrt{1001}i}{16016}$ | 0 | |
| 996 | 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 | | | | | | | | | | | | |
|--------------------------------|-----------|---|------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|-------------------------------|------------------------------|------------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(B,1)$ | | 0 | $\frac{\sqrt{858}}{286}$ | 0 | 0 | $-\frac{\sqrt{1430}}{1144}$ | 0 | 0 | $\frac{\sqrt{1430}i}{1144}$ | 0 | 0 | $-\frac{3\sqrt{858}}{1144}$ | 0 | $-\frac{3\sqrt{858}i}{1144}$ |
| | | $\frac{\sqrt{858}}{286}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1430}}{1144}$ | $-\frac{\sqrt{1430}i}{1144}$ | 0 | 0 | 0 | $\frac{3\sqrt{858}}{1144}$ | $\frac{3\sqrt{858}i}{1144}$ | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{858}}{429}$ | 0 | $-\frac{5\sqrt{858}i}{1144}$ | $\frac{5\sqrt{858}}{1144}$ | 0 | 0 | 0 | $-\frac{5\sqrt{1430}i}{1144}$ | $-\frac{5\sqrt{1430}}{1144}$ | 0 |
| | | 0 | 0 | $\frac{5\sqrt{858}}{429}$ | 0 | $\frac{5\sqrt{858}i}{1144}$ | 0 | 0 | $-\frac{5\sqrt{858}}{1144}$ | 0 | 0 | $\frac{5\sqrt{1430}i}{1144}$ | 0 | $\frac{5\sqrt{1430}}{1144}$ |
| | | $-\frac{\sqrt{1430}}{1144}$ | 0 | 0 | $-\frac{5\sqrt{858}i}{1144}$ | 0 | $-\frac{25\sqrt{858}}{6864}$ | 0 | 0 | 0 | $\frac{\sqrt{1430}i}{572}$ | 0 | $-\frac{7\sqrt{1430}}{2288}$ | 0 |
| | | 0 | $\frac{\sqrt{1430}}{1144}$ | $\frac{5\sqrt{858}i}{1144}$ | 0 | $-\frac{25\sqrt{858}}{6864}$ | 0 | 0 | 0 | $-\frac{\sqrt{1430}i}{572}$ | 0 | $-\frac{7\sqrt{1430}}{2288}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{1430}i}{1144}$ | $\frac{5\sqrt{858}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{25\sqrt{858}}{6864}$ | $\frac{\sqrt{1430}}{572}$ | 0 | 0 | 0 | $\frac{7\sqrt{1430}}{2288}$ |
| | | $-\frac{\sqrt{1430}i}{1144}$ | 0 | 0 | $-\frac{5\sqrt{858}}{1144}$ | 0 | 0 | $-\frac{25\sqrt{858}}{6864}$ | 0 | 0 | $-\frac{\sqrt{1430}}{572}$ | 0 | 0 | $\frac{7\sqrt{1430}}{2288}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{1430}i}{572}$ | $\frac{\sqrt{1430}}{572}$ | 0 | 0 | $\frac{\sqrt{858}}{286}$ | 0 | $\frac{\sqrt{858}i}{572}$ | $-\frac{\sqrt{858}}{572}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1430}i}{572}$ | 0 | 0 | $-\frac{\sqrt{1430}}{572}$ | $\frac{\sqrt{858}}{286}$ | 0 | $-\frac{\sqrt{858}i}{572}$ | 0 | $\frac{\sqrt{858}}{572}$ |
| | | $-\frac{3\sqrt{858}}{1144}$ | 0 | 0 | $-\frac{5\sqrt{1430}i}{1144}$ | 0 | $-\frac{7\sqrt{1430}}{2288}$ | 0 | 0 | 0 | $\frac{\sqrt{858}i}{572}$ | 0 | $-\frac{\sqrt{858}}{176}$ | 0 |
| | | 0 | $\frac{3\sqrt{858}}{1144}$ | $\frac{5\sqrt{1430}i}{1144}$ | 0 | $-\frac{7\sqrt{1430}}{2288}$ | 0 | 0 | 0 | $-\frac{\sqrt{858}i}{572}$ | 0 | $-\frac{\sqrt{858}}{176}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{858}i}{1144}$ | $-\frac{5\sqrt{1430}}{1144}$ | 0 | 0 | 0 | 0 | $\frac{7\sqrt{1430}}{2288}$ | $-\frac{\sqrt{858}}{572}$ | 0 | 0 | 0 | $-\frac{\sqrt{858}}{176}$ |
| | | $\frac{3\sqrt{858}i}{1144}$ | 0 | 0 | $\frac{5\sqrt{1430}}{1144}$ | 0 | 0 | $\frac{7\sqrt{1430}}{2288}$ | 0 | 0 | $\frac{\sqrt{858}}{572}$ | 0 | 0 | $-\frac{\sqrt{858}}{176}$ |
| 997 | symmetry | $-\frac{z(35x^6+105x^4y^2-210x^4z^2+105x^2y^4-420x^2y^2z^2+168x^2z^4+35y^6-210y^4z^2+168y^2z^4-16z^6)}{16}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|-----------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|-----------------------------|-------------------------------|------------------------------|----------------------------|-----------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(B,2)$ | | $\frac{\sqrt{858}}{286}$ | 0 | 0 | $\frac{\sqrt{1430}i}{1144}$ | 0 | $-\frac{\sqrt{1430}}{1144}$ | 0 | 0 | 0 | $\frac{3\sqrt{858}i}{1144}$ | 0 | $\frac{3\sqrt{858}}{1144}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{858}}{286}$ | $-\frac{\sqrt{1430}i}{1144}$ | 0 | $-\frac{\sqrt{1430}}{1144}$ | 0 | 0 | 0 | $-\frac{3\sqrt{858}i}{1144}$ | 0 | $\frac{3\sqrt{858}}{1144}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{1430}i}{1144}$ | $-\frac{25\sqrt{858}}{6864}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{858}}{1144}$ | $-\frac{7\sqrt{1430}}{2288}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1430}}{572}$ |
| | | $-\frac{\sqrt{1430}i}{1144}$ | 0 | 0 | $\frac{25\sqrt{858}}{6864}$ | 0 | 0 | 0 | $\frac{5\sqrt{858}}{1144}$ | 0 | 0 | $\frac{7\sqrt{1430}}{2288}$ | 0 | 0 | $-\frac{\sqrt{1430}}{572}$ |
| | | 0 | $-\frac{\sqrt{1430}}{1144}$ | 0 | 0 | $-\frac{25\sqrt{858}}{6864}$ | 0 | 0 | $-\frac{5\sqrt{858}i}{1144}$ | 0 | 0 | $\frac{7\sqrt{1430}}{2288}$ | 0 | 0 | $-\frac{\sqrt{1430}i}{572}$ |
| | | $-\frac{\sqrt{1430}}{1144}$ | 0 | 0 | 0 | 0 | $\frac{25\sqrt{858}}{6864}$ | $\frac{5\sqrt{858}i}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{1430}}{2288}$ | $\frac{\sqrt{1430}i}{572}$ | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{858}}{1144}$ | 0 | $-\frac{5\sqrt{858}i}{1144}$ | $\frac{5\sqrt{858}}{429}$ | 0 | 0 | $\frac{5\sqrt{1430}}{1144}$ | 0 | $\frac{5\sqrt{1430}i}{1144}$ | 0 | 0 |
| | | 0 | 0 | $\frac{5\sqrt{858}}{1144}$ | 0 | $\frac{5\sqrt{858}i}{1144}$ | 0 | 0 | $-\frac{5\sqrt{858}}{429}$ | $\frac{5\sqrt{1430}}{1144}$ | 0 | $-\frac{5\sqrt{1430}i}{1144}$ | 0 | 0 | 0 |
| | | 0 | $\frac{3\sqrt{858}i}{1144}$ | $-\frac{7\sqrt{1430}}{2288}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{1430}}{1144}$ | $-\frac{\sqrt{858}}{176}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{858}}{572}$ |
| | | $-\frac{3\sqrt{858}i}{1144}$ | 0 | 0 | $\frac{7\sqrt{1430}}{2288}$ | 0 | 0 | $\frac{5\sqrt{1430}}{1144}$ | 0 | 0 | $\frac{\sqrt{858}}{176}$ | 0 | 0 | $-\frac{\sqrt{858}}{572}$ | 0 |
| | | 0 | $\frac{3\sqrt{858}}{1144}$ | 0 | 0 | $\frac{7\sqrt{1430}}{2288}$ | 0 | 0 | $\frac{5\sqrt{1430}i}{1144}$ | 0 | 0 | $-\frac{\sqrt{858}}{176}$ | 0 | 0 | $\frac{\sqrt{858}i}{572}$ |
| | | $\frac{3\sqrt{858}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{1430}}{2288}$ | $-\frac{5\sqrt{1430}i}{1144}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{858}}{176}$ | $-\frac{\sqrt{858}i}{572}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{1430}}{572}$ | 0 | $-\frac{\sqrt{1430}i}{572}$ | 0 | 0 | 0 | $-\frac{\sqrt{858}}{572}$ | 0 | $\frac{\sqrt{858}i}{572}$ | $\frac{\sqrt{858}}{286}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{1430}}{572}$ | 0 | $\frac{\sqrt{1430}i}{572}$ | 0 | 0 | 0 | $-\frac{\sqrt{858}}{572}$ | 0 | $-\frac{\sqrt{858}i}{572}$ | 0 | 0 | $-\frac{\sqrt{858}}{286}$ |
| 998 | symmetry | $\frac{\sqrt{231}x(10x^2-3y^2-3z^2)(y^2-2yz-z^2)(y^2+2yz-z^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(B,3)$ | | 0 | $-\frac{3\sqrt{182}}{182}$ | 0 | 0 | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | $-\frac{\sqrt{2730}i}{728}$ | 0 | 0 | $\frac{9\sqrt{182}}{728}$ | 0 | 0 | $\frac{9\sqrt{182}i}{728}$ |
| | | $-\frac{3\sqrt{182}}{182}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{728}$ | $\frac{\sqrt{2730}i}{728}$ | 0 | 0 | 0 | 0 | $-\frac{9\sqrt{182}}{728}$ | $-\frac{9\sqrt{182}i}{728}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{182}i}{728}$ | $\frac{5\sqrt{182}}{728}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2730}i}{728}$ | $\frac{\sqrt{2730}}{728}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{5\sqrt{182}i}{728}$ | 0 | 0 | $-\frac{5\sqrt{182}}{728}$ | 0 | 0 | $-\frac{\sqrt{2730}i}{728}$ | 0 | 0 | $-\frac{\sqrt{2730}}{728}$ |
| | | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | $-\frac{5\sqrt{182}i}{728}$ | 0 | $-\frac{15\sqrt{182}}{1456}$ | 0 | 0 | 0 | $\frac{\sqrt{2730}i}{364}$ | 0 | $-\frac{\sqrt{2730}}{1456}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{2730}}{728}$ | $\frac{5\sqrt{182}i}{728}$ | 0 | $-\frac{15\sqrt{182}}{1456}$ | 0 | 0 | 0 | $-\frac{\sqrt{2730}i}{364}$ | 0 | $-\frac{\sqrt{2730}}{1456}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{2730}i}{728}$ | $\frac{5\sqrt{182}}{728}$ | 0 | 0 | 0 | 0 | $-\frac{15\sqrt{182}}{1456}$ | $\frac{\sqrt{2730}}{364}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2730}}{1456}$ |
| | | $\frac{\sqrt{2730}i}{728}$ | 0 | 0 | $-\frac{5\sqrt{182}}{728}$ | 0 | 0 | $-\frac{15\sqrt{182}}{1456}$ | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | 0 | 0 | $\frac{\sqrt{2730}}{1456}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{2730}i}{364}$ | $\frac{\sqrt{2730}}{364}$ | 0 | 0 | $\frac{3\sqrt{182}}{182}$ | 0 | $\frac{3\sqrt{182}i}{364}$ | $-\frac{3\sqrt{182}}{364}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2730}i}{364}$ | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | $\frac{3\sqrt{182}}{182}$ | 0 | $-\frac{3\sqrt{182}i}{364}$ | 0 | 0 | $\frac{3\sqrt{182}}{364}$ |
| | | $\frac{9\sqrt{182}}{728}$ | 0 | 0 | $\frac{\sqrt{2730}i}{728}$ | 0 | $-\frac{\sqrt{2730}}{1456}$ | 0 | 0 | 0 | $\frac{3\sqrt{182}i}{364}$ | 0 | $\frac{15\sqrt{182}}{1456}$ | 0 | 0 |
| | | 0 | $-\frac{9\sqrt{182}}{728}$ | $-\frac{\sqrt{2730}i}{728}$ | 0 | $-\frac{\sqrt{2730}}{1456}$ | 0 | 0 | 0 | $-\frac{3\sqrt{182}i}{364}$ | 0 | $\frac{15\sqrt{182}}{1456}$ | 0 | 0 | 0 |
| | | 0 | $\frac{9\sqrt{182}i}{728}$ | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2730}}{1456}$ | $-\frac{3\sqrt{182}}{364}$ | 0 | 0 | 0 | 0 | $\frac{15\sqrt{182}}{1456}$ |
| | | $-\frac{9\sqrt{182}i}{728}$ | 0 | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 | 0 | $\frac{\sqrt{2730}}{1456}$ | 0 | 0 | $\frac{3\sqrt{182}}{364}$ | 0 | 0 | $\frac{15\sqrt{182}}{1456}$ | 0 |
| 999 | symmetry | $-\frac{\sqrt{231}z(x^2-2xy-y^2)(x^2+2xy-y^2)(3x^2+3y^2-10z^2)}{16}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|-----------------------------|------------------------------|-----------------------------|------------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(B,4)$ | | $-\frac{3\sqrt{182}}{182}$ | 0 | 0 | $-\frac{\sqrt{2730}i}{728}$ | 0 | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | $-\frac{9\sqrt{182}i}{728}$ | 0 | $-\frac{9\sqrt{182}}{728}$ | 0 | 0 |
| | | 0 | $\frac{3\sqrt{182}}{182}$ | $\frac{\sqrt{2730}i}{728}$ | 0 | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | $\frac{9\sqrt{182}i}{728}$ | 0 | $-\frac{9\sqrt{182}}{728}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{2730}i}{728}$ | $-\frac{15\sqrt{182}}{1456}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{182}}{728}$ | $-\frac{\sqrt{2730}}{1456}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ |
| | | $\frac{\sqrt{2730}i}{728}$ | 0 | 0 | $\frac{15\sqrt{182}}{1456}$ | 0 | 0 | $\frac{5\sqrt{182}}{728}$ | 0 | 0 | $\frac{\sqrt{2730}}{1456}$ | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | 0 |
| | | 0 | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | $-\frac{15\sqrt{182}}{1456}$ | 0 | 0 | $-\frac{5\sqrt{182}i}{728}$ | 0 | 0 | $\frac{\sqrt{2730}}{1456}$ | 0 | 0 | $-\frac{\sqrt{2730}i}{364}$ |
| | | $\frac{\sqrt{2730}}{728}$ | 0 | 0 | 0 | 0 | $\frac{15\sqrt{182}}{1456}$ | $\frac{5\sqrt{182}i}{728}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{1456}$ | $\frac{\sqrt{2730}i}{364}$ | 0 |
| | | 0 | 0 | 0 | $\frac{5\sqrt{182}}{728}$ | 0 | $-\frac{5\sqrt{182}i}{728}$ | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 | $-\frac{\sqrt{2730}i}{728}$ | 0 | 0 |
| | | 0 | 0 | $\frac{5\sqrt{182}}{728}$ | 0 | $\frac{5\sqrt{182}i}{728}$ | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 | $\frac{\sqrt{2730}i}{728}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{9\sqrt{182}i}{728}$ | $-\frac{\sqrt{2730}}{1456}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{728}$ | $\frac{15\sqrt{182}}{1456}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{182}}{364}$ |
| | | $\frac{9\sqrt{182}i}{728}$ | 0 | 0 | $\frac{\sqrt{2730}}{1456}$ | 0 | 0 | $-\frac{\sqrt{2730}}{728}$ | 0 | 0 | $-\frac{15\sqrt{182}}{1456}$ | 0 | 0 | $-\frac{3\sqrt{182}}{364}$ | 0 |
| | | 0 | $-\frac{9\sqrt{182}}{728}$ | 0 | 0 | $\frac{\sqrt{2730}}{1456}$ | 0 | 0 | $-\frac{\sqrt{2730}i}{728}$ | 0 | 0 | $\frac{15\sqrt{182}}{1456}$ | 0 | 0 | $\frac{3\sqrt{182}i}{364}$ |
| | | $-\frac{9\sqrt{182}}{728}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{1456}$ | $\frac{\sqrt{2730}i}{728}$ | 0 | 0 | 0 | 0 | $-\frac{15\sqrt{182}}{1456}$ | $-\frac{3\sqrt{182}i}{364}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | 0 | $-\frac{\sqrt{2730}i}{364}$ | 0 | 0 | 0 | $-\frac{3\sqrt{182}}{364}$ | 0 | $\frac{3\sqrt{182}i}{364}$ | $\frac{3\sqrt{182}}{182}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{2730}}{364}$ | 0 | $\frac{\sqrt{2730}i}{364}$ | 0 | 0 | 0 | $-\frac{3\sqrt{182}}{364}$ | 0 | $-\frac{3\sqrt{182}i}{364}$ | 0 | 0 | $-\frac{3\sqrt{182}}{182}$ |
| 1000 | symmetry | $\frac{\sqrt{6006}x(y-z)(y+z)(y^2-4yz+z^2)(y^2+4yz+z^2)}{32}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|---------------------------|---|---|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(B,5)$ | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | $\frac{3\sqrt{7}i}{56}$ | 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 | 0 |
| | | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{7}}{112}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $\frac{5\sqrt{7}}{112}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{112}$ |
| | | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | $\frac{3\sqrt{7}}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ |
| | | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{112}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{112}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{112}$ |
| | | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{3\sqrt{7}}{112}$ | 0 |
| 1001 | symmetry | $\frac{\sqrt{6006}z(x-y)(x+y)(x^2-4xy+y^2)(x^2+4xy+y^2)}{32}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|--------------------------|---------------------------|--------------------------|---------------------------|---------------------------|---|---|---------------------------|--------------------------|---------------------------|--------------------------|--------------------------|---------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(B,6)$ | | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{105}i}{56}$ | $\frac{5\sqrt{7}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ |
| | | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{112}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 |
| | | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{5\sqrt{7}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ |
| | | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{7}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{112}$ | $\frac{\sqrt{105}i}{56}$ | 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 | 0 |
| | | 0 | $-\frac{3\sqrt{7}i}{56}$ | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{112}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ |
| | | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{112}$ | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 |
| | | 0 | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{112}$ | 0 | 0 | $-\frac{3\sqrt{7}i}{56}$ |
| | | $\frac{3\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{112}$ | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{7}}{112}$ | $\frac{3\sqrt{7}i}{56}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | $-\frac{3\sqrt{7}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | $-\frac{3\sqrt{7}}{56}$ | 0 | $\frac{3\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| 1002 | symmetry | $\frac{\sqrt{42}x(y-z)(y+z)(48x^4-80x^2y^2-80x^2z^2+15y^4+30y^2z^2+15z^4)}{32}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | | | | matrix | | | | | | | | | |
|--------------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------|---|--------------------------------|--------------------------------|-------------------------------|-------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(B,7)$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15015}}{8008}$ | 0 | 0 | $\frac{\sqrt{15015}i}{8008}$ | 0 | 0 | $-\frac{3\sqrt{1001}}{8008}$ | 0 | 0 | $\frac{3\sqrt{1001}i}{8008}$ |
| | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15015}}{8008}$ | $-\frac{\sqrt{15015}i}{8008}$ | 0 | 0 | 0 | $\frac{3\sqrt{1001}}{8008}$ | $-\frac{3\sqrt{1001}i}{8008}$ | 0 | |
| | 0 | 0 | 0 | 0 | 0 | $\frac{5\sqrt{1001}i}{1001}$ | $\frac{5\sqrt{1001}}{1001}$ | 0 | 0 | $\frac{2\sqrt{15015}}{1001}$ | 0 | $\frac{\sqrt{15015}i}{1001}$ | $-\frac{\sqrt{15015}}{1001}$ | 0 |
| | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{1001}i}{1001}$ | 0 | 0 | $-\frac{5\sqrt{1001}}{1001}$ | $\frac{2\sqrt{15015}}{1001}$ | 0 | $-\frac{\sqrt{15015}i}{1001}$ | 0 | 0 | $\frac{\sqrt{15015}}{1001}$ |
| | $\frac{\sqrt{15015}}{8008}$ | 0 | 0 | $\frac{5\sqrt{1001}i}{1001}$ | 0 | $\frac{75\sqrt{1001}}{16016}$ | 0 | 0 | 0 | $-\frac{\sqrt{15015}i}{1144}$ | 0 | $\frac{17\sqrt{15015}}{16016}$ | 0 | 0 |
| | 0 | $-\frac{\sqrt{15015}}{8008}$ | $-\frac{5\sqrt{1001}i}{1001}$ | 0 | $\frac{75\sqrt{1001}}{16016}$ | 0 | 0 | 0 | $\frac{\sqrt{15015}i}{1144}$ | 0 | $\frac{17\sqrt{15015}}{16016}$ | 0 | 0 | 0 |
| | 0 | $\frac{\sqrt{15015}i}{8008}$ | $\frac{5\sqrt{1001}}{1001}$ | 0 | 0 | 0 | $-\frac{75\sqrt{1001}}{16016}$ | $\frac{\sqrt{15015}}{1144}$ | 0 | 0 | 0 | 0 | 0 | $\frac{17\sqrt{15015}}{16016}$ |
| | $-\frac{\sqrt{15015}i}{8008}$ | 0 | 0 | $-\frac{5\sqrt{1001}}{1001}$ | 0 | 0 | $-\frac{75\sqrt{1001}}{16016}$ | 0 | 0 | $-\frac{\sqrt{15015}}{1144}$ | 0 | 0 | $\frac{17\sqrt{15015}}{16016}$ | 0 |
| | 0 | 0 | 0 | $\frac{2\sqrt{15015}}{1001}$ | 0 | $-\frac{\sqrt{15015}i}{1144}$ | $\frac{\sqrt{15015}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{27\sqrt{1001}i}{8008}$ | $-\frac{27\sqrt{1001}}{8008}$ | 0 |
| | 0 | 0 | $\frac{2\sqrt{15015}}{1001}$ | 0 | $\frac{\sqrt{15015}i}{1144}$ | 0 | 0 | $-\frac{\sqrt{15015}}{1144}$ | 0 | 0 | $\frac{27\sqrt{1001}i}{8008}$ | 0 | 0 | $\frac{27\sqrt{1001}}{8008}$ |
| | $-\frac{3\sqrt{1001}}{8008}$ | 0 | 0 | $\frac{\sqrt{15015}i}{1001}$ | 0 | $\frac{17\sqrt{15015}}{16016}$ | 0 | 0 | 0 | $-\frac{27\sqrt{1001}i}{8008}$ | 0 | $\frac{45\sqrt{1001}}{16016}$ | 0 | 0 |
| | 0 | $\frac{3\sqrt{1001}}{8008}$ | $-\frac{\sqrt{15015}i}{1001}$ | 0 | $\frac{17\sqrt{15015}}{16016}$ | 0 | 0 | 0 | $\frac{27\sqrt{1001}i}{8008}$ | 0 | $\frac{45\sqrt{1001}}{16016}$ | 0 | 0 | 0 |
| | 0 | $\frac{3\sqrt{1001}i}{8008}$ | $-\frac{\sqrt{15015}}{1001}$ | 0 | 0 | 0 | $\frac{17\sqrt{15015}}{16016}$ | $-\frac{27\sqrt{1001}}{8008}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{45\sqrt{1001}}{16016}$ |
| | $-\frac{3\sqrt{1001}i}{8008}$ | 0 | 0 | $\frac{\sqrt{15015}}{1001}$ | 0 | 0 | $\frac{17\sqrt{15015}}{16016}$ | 0 | 0 | $\frac{27\sqrt{1001}}{8008}$ | 0 | 0 | $-\frac{45\sqrt{1001}}{16016}$ | 0 |
| 1003 | symmetry | | | | $\frac{\sqrt{42}z(x-y)(x+y)(15x^4+30x^2y^2-80x^2z^2+15y^4-80y^2z^2+48z^4)}{32}$ | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-------------------------------|-------------------------------|--------------------------------|---------------------------------|--------------------------------|---------------------------------|-------------------------------|-------------------------------|--------------------------------|---------------------------------|--------------------------------|---------------------------------|--------------------------------|-------------------------------|
| $\mathbb{M}_7^{(1,-1;a)}(B,8)$ | | 0 | 0 | 0 | $-\frac{\sqrt{15015}i}{8008}$ | 0 | $-\frac{\sqrt{15015}}{8008}$ | 0 | 0 | 0 | $\frac{3\sqrt{1001}i}{8008}$ | 0 | $-\frac{3\sqrt{1001}}{8008}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{15015}i}{8008}$ | 0 | $-\frac{\sqrt{15015}}{8008}$ | 0 | 0 | 0 | $-\frac{3\sqrt{1001}i}{8008}$ | 0 | $-\frac{3\sqrt{1001}}{8008}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15015}i}{8008}$ | $\frac{75\sqrt{1001}}{16016}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{1001}}{1001}$ | $\frac{17\sqrt{15015}}{16016}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ |
| | | $\frac{\sqrt{15015}i}{8008}$ | 0 | 0 | $-\frac{75\sqrt{1001}}{16016}$ | 0 | 0 | $-\frac{5\sqrt{1001}}{1001}$ | 0 | 0 | $-\frac{17\sqrt{15015}}{16016}$ | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 |
| | | 0 | $-\frac{\sqrt{15015}}{8008}$ | 0 | 0 | $-\frac{75\sqrt{1001}}{16016}$ | 0 | 0 | $-\frac{5\sqrt{1001}i}{1001}$ | 0 | 0 | $\frac{17\sqrt{15015}}{16016}$ | 0 | 0 | $-\frac{\sqrt{15015}i}{1144}$ |
| | | $-\frac{\sqrt{15015}}{8008}$ | 0 | 0 | 0 | 0 | $\frac{75\sqrt{1001}}{16016}$ | $\frac{5\sqrt{1001}i}{1001}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{15015}}{16016}$ | $\frac{\sqrt{15015}i}{1144}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{1001}}{1001}$ | 0 | $-\frac{5\sqrt{1001}i}{1001}$ | 0 | 0 | 0 | $-\frac{\sqrt{15015}}{1001}$ | 0 | $\frac{\sqrt{15015}i}{1001}$ | $\frac{2\sqrt{15015}}{1001}$ | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{1001}}{1001}$ | 0 | $\frac{5\sqrt{1001}i}{1001}$ | 0 | 0 | 0 | $-\frac{\sqrt{15015}}{1001}$ | 0 | $-\frac{\sqrt{15015}i}{1001}$ | 0 | 0 | $-\frac{2\sqrt{15015}}{1001}$ |
| | | 0 | $\frac{3\sqrt{1001}i}{8008}$ | $\frac{17\sqrt{15015}}{16016}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15015}}{1001}$ | $\frac{45\sqrt{1001}}{16016}$ | 0 | 0 | 0 | 0 | $\frac{27\sqrt{1001}}{8008}$ |
| | | $-\frac{3\sqrt{1001}i}{8008}$ | 0 | 0 | $-\frac{17\sqrt{15015}}{16016}$ | 0 | 0 | $-\frac{\sqrt{15015}}{1001}$ | 0 | 0 | $-\frac{45\sqrt{1001}}{16016}$ | 0 | 0 | $\frac{27\sqrt{1001}}{8008}$ | 0 |
| | | 0 | $-\frac{3\sqrt{1001}}{8008}$ | 0 | 0 | $\frac{17\sqrt{15015}}{16016}$ | 0 | 0 | $\frac{\sqrt{15015}i}{1001}$ | 0 | 0 | $-\frac{45\sqrt{1001}}{16016}$ | 0 | 0 | $\frac{27\sqrt{1001}i}{8008}$ |
| | | $-\frac{3\sqrt{1001}}{8008}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{15015}}{16016}$ | $-\frac{\sqrt{15015}i}{1001}$ | 0 | 0 | 0 | 0 | $\frac{45\sqrt{1001}}{16016}$ | $-\frac{27\sqrt{1001}i}{8008}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | $-\frac{\sqrt{15015}i}{1144}$ | $\frac{2\sqrt{15015}}{1001}$ | 0 | 0 | $\frac{27\sqrt{1001}}{8008}$ | 0 | $\frac{27\sqrt{1001}i}{8008}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | $\frac{\sqrt{15015}i}{1144}$ | 0 | 0 | $-\frac{2\sqrt{15015}}{1001}$ | $\frac{27\sqrt{1001}}{8008}$ | 0 | $-\frac{27\sqrt{1001}i}{8008}$ | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | |
|------|----------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 1004 | symmetry | y | | | | | | | | | | | | | |
|------|----------|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------|-----------|------------------------|------------------------|----------------------------|---------------------------|----------------------------|-----------------------------|----------------------------|---------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|
| $M_1^{(1,1;a)}(A)$ | | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{105}$ | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{105}i}{105}$ | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | $-\frac{2\sqrt{105}i}{105}$ | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | $\frac{2\sqrt{105}i}{105}$ | 0 | 0 | $\frac{\sqrt{105}}{280}$ | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ |
| | | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | $\frac{\sqrt{105}i}{105}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ |
| | | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{280}$ | $-\frac{\sqrt{105}i}{105}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | $\frac{\sqrt{7}i}{14}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 |

1005

symmetry

 x *continued ...*

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|-------------------------|------------------------|----------------------------|---------------------------|----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|--------------------------|---------------------------|--------------------------|--------------------------|-------------------------|
| $\mathbb{M}_1^{(1,1;a)}(B,1)$ | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{2\sqrt{105}}{105}$ | 0 | $\frac{\sqrt{105}i}{280}$ | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | $\frac{\sqrt{7}}{56}$ | 0 |
| | | 0 | 0 | $\frac{2\sqrt{105}}{105}$ | 0 | $-\frac{\sqrt{105}i}{280}$ | 0 | 0 | $\frac{\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ |
| | | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{105}i}{280}$ | 0 | $-\frac{\sqrt{105}}{105}$ | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{105}i}{280}$ | 0 | $-\frac{\sqrt{105}}{105}$ | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{105}$ | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{105}}{105}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | $-\frac{\sqrt{105}}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{105}}{56}$ | 0 | 0 | 0 | 0 |
| 1006 | symmetry | z | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-------------------------|------------------------|---------------------------|---------------------------|----------------------------|---------------------------|----------------------------|----------------------------|--------------------------|--------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
| $\mathbb{M}_1^{(1,1;a)}(B, 2)$ | | 0 | 0 | 0 | $\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{7}i}{14}$ | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{7}i}{14}$ | $-\frac{\sqrt{105}}{105}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 |
| | | $-\frac{\sqrt{7}i}{14}$ | 0 | 0 | $\frac{\sqrt{105}}{105}$ | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 |
| | | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{105}}{105}$ | 0 | 0 | $\frac{\sqrt{105}i}{280}$ | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $\frac{\sqrt{7}i}{56}$ |
| | | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}}{105}$ | $-\frac{\sqrt{105}i}{280}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | $-\frac{\sqrt{7}i}{56}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | $\frac{\sqrt{105}i}{280}$ | $\frac{2\sqrt{105}}{105}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{105}}{280}$ | 0 | $-\frac{\sqrt{105}i}{280}$ | 0 | 0 | $-\frac{2\sqrt{105}}{105}$ | $-\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}}{14}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{7}}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{7}}{14}$ | 0 | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{105}i}{56}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{7}}{14}$ | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | $\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | $\frac{\sqrt{105}i}{56}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{7}}{56}$ | 0 | $-\frac{\sqrt{7}i}{56}$ | 0 | 0 | 0 | $-\frac{\sqrt{105}}{56}$ | 0 | $-\frac{\sqrt{105}i}{56}$ | 0 | 0 | 0 |
| 1007 | symmetry | $\sqrt{15}xyz$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|-------------------------------|-----------|--------------------------------|--------------------------|----------------------------|-----------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------|
| $\mathbb{M}_3^{(1,1;a)}(A,1)$ | | 0 | 0 | 0 | $-\frac{\sqrt{77}}{154}$ | 0 | $\frac{\sqrt{77}i}{154}$ | $-\frac{\sqrt{77}}{154}$ | 0 | 0 | 0 | 0 | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{77}}{154}$ | 0 | $-\frac{\sqrt{77}i}{154}$ | 0 | 0 | $\frac{\sqrt{77}}{154}$ | 0 | 0 | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{77}}{154}$ | 0 | 0 | $\frac{\sqrt{1155}}{154}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{154}$ | 0 | 0 | $-\frac{\sqrt{77}}{77}$ | 0 | $-\frac{\sqrt{77}i}{77}$ |
| | | $-\frac{\sqrt{77}}{154}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{154}$ | $\frac{\sqrt{1155}i}{154}$ | 0 | 0 | 0 | $\frac{\sqrt{77}}{77}$ | $\frac{\sqrt{77}i}{77}$ | 0 |
| | | 0 | $\frac{\sqrt{77}i}{154}$ | $\frac{\sqrt{1155}}{154}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{154}$ | $\frac{\sqrt{77}}{77}$ | 0 | 0 | 0 | $-\frac{\sqrt{77}}{77}$ |
| | | $-\frac{\sqrt{77}i}{154}$ | 0 | 0 | $-\frac{\sqrt{1155}}{154}$ | 0 | 0 | $\frac{\sqrt{1155}}{154}$ | 0 | 0 | $-\frac{\sqrt{77}}{77}$ | 0 | 0 | $-\frac{\sqrt{77}}{77}$ |
| | | $-\frac{\sqrt{77}}{154}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{154}$ | 0 | $\frac{\sqrt{1155}}{154}$ | 0 | 0 | $\frac{\sqrt{77}i}{77}$ | 0 | $\frac{\sqrt{77}}{77}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{77}}{154}$ | $\frac{\sqrt{1155}i}{154}$ | 0 | $\frac{\sqrt{1155}}{154}$ | 0 | 0 | $-\frac{\sqrt{77}i}{77}$ | 0 | $\frac{\sqrt{77}}{77}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{77}}{77}$ | 0 | 0 | $\frac{\sqrt{77}i}{77}$ | 0 | 0 | $\frac{\sqrt{1155}}{462}$ | 0 | $-\frac{\sqrt{1155}i}{462}$ |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{77}}{77}$ | $-\frac{\sqrt{77}i}{77}$ | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{462}$ | $\frac{\sqrt{1155}i}{462}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{77}}{77}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{77}}{77}$ | $\frac{\sqrt{1155}}{462}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}}{462}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{77}}{77}$ | 0 | 0 | $\frac{\sqrt{77}}{77}$ | 0 | 0 | $-\frac{\sqrt{1155}}{462}$ | 0 | 0 | $\frac{\sqrt{1155}}{462}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{77}i}{77}$ | 0 | $-\frac{\sqrt{77}}{77}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{462}$ | 0 | $\frac{\sqrt{1155}}{462}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{77}i}{77}$ | 0 | $-\frac{\sqrt{77}}{77}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}i}{462}$ | 0 | $\frac{\sqrt{1155}}{462}$ | 0 | 0 |
| 1008 | symmetry | $-\frac{y(3x^2-2y^2+3z^2)}{2}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-----------------------------------|-----------------------------|----------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|------------------------------|-----------------------------|
| $\mathbb{M}_3^{(1,1;a)}(A, 2)$ | | 0 | $\frac{\sqrt{77}i}{33}$ | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{1848}$ | $\frac{5\sqrt{77}}{264}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{264}$ |
| | | $-\frac{\sqrt{77}i}{33}$ | 0 | 0 | $-\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $-\frac{5\sqrt{77}}{264}$ | 0 | 0 | $-\frac{5\sqrt{77}}{264}$ | 0 |
| | | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $-\frac{3\sqrt{77}i}{308}$ | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 | $-\frac{\sqrt{1155}i}{924}$ | 0 | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{1155}}{1848}$ | $\frac{3\sqrt{77}i}{308}$ | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}i}{924}$ | 0 | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | $-\frac{2\sqrt{77}i}{77}$ | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | $\frac{5\sqrt{1155}}{1848}$ | 0 | 0 | $-\frac{5\sqrt{1155}}{1848}$ | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | $\frac{2\sqrt{77}i}{77}$ | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | $\frac{5\sqrt{1155}}{1848}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{1155}}{1848}$ |
| | | 0 | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | $-\frac{3\sqrt{77}i}{308}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}i}{924}$ |
| | | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | $\frac{3\sqrt{77}i}{308}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{1155}}{616}$ | $-\frac{\sqrt{1155}i}{924}$ | 0 |
| | | $\frac{5\sqrt{77}}{264}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{924}$ | 0 | $\frac{5\sqrt{1155}}{1848}$ | 0 | 0 | 0 | $-\frac{\sqrt{77}i}{132}$ | 0 | $-\frac{5\sqrt{77}}{1848}$ | 0 | 0 |
| | | 0 | $-\frac{5\sqrt{77}}{264}$ | $\frac{\sqrt{1155}i}{924}$ | 0 | $\frac{5\sqrt{1155}}{1848}$ | 0 | 0 | 0 | $\frac{\sqrt{77}i}{132}$ | 0 | $-\frac{5\sqrt{77}}{1848}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{5\sqrt{77}}{1848}$ | 0 | $\frac{\sqrt{77}i}{33}$ | $-\frac{5\sqrt{77}}{1848}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{1155}}{616}$ | $-\frac{5\sqrt{77}}{1848}$ | 0 | $-\frac{\sqrt{77}i}{33}$ | 0 | 0 | $\frac{5\sqrt{77}}{1848}$ |
| | | 0 | $-\frac{5\sqrt{77}}{264}$ | 0 | 0 | $-\frac{5\sqrt{1155}}{1848}$ | 0 | 0 | $\frac{\sqrt{1155}i}{924}$ | 0 | 0 | $-\frac{5\sqrt{77}}{1848}$ | 0 | 0 | $-\frac{\sqrt{77}i}{132}$ |
| | | $-\frac{5\sqrt{77}}{264}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{1155}}{1848}$ | $-\frac{\sqrt{1155}i}{924}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{77}}{1848}$ | $\frac{\sqrt{77}i}{132}$ | 0 |
| 1009 | symmetry | $-\frac{\sqrt{15}y(x-z)(x+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|-------------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|---------------------------|----------------------------|-----------------------------|
| $\mathbb{M}_3^{(1,1;a)}(A,3)$ | | 0 | 0 | $\frac{3\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{77}}{616}$ | $-\frac{\sqrt{1155}}{264}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{264}$ |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{77}}{616}$ | 0 | 0 | $-\frac{3\sqrt{77}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{264}$ | 0 | 0 | $-\frac{\sqrt{1155}}{264}$ | 0 |
| | | $\frac{3\sqrt{77}}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{308}$ | 0 | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 | 0 | $-\frac{\sqrt{77}i}{308}$ | 0 | $\frac{\sqrt{77}}{616}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{77}}{616}$ | $\frac{\sqrt{1155}i}{308}$ | 0 | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 | 0 | $\frac{\sqrt{77}i}{308}$ | 0 | $\frac{\sqrt{77}}{616}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | $\frac{\sqrt{77}i}{154}$ | $\frac{13\sqrt{77}}{616}$ | 0 |
| | | 0 | 0 | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{1155}}{616}$ | $\frac{13\sqrt{77}}{616}$ | 0 | $-\frac{\sqrt{77}i}{154}$ | 0 | 0 | $-\frac{13\sqrt{77}}{616}$ |
| | | 0 | $-\frac{3\sqrt{77}}{616}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}i}{308}$ | 0 | 0 | $\frac{\sqrt{77}}{616}$ | 0 | 0 | $-\frac{\sqrt{77}i}{308}$ |
| | | $-\frac{3\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{1155}}{616}$ | $-\frac{\sqrt{1155}i}{308}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{77}}{616}$ | $\frac{\sqrt{77}i}{308}$ | 0 |
| | | $-\frac{\sqrt{1155}}{264}$ | 0 | 0 | $-\frac{\sqrt{77}i}{308}$ | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}i}{132}$ | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{1155}}{264}$ | $\frac{\sqrt{77}i}{308}$ | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | 0 | 0 | $-\frac{\sqrt{1155}i}{132}$ | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{77}}{616}$ | 0 | $\frac{\sqrt{77}i}{154}$ | $\frac{\sqrt{77}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{77}}{616}$ | 0 | $-\frac{\sqrt{77}i}{154}$ | 0 | 0 | $-\frac{\sqrt{77}}{616}$ | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{616}$ |
| | | 0 | $-\frac{\sqrt{1155}}{264}$ | 0 | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | 0 | $-\frac{\sqrt{77}i}{308}$ | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{132}$ |
| | | $-\frac{\sqrt{1155}}{264}$ | 0 | 0 | 0 | 0 | $-\frac{13\sqrt{77}}{616}$ | $\frac{\sqrt{77}i}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{616}$ | $\frac{\sqrt{1155}i}{132}$ | 0 |
| 1010 | symmetry | $\frac{x(2x^2-3y^2-3z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|--------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|-----------------------------|-------------------------------|------------------------------|-----------------------------|------------------------------|
| $\mathbb{M}_3^{(1,1;a)}(B,1)$ | | 0 | $-\frac{\sqrt{77}}{33}$ | 0 | 0 | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{1848}$ | 0 | 0 | $-\frac{5\sqrt{77}}{264}$ | 0 | 0 | $-\frac{5\sqrt{77}i}{264}$ |
| | | $-\frac{\sqrt{77}}{33}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{1848}$ | $\frac{\sqrt{1155}i}{1848}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{77}}{264}$ | $\frac{5\sqrt{77}i}{264}$ | 0 |
| | | 0 | 0 | 0 | $\frac{2\sqrt{77}}{77}$ | 0 | $\frac{5\sqrt{77}i}{616}$ | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{1155}i}{1848}$ | $\frac{5\sqrt{1155}}{1848}$ | 0 |
| | | 0 | 0 | $\frac{2\sqrt{77}}{77}$ | 0 | $-\frac{5\sqrt{77}i}{616}$ | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | 0 | 0 | $-\frac{5\sqrt{1155}i}{1848}$ | 0 | 0 | $-\frac{5\sqrt{1155}}{1848}$ |
| | | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $\frac{5\sqrt{77}i}{616}$ | 0 | $\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | $\frac{3\sqrt{1155}i}{616}$ | 0 | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{1155}}{1848}$ | $-\frac{5\sqrt{77}i}{616}$ | 0 | $\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | $-\frac{3\sqrt{1155}i}{616}$ | 0 | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{1155}i}{1848}$ | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | 0 | $\frac{3\sqrt{77}}{308}$ | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{924}$ |
| | | $\frac{\sqrt{1155}i}{1848}$ | 0 | 0 | $\frac{5\sqrt{77}}{616}$ | 0 | 0 | $\frac{3\sqrt{77}}{308}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{1155}i}{616}$ | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{\sqrt{77}}{33}$ | 0 | $\frac{5\sqrt{77}i}{1848}$ | $-\frac{5\sqrt{77}}{1848}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{1155}i}{616}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | $-\frac{\sqrt{77}}{33}$ | 0 | $-\frac{5\sqrt{77}i}{1848}$ | 0 | 0 | $\frac{5\sqrt{77}}{1848}$ |
| | | $-\frac{5\sqrt{77}}{264}$ | 0 | 0 | $\frac{5\sqrt{1155}i}{1848}$ | 0 | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 | 0 | $\frac{5\sqrt{77}i}{1848}$ | 0 | $\frac{\sqrt{77}}{132}$ | 0 | 0 |
| | | 0 | $\frac{5\sqrt{77}}{264}$ | $-\frac{5\sqrt{1155}i}{1848}$ | 0 | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 | 0 | $-\frac{5\sqrt{77}i}{1848}$ | 0 | $\frac{\sqrt{77}}{132}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{5\sqrt{77}i}{264}$ | $\frac{5\sqrt{1155}}{1848}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | $-\frac{5\sqrt{77}}{1848}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{77}}{132}$ |
| | | $\frac{5\sqrt{77}i}{264}$ | 0 | 0 | $-\frac{5\sqrt{1155}}{1848}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 | 0 | $\frac{5\sqrt{77}}{1848}$ | 0 | 0 | $\frac{\sqrt{77}}{132}$ | 0 |
| 1011 | symmetry | $-\frac{z(3x^2+3y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|----------------------------------|------------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|-----------------------------|------------------------------|
| $\mathbb{M}_3^{(1,1;a)}(B, 2)$ | | $-\frac{\sqrt{77}}{33}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{1848}$ | 0 | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | 0 | $\frac{5\sqrt{77}i}{264}$ | 0 | $\frac{5\sqrt{77}}{264}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{77}}{33}$ | $\frac{\sqrt{1155}i}{1848}$ | 0 | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | 0 | $-\frac{5\sqrt{77}i}{264}$ | 0 | $\frac{5\sqrt{77}}{264}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{1155}i}{1848}$ | $\frac{3\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ |
| | | $\frac{\sqrt{1155}i}{1848}$ | 0 | 0 | $-\frac{3\sqrt{77}}{308}$ | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 |
| | | 0 | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | $\frac{3\sqrt{77}}{308}$ | 0 | 0 | $\frac{5\sqrt{77}i}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 | 0 | $-\frac{3\sqrt{1155}i}{616}$ |
| | | $\frac{\sqrt{1155}}{1848}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{77}}{308}$ | $-\frac{5\sqrt{77}i}{616}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{924}$ | $\frac{3\sqrt{1155}i}{616}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | $\frac{5\sqrt{77}i}{616}$ | $\frac{2\sqrt{77}}{77}$ | 0 | 0 | $-\frac{5\sqrt{1155}}{1848}$ | 0 | $-\frac{5\sqrt{1155}i}{1848}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{77}}{616}$ | 0 | $-\frac{5\sqrt{77}i}{616}$ | 0 | 0 | $-\frac{2\sqrt{77}}{77}$ | $-\frac{5\sqrt{1155}}{1848}$ | 0 | $\frac{5\sqrt{1155}i}{1848}$ | 0 | 0 | 0 |
| | | 0 | $\frac{5\sqrt{77}i}{264}$ | $-\frac{\sqrt{1155}}{924}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{1155}}{1848}$ | $\frac{\sqrt{77}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{1848}$ |
| | | $-\frac{5\sqrt{77}i}{264}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 | 0 | $-\frac{5\sqrt{1155}}{1848}$ | 0 | 0 | $-\frac{\sqrt{77}}{132}$ | 0 | 0 | $-\frac{5\sqrt{77}}{1848}$ | 0 |
| | | 0 | $\frac{5\sqrt{77}}{264}$ | 0 | 0 | $\frac{\sqrt{1155}}{924}$ | 0 | 0 | $-\frac{5\sqrt{1155}i}{1848}$ | 0 | 0 | $\frac{\sqrt{77}}{132}$ | 0 | 0 | $\frac{5\sqrt{77}i}{1848}$ |
| | | $\frac{5\sqrt{77}}{264}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{924}$ | $\frac{5\sqrt{1155}i}{1848}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{77}}{132}$ | $-\frac{5\sqrt{77}i}{1848}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 | $-\frac{3\sqrt{1155}i}{616}$ | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{1848}$ | 0 | $\frac{5\sqrt{77}i}{1848}$ | $-\frac{\sqrt{77}}{33}$ | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 | $\frac{3\sqrt{1155}i}{616}$ | 0 | 0 | 0 | $-\frac{5\sqrt{77}}{1848}$ | 0 | $-\frac{5\sqrt{77}i}{1848}$ | 0 | 0 | $\frac{\sqrt{77}}{33}$ |
| 1012 | symmetry | $\frac{\sqrt{15}x(y-z)(y+z)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|----------------------------------|----------------------------|------------------------------|-----------------------------|------------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|
| $\mathbb{M}_3^{(1,1;a)}(B,3)$ | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{77}}{616}$ | 0 | 0 | $-\frac{3\sqrt{77}i}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}}{264}$ | 0 | 0 | $\frac{\sqrt{1155}i}{264}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{77}}{616}$ | $\frac{3\sqrt{77}i}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{264}$ | $-\frac{\sqrt{1155}i}{264}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{3\sqrt{1155}i}{616}$ | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{\sqrt{77}}{154}$ | 0 | $-\frac{13\sqrt{77}i}{616}$ | $\frac{13\sqrt{77}}{616}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{1155}i}{616}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | $-\frac{\sqrt{77}}{154}$ | 0 | $\frac{13\sqrt{77}i}{616}$ | 0 | 0 | $-\frac{13\sqrt{77}}{616}$ |
| | | $-\frac{3\sqrt{77}}{616}$ | 0 | 0 | $\frac{3\sqrt{1155}i}{616}$ | 0 | $-\frac{\sqrt{1155}}{308}$ | 0 | 0 | 0 | $-\frac{\sqrt{77}i}{616}$ | 0 | $\frac{\sqrt{77}}{308}$ | 0 | 0 |
| | | 0 | $\frac{3\sqrt{77}}{616}$ | $-\frac{3\sqrt{1155}i}{616}$ | 0 | $-\frac{\sqrt{1155}}{308}$ | 0 | 0 | 0 | $\frac{\sqrt{77}i}{616}$ | 0 | $\frac{\sqrt{77}}{308}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{77}i}{616}$ | $\frac{3\sqrt{1155}}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{308}$ | $\frac{\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{77}}{308}$ |
| | | $\frac{3\sqrt{77}i}{616}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{308}$ | 0 | 0 | $-\frac{\sqrt{77}}{616}$ | 0 | 0 | $\frac{\sqrt{77}}{308}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{77}}{154}$ | 0 | $-\frac{\sqrt{77}i}{616}$ | $\frac{\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}i}{616}$ | $\frac{\sqrt{1155}}{616}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{77}}{154}$ | 0 | $\frac{\sqrt{77}i}{616}$ | 0 | 0 | $-\frac{\sqrt{77}}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ |
| | | $-\frac{\sqrt{1155}}{264}$ | 0 | 0 | $-\frac{13\sqrt{77}i}{616}$ | 0 | $\frac{\sqrt{77}}{308}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}i}{616}$ | 0 | $\frac{\sqrt{1155}}{132}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{1155}}{264}$ | $\frac{13\sqrt{77}i}{616}$ | 0 | $\frac{\sqrt{77}}{308}$ | 0 | 0 | 0 | $-\frac{\sqrt{1155}i}{616}$ | 0 | $\frac{\sqrt{1155}}{132}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{1155}i}{264}$ | $\frac{13\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{77}}{308}$ | $\frac{\sqrt{1155}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{132}$ |
| | | $-\frac{\sqrt{1155}i}{264}$ | 0 | 0 | $-\frac{13\sqrt{77}}{616}$ | 0 | 0 | $\frac{\sqrt{77}}{308}$ | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}}{132}$ | 0 |
| 1013 | symmetry | $\frac{\sqrt{15}z(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|-------------------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|-----------------------------|----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|
| $\mathbb{M}_3^{(1,1;a)}(B, 4)$ | | 0 | 0 | 0 | $\frac{3\sqrt{77}i}{616}$ | 0 | $\frac{3\sqrt{77}}{616}$ | 0 | 0 | 0 | $\frac{\sqrt{1155}i}{264}$ | 0 | $-\frac{\sqrt{1155}}{264}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{77}i}{616}$ | 0 | $\frac{3\sqrt{77}}{616}$ | 0 | 0 | 0 | $-\frac{\sqrt{1155}i}{264}$ | 0 | $-\frac{\sqrt{1155}}{264}$ | 0 | 0 | 0 |
| | | 0 | $\frac{3\sqrt{77}i}{616}$ | $-\frac{\sqrt{1155}}{308}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | $\frac{\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{77}}{616}$ |
| | | $-\frac{3\sqrt{77}i}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{308}$ | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 | 0 | $-\frac{\sqrt{77}}{308}$ | 0 | 0 | $\frac{\sqrt{77}}{616}$ | 0 |
| | | 0 | $\frac{3\sqrt{77}}{616}$ | 0 | 0 | $\frac{\sqrt{1155}}{308}$ | 0 | 0 | $-\frac{3\sqrt{1155}i}{616}$ | 0 | 0 | $\frac{\sqrt{77}}{308}$ | 0 | 0 | $-\frac{\sqrt{77}i}{616}$ |
| | | $\frac{3\sqrt{77}}{616}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{308}$ | $\frac{3\sqrt{1155}i}{616}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{77}}{308}$ | $\frac{\sqrt{77}i}{616}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 | $-\frac{3\sqrt{1155}i}{616}$ | 0 | 0 | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | $-\frac{13\sqrt{77}i}{616}$ | $-\frac{\sqrt{77}}{154}$ | 0 |
| | | 0 | 0 | $-\frac{3\sqrt{1155}}{616}$ | 0 | $\frac{3\sqrt{1155}i}{616}$ | 0 | 0 | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | $\frac{13\sqrt{77}i}{616}$ | 0 | 0 | $\frac{\sqrt{77}}{154}$ |
| | | 0 | $\frac{\sqrt{1155}i}{264}$ | $\frac{\sqrt{77}}{308}$ | 0 | 0 | 0 | 0 | $\frac{13\sqrt{77}}{616}$ | $\frac{\sqrt{1155}}{132}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ |
| | | $-\frac{\sqrt{1155}i}{264}$ | 0 | 0 | $-\frac{\sqrt{77}}{308}$ | 0 | 0 | $\frac{13\sqrt{77}}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}}{132}$ | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 |
| | | 0 | $-\frac{\sqrt{1155}}{264}$ | 0 | 0 | $\frac{\sqrt{77}}{308}$ | 0 | 0 | $-\frac{13\sqrt{77}i}{616}$ | 0 | 0 | $-\frac{\sqrt{1155}}{132}$ | 0 | 0 | $-\frac{\sqrt{1155}i}{616}$ |
| | | $-\frac{\sqrt{1155}}{264}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{77}}{308}$ | $\frac{13\sqrt{77}i}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1155}}{132}$ | $\frac{\sqrt{1155}i}{616}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{77}}{616}$ | 0 | $-\frac{\sqrt{77}i}{616}$ | $-\frac{\sqrt{77}}{154}$ | 0 | 0 | $-\frac{\sqrt{1155}}{616}$ | 0 | $-\frac{\sqrt{1155}i}{616}$ | 0 | 0 |
| | | 0 | 0 | $\frac{\sqrt{77}}{616}$ | 0 | $\frac{\sqrt{77}i}{616}$ | 0 | 0 | $\frac{\sqrt{77}}{154}$ | $-\frac{\sqrt{1155}}{616}$ | 0 | $\frac{\sqrt{1155}i}{616}$ | 0 | 0 | 0 |
| 1014 | symmetry | $\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|---|----------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|-------------------------------|------------------------------|
| $\mathbb{M}_5^{(1,1;a)}(A,1)$ | | 0 | 0 | 0 | $\frac{4\sqrt{429}}{429}$ | 0 | $\frac{4\sqrt{429}i}{429}$ | 0 | 0 | 0 | $-\frac{\sqrt{715}}{286}$ | 0 | $\frac{\sqrt{715}i}{286}$ | $\frac{\sqrt{715}}{143}$ | 0 |
| | | 0 | 0 | $\frac{4\sqrt{429}}{429}$ | 0 | $-\frac{4\sqrt{429}i}{429}$ | 0 | 0 | 0 | $-\frac{\sqrt{715}}{286}$ | 0 | $-\frac{\sqrt{715}i}{286}$ | 0 | 0 | $-\frac{\sqrt{715}}{143}$ |
| | | 0 | $\frac{4\sqrt{429}}{429}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{715}i}{1144}$ | 0 | 0 | $\frac{5\sqrt{429}}{858}$ | 0 | 0 | $\frac{23\sqrt{429}i}{3432}$ |
| | | $\frac{4\sqrt{429}}{429}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{715}i}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{429}}{858}$ | $-\frac{23\sqrt{429}i}{3432}$ | 0 |
| | | 0 | $\frac{4\sqrt{429}i}{429}$ | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{715}}{1144}$ | $\frac{5\sqrt{429}}{858}$ | 0 | 0 | 0 | 0 | $-\frac{23\sqrt{429}}{3432}$ |
| | | $-\frac{4\sqrt{429}i}{429}$ | 0 | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{715}}{1144}$ | 0 | 0 | $-\frac{5\sqrt{429}}{858}$ | 0 | 0 | $-\frac{23\sqrt{429}}{3432}$ |
| | | 0 | 0 | 0 | $\frac{\sqrt{715}i}{1144}$ | 0 | $\frac{\sqrt{715}}{1144}$ | 0 | 0 | 0 | $-\frac{\sqrt{429}i}{1144}$ | 0 | $\frac{\sqrt{429}}{1144}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{715}i}{1144}$ | 0 | $\frac{\sqrt{715}}{1144}$ | 0 | 0 | 0 | $\frac{\sqrt{429}i}{1144}$ | 0 | $\frac{\sqrt{429}}{1144}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{715}}{286}$ | 0 | 0 | $\frac{5\sqrt{429}}{858}$ | 0 | 0 | $-\frac{\sqrt{429}i}{1144}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{715}i}{1144}$ |
| | | $-\frac{\sqrt{715}}{286}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{429}}{858}$ | $\frac{\sqrt{429}i}{1144}$ | 0 | 0 | 0 | 0 | 0 | $\frac{7\sqrt{715}i}{1144}$ | 0 |
| | | 0 | $\frac{\sqrt{715}i}{286}$ | $\frac{5\sqrt{429}}{858}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{429}}{1144}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{715}}{1144}$ |
| | | $-\frac{\sqrt{715}i}{286}$ | 0 | 0 | $-\frac{5\sqrt{429}}{858}$ | 0 | 0 | 0 | $\frac{\sqrt{429}}{1144}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{715}}{1144}$ |
| | | $\frac{\sqrt{715}}{143}$ | 0 | 0 | $\frac{23\sqrt{429}i}{3432}$ | 0 | $-\frac{23\sqrt{429}}{3432}$ | 0 | 0 | 0 | $-\frac{7\sqrt{715}i}{1144}$ | 0 | $-\frac{7\sqrt{715}}{1144}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{715}}{143}$ | $-\frac{23\sqrt{429}i}{3432}$ | 0 | $-\frac{23\sqrt{429}}{3432}$ | 0 | 0 | 0 | $\frac{7\sqrt{715}i}{1144}$ | 0 | $-\frac{7\sqrt{715}}{1144}$ | 0 | 0 | 0 |
| 1015 | symmetry | $\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------------------------|--|-------------------------------|------------------------------|-----------------------------|-----------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|---|
| $\mathbb{M}_5^{(1,1;a)}(A, 2)$ | 0 | 0 | 0 | $\frac{4\sqrt{143}}{429}$ | 0 | $-\frac{4\sqrt{143}i}{429}$ | $-\frac{8\sqrt{143}}{429}$ | 0 | 0 | $\frac{\sqrt{2145}}{286}$ | 0 | $\frac{\sqrt{2145}i}{286}$ | 0 | 0 | |
| | 0 | 0 | $\frac{4\sqrt{143}}{429}$ | 0 | $\frac{4\sqrt{143}i}{429}$ | 0 | 0 | $\frac{8\sqrt{143}}{429}$ | $\frac{\sqrt{2145}}{286}$ | 0 | $-\frac{\sqrt{2145}i}{286}$ | 0 | 0 | 0 | |
| | 0 | $\frac{4\sqrt{143}}{429}$ | 0 | 0 | $-\frac{\sqrt{2145}}{1716}$ | 0 | 0 | $-\frac{\sqrt{2145}i}{3432}$ | 0 | 0 | $\frac{\sqrt{143}}{132}$ | 0 | 0 | $\frac{17\sqrt{143}i}{3432}$ | |
| | $\frac{4\sqrt{143}}{429}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2145}}{1716}$ | $\frac{\sqrt{2145}i}{3432}$ | 0 | 0 | 0 | $-\frac{\sqrt{143}}{132}$ | $-\frac{17\sqrt{143}i}{3432}$ | 0 | | |
| | 0 | $-\frac{4\sqrt{143}i}{429}$ | $-\frac{\sqrt{2145}}{1716}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2145}}{3432}$ | $-\frac{\sqrt{143}}{132}$ | 0 | 0 | 0 | 0 | $\frac{17\sqrt{143}}{3432}$ | |
| | $\frac{4\sqrt{143}i}{429}$ | 0 | 0 | $\frac{\sqrt{2145}}{1716}$ | 0 | 0 | 0 | $\frac{\sqrt{2145}}{3432}$ | 0 | 0 | $\frac{\sqrt{143}}{132}$ | 0 | 0 | $\frac{17\sqrt{143}}{3432}$ | 0 |
| | $-\frac{8\sqrt{143}}{429}$ | 0 | 0 | $-\frac{\sqrt{2145}i}{3432}$ | 0 | $\frac{\sqrt{2145}}{3432}$ | 0 | 0 | 0 | $\frac{43\sqrt{143}i}{3432}$ | 0 | $\frac{43\sqrt{143}}{3432}$ | 0 | 0 | |
| | 0 | $\frac{8\sqrt{143}}{429}$ | $\frac{\sqrt{2145}i}{3432}$ | 0 | $\frac{\sqrt{2145}}{3432}$ | 0 | 0 | 0 | $-\frac{43\sqrt{143}i}{3432}$ | 0 | $\frac{43\sqrt{143}}{3432}$ | 0 | 0 | 0 | |
| | 0 | $\frac{\sqrt{2145}}{286}$ | 0 | 0 | $-\frac{\sqrt{143}}{132}$ | 0 | 0 | $\frac{43\sqrt{143}i}{3432}$ | 0 | 0 | $\frac{7\sqrt{2145}}{1716}$ | 0 | 0 | $\frac{7\sqrt{2145}i}{3432}$ | |
| | $\frac{\sqrt{2145}}{286}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{143}}{132}$ | $-\frac{43\sqrt{143}i}{3432}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{2145}}{1716}$ | $-\frac{7\sqrt{2145}i}{3432}$ | 0 | |
| | 0 | $\frac{\sqrt{2145}i}{286}$ | $\frac{\sqrt{143}}{132}$ | 0 | 0 | 0 | 0 | $\frac{43\sqrt{143}}{3432}$ | $\frac{7\sqrt{2145}}{1716}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{2145}}{3432}$ | |
| | $-\frac{\sqrt{2145}i}{286}$ | 0 | 0 | $-\frac{\sqrt{143}}{132}$ | 0 | 0 | 0 | $\frac{43\sqrt{143}}{3432}$ | 0 | 0 | $-\frac{7\sqrt{2145}}{1716}$ | 0 | 0 | $-\frac{7\sqrt{2145}}{3432}$ | 0 |
| | 0 | 0 | 0 | $\frac{17\sqrt{143}i}{3432}$ | 0 | $\frac{17\sqrt{143}}{3432}$ | 0 | 0 | 0 | $\frac{7\sqrt{2145}i}{3432}$ | 0 | $-\frac{7\sqrt{2145}}{3432}$ | 0 | 0 | |
| | 0 | 0 | $-\frac{17\sqrt{143}i}{3432}$ | 0 | $\frac{17\sqrt{143}}{3432}$ | 0 | 0 | 0 | $-\frac{7\sqrt{2145}i}{3432}$ | 0 | $-\frac{7\sqrt{2145}}{3432}$ | 0 | 0 | 0 | |
| 1016 | symmetry | $\frac{y(15x^4-40x^2y^2+30x^2z^2+8y^4-40y^2z^2+15z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | |
|-------------------------------|-----------|---|-------------------------------|--------------------------------|-------------------------------|-------------------------------|--------------------------------|--------------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------|-------------------------------|-------------------------------|
| $\mathbb{M}_5^{(1,1;a)}(A,3)$ | | 0 | $-\frac{3\sqrt{1001}i}{1001}$ | $\frac{\sqrt{15015}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15015}}{3432}$ | $-\frac{3\sqrt{1001}}{1144}$ | 0 | 0 | 0 | $\frac{3\sqrt{1001}}{1144}$ |
| | | $\frac{3\sqrt{1001}i}{1001}$ | 0 | 0 | $-\frac{\sqrt{15015}}{3432}$ | 0 | 0 | $\frac{\sqrt{15015}}{3432}$ | 0 | 0 | $\frac{3\sqrt{1001}}{1144}$ | 0 | 0 | $\frac{3\sqrt{1001}}{1144}$ |
| | | $\frac{\sqrt{15015}}{3432}$ | 0 | 0 | $\frac{25\sqrt{1001}i}{8008}$ | 0 | $-\frac{5\sqrt{1001}}{1144}$ | 0 | 0 | 0 | $-\frac{\sqrt{15015}i}{1144}$ | 0 | $-\frac{\sqrt{15015}}{1716}$ | 0 |
| | | 0 | $-\frac{\sqrt{15015}}{3432}$ | $-\frac{25\sqrt{1001}i}{8008}$ | 0 | $-\frac{5\sqrt{1001}}{1144}$ | 0 | 0 | 0 | $\frac{\sqrt{15015}i}{1144}$ | 0 | $-\frac{\sqrt{15015}}{1716}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{1001}}{1144}$ | 0 | $-\frac{10\sqrt{1001}i}{1001}$ | $-\frac{5\sqrt{1001}}{1144}$ | 0 | 0 | $\frac{5\sqrt{15015}}{3432}$ | 0 | 0 | $-\frac{5\sqrt{15015}}{3432}$ |
| | | 0 | 0 | $-\frac{5\sqrt{1001}}{1144}$ | 0 | $\frac{10\sqrt{1001}i}{1001}$ | 0 | 0 | $\frac{5\sqrt{1001}}{1144}$ | $\frac{5\sqrt{15015}}{3432}$ | 0 | 0 | 0 | $\frac{5\sqrt{15015}}{3432}$ |
| | | 0 | $\frac{\sqrt{15015}}{3432}$ | 0 | 0 | $-\frac{5\sqrt{1001}}{1144}$ | 0 | 0 | $\frac{25\sqrt{1001}i}{8008}$ | 0 | 0 | $\frac{\sqrt{15015}}{1716}$ | 0 | $\frac{\sqrt{15015}i}{1144}$ |
| | | $\frac{\sqrt{15015}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{1001}}{1144}$ | $-\frac{25\sqrt{1001}i}{8008}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15015}}{1716}$ | $-\frac{\sqrt{15015}i}{1144}$ |
| | | $-\frac{3\sqrt{1001}}{1144}$ | 0 | 0 | $-\frac{\sqrt{15015}i}{1144}$ | 0 | $\frac{5\sqrt{15015}}{3432}$ | 0 | 0 | 0 | $\frac{3\sqrt{1001}i}{616}$ | 0 | $\frac{\sqrt{1001}}{572}$ | 0 |
| | | 0 | $\frac{3\sqrt{1001}}{1144}$ | $\frac{\sqrt{15015}i}{1144}$ | 0 | $\frac{5\sqrt{15015}}{3432}$ | 0 | 0 | 0 | $-\frac{3\sqrt{1001}i}{616}$ | 0 | $\frac{\sqrt{1001}}{572}$ | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{15015}}{1716}$ | 0 | 0 | $\frac{\sqrt{15015}}{1716}$ | 0 | 0 | $\frac{\sqrt{1001}}{572}$ | 0 | $-\frac{3\sqrt{1001}i}{1001}$ | $\frac{\sqrt{1001}}{572}$ |
| | | 0 | 0 | $-\frac{\sqrt{15015}}{1716}$ | 0 | 0 | 0 | $-\frac{\sqrt{15015}}{1716}$ | $\frac{\sqrt{1001}}{572}$ | 0 | $\frac{3\sqrt{1001}i}{1001}$ | 0 | 0 | $-\frac{\sqrt{1001}}{572}$ |
| | | 0 | $\frac{3\sqrt{1001}}{1144}$ | 0 | 0 | $-\frac{5\sqrt{15015}}{3432}$ | 0 | 0 | $\frac{\sqrt{15015}i}{1144}$ | 0 | 0 | $\frac{\sqrt{1001}}{572}$ | 0 | $\frac{3\sqrt{1001}i}{616}$ |
| | | $\frac{3\sqrt{1001}}{1144}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{15015}}{3432}$ | $-\frac{\sqrt{15015}i}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{1001}}{572}$ | $-\frac{3\sqrt{1001}i}{616}$ |
| 1017 | symmetry | $\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$ | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|------------------------------|------------------------------|------------------------------|----------------------------|----------------------------|------------------------------|-----------------------------|-----------------------------|------------------------------|----------------------------|----------------------------|------------------------------|------------------------------|
| $\mathbb{M}_5^{(1,1;a)}(A, 4)$ | | 0 | $\frac{\sqrt{715}i}{143}$ | $\frac{23\sqrt{429}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{23\sqrt{429}}{3432}$ | $\frac{7\sqrt{715}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{715}}{1144}$ |
| | | $-\frac{\sqrt{715}i}{143}$ | 0 | 0 | $-\frac{23\sqrt{429}}{3432}$ | 0 | 0 | $\frac{23\sqrt{429}}{3432}$ | 0 | 0 | $-\frac{7\sqrt{715}}{1144}$ | 0 | 0 | $-\frac{7\sqrt{715}}{1144}$ | 0 |
| | | $\frac{23\sqrt{429}}{3432}$ | 0 | 0 | $\frac{5\sqrt{715}i}{1144}$ | 0 | $-\frac{\sqrt{715}}{1144}$ | 0 | 0 | 0 | $-\frac{5\sqrt{429}i}{3432}$ | 0 | $-\frac{4\sqrt{429}}{429}$ | 0 | 0 |
| | | 0 | $-\frac{23\sqrt{429}}{3432}$ | $-\frac{5\sqrt{715}i}{1144}$ | 0 | $-\frac{\sqrt{715}}{1144}$ | 0 | 0 | 0 | $\frac{5\sqrt{429}i}{3432}$ | 0 | $-\frac{4\sqrt{429}}{429}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{715}}{1144}$ | 0 | 0 | $-\frac{\sqrt{715}}{1144}$ | 0 | 0 | $-\frac{\sqrt{429}}{1144}$ | 0 | 0 | $\frac{\sqrt{429}}{1144}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{715}}{1144}$ | 0 | 0 | 0 | $\frac{\sqrt{715}}{1144}$ | $-\frac{\sqrt{429}}{1144}$ | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{429}}{1144}$ |
| | | 0 | $\frac{23\sqrt{429}}{3432}$ | 0 | 0 | $-\frac{\sqrt{715}}{1144}$ | 0 | 0 | $\frac{5\sqrt{715}i}{1144}$ | 0 | 0 | $\frac{4\sqrt{429}}{429}$ | 0 | 0 | $\frac{5\sqrt{429}i}{3432}$ |
| | | $\frac{23\sqrt{429}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{715}}{1144}$ | $-\frac{5\sqrt{715}i}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{4\sqrt{429}}{429}$ | $-\frac{5\sqrt{429}i}{3432}$ | 0 |
| | | $\frac{7\sqrt{715}}{1144}$ | 0 | 0 | $-\frac{5\sqrt{429}i}{3432}$ | 0 | $-\frac{\sqrt{429}}{1144}$ | 0 | 0 | 0 | $-\frac{5\sqrt{715}i}{1144}$ | 0 | $-\frac{\sqrt{715}}{286}$ | 0 | 0 |
| | | 0 | $-\frac{7\sqrt{715}}{1144}$ | $\frac{5\sqrt{429}i}{3432}$ | 0 | $-\frac{\sqrt{429}}{1144}$ | 0 | 0 | 0 | $\frac{5\sqrt{715}i}{1144}$ | 0 | $-\frac{\sqrt{715}}{286}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{4\sqrt{429}}{429}$ | 0 | 0 | $\frac{4\sqrt{429}}{429}$ | 0 | 0 | $-\frac{\sqrt{715}}{286}$ | 0 | $-\frac{\sqrt{715}i}{143}$ | $-\frac{\sqrt{715}}{286}$ | 0 |
| | | 0 | 0 | $-\frac{4\sqrt{429}}{429}$ | 0 | 0 | 0 | $-\frac{4\sqrt{429}}{429}$ | $-\frac{\sqrt{715}}{286}$ | 0 | $\frac{\sqrt{715}i}{143}$ | 0 | 0 | 0 | $\frac{\sqrt{715}}{286}$ |
| | | 0 | $-\frac{7\sqrt{715}}{1144}$ | 0 | 0 | $\frac{\sqrt{429}}{1144}$ | 0 | 0 | $\frac{5\sqrt{429}i}{3432}$ | 0 | 0 | $-\frac{\sqrt{715}}{286}$ | 0 | 0 | $-\frac{5\sqrt{715}i}{1144}$ |
| | | $-\frac{7\sqrt{715}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{429}}{1144}$ | $-\frac{5\sqrt{429}i}{3432}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{715}}{286}$ | $\frac{5\sqrt{715}i}{1144}$ | 0 |
| 1018 | symmetry | $\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|----------------------------|-------------------------------|-------------------------------|----------------------------|-----------------------------|------------------------------|-------------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|
| $\mathbb{M}_5^{(1,1;a)}(A, 5)$ | | 0 | 0 | $\frac{\sqrt{143}}{156}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{143}}{156}$ | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2145}}{572}$ |
| | | 0 | 0 | 0 | $-\frac{\sqrt{143}}{156}$ | 0 | 0 | $-\frac{\sqrt{143}}{156}$ | 0 | 0 | $\frac{\sqrt{2145}}{572}$ | 0 | 0 | $-\frac{\sqrt{2145}}{572}$ | 0 |
| | | $\frac{\sqrt{143}}{156}$ | 0 | 0 | $\frac{5\sqrt{2145}i}{1716}$ | 0 | $-\frac{\sqrt{2145}}{312}$ | 0 | 0 | 0 | $-\frac{17\sqrt{143}i}{1716}$ | 0 | $-\frac{37\sqrt{143}}{3432}$ | 0 | 0 |
| | | 0 | $-\frac{\sqrt{143}}{156}$ | $-\frac{5\sqrt{2145}i}{1716}$ | 0 | $-\frac{\sqrt{2145}}{312}$ | 0 | 0 | 0 | $\frac{17\sqrt{143}i}{1716}$ | 0 | $-\frac{37\sqrt{143}}{3432}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{2145}}{312}$ | 0 | 0 | $\frac{\sqrt{2145}}{312}$ | 0 | 0 | $\frac{7\sqrt{143}}{3432}$ | 0 | $-\frac{8\sqrt{143}i}{429}$ | $\frac{7\sqrt{143}}{3432}$ | 0 |
| | | 0 | 0 | $-\frac{\sqrt{2145}}{312}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2145}}{312}$ | $\frac{7\sqrt{143}}{3432}$ | 0 | $\frac{8\sqrt{143}i}{429}$ | 0 | 0 | $-\frac{7\sqrt{143}}{3432}$ |
| | | 0 | $-\frac{\sqrt{143}}{156}$ | 0 | 0 | $\frac{\sqrt{2145}}{312}$ | 0 | 0 | $-\frac{5\sqrt{2145}i}{1716}$ | 0 | 0 | $-\frac{37\sqrt{143}}{3432}$ | 0 | 0 | $-\frac{17\sqrt{143}i}{1716}$ |
| | | $-\frac{\sqrt{143}}{156}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2145}}{312}$ | $\frac{5\sqrt{2145}i}{1716}$ | 0 | 0 | 0 | 0 | $\frac{37\sqrt{143}}{3432}$ | $\frac{17\sqrt{143}i}{1716}$ | 0 |
| | | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | $-\frac{17\sqrt{143}i}{1716}$ | 0 | $\frac{7\sqrt{143}}{3432}$ | 0 | 0 | 0 | $\frac{\sqrt{2145}i}{572}$ | 0 | $\frac{\sqrt{2145}}{312}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{2145}}{572}$ | $\frac{17\sqrt{143}i}{1716}$ | 0 | $\frac{7\sqrt{143}}{3432}$ | 0 | 0 | 0 | $-\frac{\sqrt{2145}i}{572}$ | 0 | $\frac{\sqrt{2145}}{312}$ | 0 | 0 | 0 |
| | | 0 | 0 | 0 | $-\frac{37\sqrt{143}}{3432}$ | 0 | $-\frac{8\sqrt{143}i}{429}$ | $-\frac{37\sqrt{143}}{3432}$ | 0 | 0 | $\frac{\sqrt{2145}}{312}$ | 0 | 0 | $-\frac{\sqrt{2145}}{312}$ | 0 |
| | | 0 | 0 | $-\frac{37\sqrt{143}}{3432}$ | 0 | $\frac{8\sqrt{143}i}{429}$ | 0 | 0 | $\frac{37\sqrt{143}}{3432}$ | $\frac{\sqrt{2145}}{312}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2145}}{312}$ |
| | | 0 | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | $\frac{7\sqrt{143}}{3432}$ | 0 | 0 | $-\frac{17\sqrt{143}i}{1716}$ | 0 | 0 | $-\frac{\sqrt{2145}}{312}$ | 0 | 0 | $-\frac{\sqrt{2145}i}{572}$ |
| | | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | 0 | 0 | $-\frac{7\sqrt{143}}{3432}$ | $\frac{17\sqrt{143}i}{1716}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2145}}{312}$ | $\frac{\sqrt{2145}i}{572}$ | 0 |
| 1019 | symmetry | $\frac{x(8x^4 - 40x^2y^2 - 40x^2z^2 + 15y^4 + 30y^2z^2 + 15z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-------------------------------|--|--------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|--------------------------------|-------------------------------|-------------------------------|-------------------------------|---|
| $\mathbb{M}_5^{(1,1;a)}(B,1)$ | 0 | $\frac{3\sqrt{1001}}{1001}$ | 0 | 0 | $\frac{\sqrt{15015}}{3432}$ | 0 | 0 | $-\frac{\sqrt{15015}i}{3432}$ | 0 | 0 | $\frac{3\sqrt{1001}}{1144}$ | 0 | 0 | $\frac{3\sqrt{1001}i}{1144}$ | |
| | $\frac{3\sqrt{1001}}{1001}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15015}}{3432}$ | $\frac{\sqrt{15015}i}{3432}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{1001}}{1144}$ | $-\frac{3\sqrt{1001}i}{1144}$ | 0 | |
| | 0 | 0 | 0 | $\frac{10\sqrt{1001}}{1001}$ | 0 | $\frac{5\sqrt{1001}i}{1144}$ | $-\frac{5\sqrt{1001}}{1144}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{15015}i}{3432}$ | $\frac{5\sqrt{15015}}{3432}$ | 0 | |
| | 0 | 0 | $\frac{10\sqrt{1001}}{1001}$ | 0 | $-\frac{5\sqrt{1001}i}{1144}$ | 0 | 0 | $\frac{5\sqrt{1001}}{1144}$ | 0 | 0 | $-\frac{5\sqrt{15015}i}{3432}$ | 0 | 0 | $-\frac{5\sqrt{15015}}{3432}$ | |
| | $\frac{\sqrt{15015}}{3432}$ | 0 | 0 | $\frac{5\sqrt{1001}i}{1144}$ | 0 | $-\frac{25\sqrt{1001}}{8008}$ | 0 | 0 | 0 | $-\frac{\sqrt{15015}i}{1716}$ | 0 | $-\frac{\sqrt{15015}}{1144}$ | 0 | 0 | |
| | 0 | $-\frac{\sqrt{15015}}{3432}$ | $-\frac{5\sqrt{1001}i}{1144}$ | 0 | $-\frac{25\sqrt{1001}}{8008}$ | 0 | 0 | 0 | $\frac{\sqrt{15015}i}{1716}$ | 0 | $-\frac{\sqrt{15015}}{1144}$ | 0 | 0 | 0 | |
| | 0 | $-\frac{\sqrt{15015}i}{3432}$ | $-\frac{5\sqrt{1001}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{25\sqrt{1001}}{8008}$ | $-\frac{\sqrt{15015}}{1716}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | |
| | $\frac{\sqrt{15015}i}{3432}$ | 0 | 0 | $\frac{5\sqrt{1001}}{1144}$ | 0 | 0 | $-\frac{25\sqrt{1001}}{8008}$ | 0 | 0 | $\frac{\sqrt{15015}}{1716}$ | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | |
| | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15015}i}{1716}$ | $-\frac{\sqrt{15015}}{1716}$ | 0 | 0 | $\frac{3\sqrt{1001}}{1001}$ | 0 | $-\frac{\sqrt{1001}i}{572}$ | $\frac{\sqrt{1001}}{572}$ | 0 | |
| | 0 | 0 | 0 | 0 | $\frac{\sqrt{15015}i}{1716}$ | 0 | 0 | $\frac{\sqrt{15015}}{1716}$ | $\frac{3\sqrt{1001}}{1001}$ | 0 | $\frac{\sqrt{1001}i}{572}$ | 0 | 0 | $-\frac{\sqrt{1001}}{572}$ | |
| | $\frac{3\sqrt{1001}}{1144}$ | 0 | 0 | $\frac{5\sqrt{15015}i}{3432}$ | 0 | $-\frac{\sqrt{15015}}{1144}$ | 0 | 0 | 0 | $-\frac{\sqrt{1001}i}{572}$ | 0 | $-\frac{3\sqrt{1001}}{616}$ | 0 | 0 | |
| | 0 | $-\frac{3\sqrt{1001}}{1144}$ | $-\frac{5\sqrt{15015}i}{3432}$ | 0 | $-\frac{\sqrt{15015}}{1144}$ | 0 | 0 | 0 | $\frac{\sqrt{1001}i}{572}$ | 0 | $-\frac{3\sqrt{1001}}{616}$ | 0 | 0 | 0 | |
| | 0 | $\frac{3\sqrt{1001}i}{1144}$ | $\frac{5\sqrt{15015}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | $\frac{\sqrt{1001}}{572}$ | 0 | 0 | 0 | 0 | $-\frac{3\sqrt{1001}}{616}$ | |
| | $-\frac{3\sqrt{1001}i}{1144}$ | 0 | 0 | $-\frac{5\sqrt{15015}}{3432}$ | 0 | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | 0 | $-\frac{\sqrt{1001}}{572}$ | 0 | 0 | $-\frac{3\sqrt{1001}}{616}$ | 0 |
| 1020 | symmetry | $\frac{z(15x^4+30x^2y^2-40x^2z^2+15y^4-40y^2z^2+8z^4)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|--------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|-------------------------------|------------------------------|
| $\mathbb{M}_5^{(1,1;a)}(B, 2)$ | | $\frac{3\sqrt{1001}}{1001}$ | 0 | 0 | $-\frac{\sqrt{15015}i}{3432}$ | 0 | $\frac{\sqrt{15015}}{3432}$ | 0 | 0 | 0 | $-\frac{3\sqrt{1001}i}{1144}$ | 0 | $-\frac{3\sqrt{1001}}{1144}$ | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{1001}}{1001}$ | $\frac{\sqrt{15015}i}{3432}$ | 0 | $\frac{\sqrt{15015}}{3432}$ | 0 | 0 | 0 | $\frac{3\sqrt{1001}i}{1144}$ | 0 | $-\frac{3\sqrt{1001}}{1144}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{15015}i}{3432}$ | $-\frac{25\sqrt{1001}}{8008}$ | 0 | 0 | 0 | $-\frac{5\sqrt{1001}}{1144}$ | $-\frac{\sqrt{15015}}{1144}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{15015}}{1716}$ | 0 |
| | | $\frac{\sqrt{15015}i}{3432}$ | 0 | 0 | $\frac{25\sqrt{1001}}{8008}$ | 0 | 0 | $-\frac{5\sqrt{1001}}{1144}$ | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | 0 | $\frac{\sqrt{15015}}{1716}$ | 0 |
| | | 0 | $\frac{\sqrt{15015}}{3432}$ | 0 | 0 | $-\frac{25\sqrt{1001}}{8008}$ | 0 | 0 | $\frac{5\sqrt{1001}i}{1144}$ | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | 0 | $\frac{\sqrt{15015}i}{1716}$ |
| | | $\frac{\sqrt{15015}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{25\sqrt{1001}}{8008}$ | $-\frac{5\sqrt{1001}i}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15015}}{1144}$ | $-\frac{\sqrt{15015}i}{1716}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{5\sqrt{1001}}{1144}$ | 0 | $\frac{5\sqrt{1001}i}{1144}$ | $\frac{10\sqrt{1001}}{1001}$ | 0 | 0 | $-\frac{5\sqrt{15015}}{3432}$ | 0 | $-\frac{5\sqrt{15015}i}{3432}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{5\sqrt{1001}}{1144}$ | 0 | $-\frac{5\sqrt{1001}i}{1144}$ | 0 | 0 | $-\frac{10\sqrt{1001}}{1001}$ | $-\frac{5\sqrt{15015}}{3432}$ | 0 | $\frac{5\sqrt{15015}i}{3432}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{3\sqrt{1001}i}{1144}$ | $-\frac{\sqrt{15015}}{1144}$ | 0 | 0 | 0 | $-\frac{5\sqrt{15015}}{3432}$ | $-\frac{3\sqrt{1001}}{616}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{1001}}{572}$ | 0 |
| | | $\frac{3\sqrt{1001}i}{1144}$ | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | 0 | $-\frac{5\sqrt{15015}}{3432}$ | 0 | 0 | $\frac{3\sqrt{1001}}{616}$ | 0 | 0 | $\frac{\sqrt{1001}}{572}$ | 0 |
| | | 0 | $-\frac{3\sqrt{1001}}{1144}$ | 0 | 0 | $\frac{\sqrt{15015}}{1144}$ | 0 | 0 | $-\frac{5\sqrt{15015}i}{3432}$ | 0 | 0 | $-\frac{3\sqrt{1001}}{616}$ | 0 | 0 | $-\frac{\sqrt{1001}i}{572}$ |
| | | $-\frac{3\sqrt{1001}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{15015}}{1144}$ | $\frac{5\sqrt{15015}i}{3432}$ | 0 | 0 | 0 | 0 | $\frac{3\sqrt{1001}}{616}$ | $\frac{\sqrt{1001}i}{572}$ | 0 |
| | | 0 | 0 | 0 | $\frac{\sqrt{15015}}{1716}$ | 0 | $\frac{\sqrt{15015}i}{1716}$ | 0 | 0 | 0 | $\frac{\sqrt{1001}}{572}$ | 0 | $-\frac{\sqrt{1001}i}{572}$ | $\frac{3\sqrt{1001}}{1001}$ | 0 |
| | | 0 | 0 | $\frac{\sqrt{15015}}{1716}$ | 0 | $-\frac{\sqrt{15015}i}{1716}$ | 0 | 0 | 0 | $\frac{\sqrt{1001}}{572}$ | 0 | $\frac{\sqrt{1001}i}{572}$ | 0 | 0 | $-\frac{3\sqrt{1001}}{1001}$ |
| 1021 | symmetry | $\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|-------------------------------|-----------|---|-------------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|-------------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|
| $\mathbb{M}_5^{(1,1;a)}(B,3)$ | | 0 | $-\frac{\sqrt{715}}{143}$ | 0 | 0 | $\frac{23\sqrt{429}}{3432}$ | 0 | 0 | $-\frac{23\sqrt{429i}}{3432}$ | 0 | 0 | $-\frac{7\sqrt{715}}{1144}$ | 0 | 0 | $-\frac{7\sqrt{715i}}{1144}$ |
| | | $-\frac{\sqrt{715}}{143}$ | 0 | 0 | 0 | 0 | $-\frac{23\sqrt{429}}{3432}$ | $\frac{23\sqrt{429i}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{7\sqrt{715}}{1144}$ | $\frac{7\sqrt{715i}}{1144}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{715i}}{1144}$ | $-\frac{\sqrt{715}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{429i}}{1144}$ | $-\frac{\sqrt{429}}{1144}$ | 0 |
| | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{715i}}{1144}$ | 0 | 0 | $\frac{\sqrt{715}}{1144}$ | 0 | 0 | $\frac{\sqrt{429i}}{1144}$ | 0 | 0 | $\frac{\sqrt{429}}{1144}$ |
| | | $\frac{23\sqrt{429}}{3432}$ | 0 | 0 | $\frac{\sqrt{715i}}{1144}$ | 0 | $-\frac{5\sqrt{715}}{1144}$ | 0 | 0 | 0 | $-\frac{4\sqrt{429i}}{429}$ | 0 | $-\frac{5\sqrt{429}}{3432}$ | 0 | 0 |
| | | 0 | $-\frac{23\sqrt{429}}{3432}$ | $-\frac{\sqrt{715i}}{1144}$ | 0 | $-\frac{5\sqrt{715}}{1144}$ | 0 | 0 | 0 | $\frac{4\sqrt{429i}}{429}$ | 0 | $-\frac{5\sqrt{429}}{3432}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{23\sqrt{429i}}{3432}$ | $-\frac{\sqrt{715}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{715}}{1144}$ | $-\frac{4\sqrt{429}}{429}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{429}}{3432}$ |
| | | $\frac{23\sqrt{429i}}{3432}$ | 0 | 0 | $\frac{\sqrt{715}}{1144}$ | 0 | 0 | $-\frac{5\sqrt{715}}{1144}$ | 0 | 0 | $\frac{4\sqrt{429}}{429}$ | 0 | 0 | $\frac{5\sqrt{429}}{3432}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{4\sqrt{429i}}{429}$ | $-\frac{4\sqrt{429}}{429}$ | 0 | 0 | $\frac{\sqrt{715}}{143}$ | 0 | $\frac{\sqrt{715i}}{286}$ | $-\frac{\sqrt{715}}{286}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{4\sqrt{429i}}{429}$ | 0 | 0 | $\frac{4\sqrt{429}}{429}$ | $\frac{\sqrt{715}}{143}$ | 0 | $-\frac{\sqrt{715i}}{286}$ | 0 | 0 | $\frac{\sqrt{715}}{286}$ |
| | | $-\frac{7\sqrt{715}}{1144}$ | 0 | 0 | $-\frac{\sqrt{429i}}{1144}$ | 0 | $-\frac{5\sqrt{429}}{3432}$ | 0 | 0 | 0 | $\frac{\sqrt{715i}}{286}$ | 0 | $\frac{5\sqrt{715}}{1144}$ | 0 | 0 |
| | | 0 | $\frac{7\sqrt{715}}{1144}$ | $\frac{\sqrt{429i}}{1144}$ | 0 | $-\frac{5\sqrt{429}}{3432}$ | 0 | 0 | 0 | $-\frac{\sqrt{715i}}{286}$ | 0 | $\frac{5\sqrt{715}}{1144}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{7\sqrt{715i}}{1144}$ | $-\frac{\sqrt{429}}{1144}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{429}}{3432}$ | $-\frac{\sqrt{715}}{286}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{715}}{1144}$ |
| | | $\frac{7\sqrt{715i}}{1144}$ | 0 | 0 | $\frac{\sqrt{429}}{1144}$ | 0 | 0 | $\frac{5\sqrt{429}}{3432}$ | 0 | 0 | $\frac{\sqrt{715}}{286}$ | 0 | 0 | $\frac{5\sqrt{715}}{1144}$ | 0 |
| 1022 | symmetry | $\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|---|-------------------------------|------------------------------|-------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------------------|
| $\mathbb{M}_5^{(1,1;a)}(B, 4)$ | | $-\frac{\sqrt{715}}{143}$ | 0 | 0 | $-\frac{23\sqrt{429}i}{3432}$ | 0 | $\frac{23\sqrt{429}}{3432}$ | 0 | 0 | 0 | $\frac{7\sqrt{715}i}{1144}$ | 0 | $\frac{7\sqrt{715}}{1144}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{715}}{143}$ | $\frac{23\sqrt{429}i}{3432}$ | 0 | $\frac{23\sqrt{429}}{3432}$ | 0 | 0 | 0 | $-\frac{7\sqrt{715}i}{1144}$ | 0 | $\frac{7\sqrt{715}}{1144}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{23\sqrt{429}i}{3432}$ | $-\frac{5\sqrt{715}}{1144}$ | 0 | 0 | 0 | $-\frac{\sqrt{715}}{1144}$ | $-\frac{5\sqrt{429}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{4\sqrt{429}}{429}$ | $\frac{4\sqrt{429}i}{429}$ |
| | | $\frac{23\sqrt{429}i}{3432}$ | 0 | 0 | $\frac{5\sqrt{715}}{1144}$ | 0 | 0 | $-\frac{\sqrt{715}}{1144}$ | 0 | 0 | $\frac{5\sqrt{429}}{3432}$ | 0 | 0 | $\frac{4\sqrt{429}}{429}$ | 0 |
| | | 0 | $\frac{23\sqrt{429}}{3432}$ | 0 | 0 | $-\frac{5\sqrt{715}}{1144}$ | 0 | 0 | $\frac{\sqrt{715}i}{1144}$ | 0 | 0 | $\frac{5\sqrt{429}}{3432}$ | 0 | 0 | $\frac{4\sqrt{429}i}{429}$ |
| | | $\frac{23\sqrt{429}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{715}}{1144}$ | $-\frac{\sqrt{715}i}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{429}}{3432}$ | $-\frac{4\sqrt{429}i}{429}$ | 0 |
| | | 0 | 0 | 0 | $-\frac{\sqrt{715}}{1144}$ | 0 | $\frac{\sqrt{715}i}{1144}$ | 0 | 0 | 0 | $\frac{\sqrt{429}}{1144}$ | 0 | $\frac{\sqrt{429}i}{1144}$ | 0 | 0 |
| | | 0 | 0 | $-\frac{\sqrt{715}}{1144}$ | 0 | $-\frac{\sqrt{715}i}{1144}$ | 0 | 0 | 0 | $\frac{\sqrt{429}}{1144}$ | 0 | $-\frac{\sqrt{429}i}{1144}$ | 0 | 0 | 0 |
| | | 0 | $\frac{7\sqrt{715}i}{1144}$ | $-\frac{5\sqrt{429}}{3432}$ | 0 | 0 | 0 | $\frac{\sqrt{429}}{1144}$ | $\frac{5\sqrt{715}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{715}}{286}$ | $-\frac{\sqrt{715}i}{286}$ |
| | | $-\frac{7\sqrt{715}i}{1144}$ | 0 | 0 | $\frac{5\sqrt{429}}{3432}$ | 0 | 0 | $\frac{\sqrt{429}}{1144}$ | 0 | 0 | $-\frac{5\sqrt{715}}{1144}$ | 0 | 0 | $-\frac{\sqrt{715}}{286}$ | 0 |
| | | 0 | $\frac{7\sqrt{715}}{1144}$ | 0 | 0 | $\frac{5\sqrt{429}}{3432}$ | 0 | 0 | $\frac{\sqrt{429}i}{1144}$ | 0 | 0 | $\frac{5\sqrt{715}}{1144}$ | 0 | 0 | $\frac{\sqrt{715}i}{286}$ |
| | | $\frac{7\sqrt{715}}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{429}}{3432}$ | $-\frac{\sqrt{429}i}{1144}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{715}}{1144}$ | $-\frac{\sqrt{715}i}{286}$ | 0 |
| | | 0 | 0 | 0 | $\frac{4\sqrt{429}}{429}$ | 0 | $\frac{4\sqrt{429}i}{429}$ | 0 | 0 | 0 | $-\frac{\sqrt{715}}{286}$ | 0 | $\frac{\sqrt{715}i}{286}$ | $\frac{\sqrt{715}}{143}$ | 0 |
| | | 0 | 0 | $\frac{4\sqrt{429}}{429}$ | 0 | $-\frac{4\sqrt{429}i}{429}$ | 0 | 0 | 0 | $-\frac{\sqrt{715}}{286}$ | 0 | $-\frac{\sqrt{715}i}{286}$ | 0 | 0 | $-\frac{\sqrt{715}}{143}$ |
| 1023 | symmetry | $\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | matrix | | | | | | | | | | | | | |
|--------------------------------|-----------|--|----------------------------|-----------------------------|------------------------------|-------------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|------------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|
| $\mathbb{M}_5^{(1,1;a)}(B, 5)$ | | 0 | 0 | 0 | 0 | $-\frac{\sqrt{143}}{156}$ | 0 | 0 | $-\frac{\sqrt{143}i}{156}$ | 0 | 0 | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | $\frac{\sqrt{2145}i}{572}$ |
| | | 0 | 0 | 0 | 0 | 0 | $\frac{\sqrt{143}}{156}$ | $\frac{\sqrt{143}i}{156}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2145}}{572}$ | $-\frac{\sqrt{2145}i}{572}$ | 0 |
| | | 0 | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2145}i}{312}$ | $-\frac{\sqrt{2145}}{312}$ | 0 | 0 | $\frac{8\sqrt{143}}{429}$ | 0 | $-\frac{7\sqrt{143}i}{3432}$ | $\frac{7\sqrt{143}}{3432}$ | 0 |
| | | 0 | 0 | 0 | 0 | $\frac{\sqrt{2145}i}{312}$ | 0 | 0 | $\frac{\sqrt{2145}}{312}$ | $\frac{8\sqrt{143}}{429}$ | 0 | $\frac{7\sqrt{143}i}{3432}$ | 0 | 0 | $-\frac{7\sqrt{143}}{3432}$ |
| | | $-\frac{\sqrt{143}}{156}$ | 0 | 0 | $-\frac{\sqrt{2145}i}{312}$ | 0 | $\frac{5\sqrt{2145}}{1716}$ | 0 | 0 | 0 | $\frac{37\sqrt{143}i}{3432}$ | 0 | $\frac{17\sqrt{143}}{1716}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{143}}{156}$ | $\frac{\sqrt{2145}i}{312}$ | 0 | $\frac{5\sqrt{2145}}{1716}$ | 0 | 0 | 0 | $-\frac{37\sqrt{143}i}{3432}$ | 0 | $\frac{17\sqrt{143}}{1716}$ | 0 | 0 | 0 |
| | | 0 | $-\frac{\sqrt{143}i}{156}$ | $-\frac{\sqrt{2145}}{312}$ | 0 | 0 | 0 | 0 | $-\frac{5\sqrt{2145}}{1716}$ | $-\frac{37\sqrt{143}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{17\sqrt{143}}{1716}$ |
| | | $\frac{\sqrt{143}i}{156}$ | 0 | 0 | $\frac{\sqrt{2145}}{312}$ | 0 | 0 | $-\frac{5\sqrt{2145}}{1716}$ | 0 | 0 | $\frac{37\sqrt{143}}{3432}$ | 0 | 0 | $\frac{17\sqrt{143}}{1716}$ | 0 |
| | | 0 | 0 | 0 | $\frac{8\sqrt{143}}{429}$ | 0 | $\frac{37\sqrt{143}i}{3432}$ | $-\frac{37\sqrt{143}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2145}i}{312}$ | $\frac{\sqrt{2145}}{312}$ | 0 |
| | | 0 | 0 | $\frac{8\sqrt{143}}{429}$ | 0 | $-\frac{37\sqrt{143}i}{3432}$ | 0 | 0 | $\frac{37\sqrt{143}}{3432}$ | 0 | 0 | $-\frac{\sqrt{2145}i}{312}$ | 0 | 0 | $-\frac{\sqrt{2145}}{312}$ |
| | | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | $-\frac{7\sqrt{143}i}{3432}$ | 0 | $\frac{17\sqrt{143}}{1716}$ | 0 | 0 | 0 | $\frac{\sqrt{2145}i}{312}$ | 0 | $\frac{\sqrt{2145}}{572}$ | 0 | 0 |
| | | 0 | $\frac{\sqrt{2145}}{572}$ | $\frac{7\sqrt{143}i}{3432}$ | 0 | $\frac{17\sqrt{143}}{1716}$ | 0 | 0 | 0 | $-\frac{\sqrt{2145}i}{312}$ | 0 | $\frac{\sqrt{2145}}{572}$ | 0 | 0 | 0 |
| | | 0 | $\frac{\sqrt{2145}i}{572}$ | $\frac{7\sqrt{143}}{3432}$ | 0 | 0 | 0 | 0 | $\frac{17\sqrt{143}}{1716}$ | $\frac{\sqrt{2145}}{312}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2145}}{572}$ |
| | | $-\frac{\sqrt{2145}i}{572}$ | 0 | 0 | $-\frac{7\sqrt{143}}{3432}$ | 0 | 0 | $\frac{17\sqrt{143}}{1716}$ | 0 | 0 | $-\frac{\sqrt{2145}}{312}$ | 0 | 0 | $-\frac{\sqrt{2145}}{572}$ | 0 |
| 1024 | symmetry | $-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$ | | | | | | | | | | | | | |

continued ...

Table 10

| No. | multipole | | matrix | | | | | | | | | | | | |
|--------------------------------|-----------------------------|----------------------------|------------------------------|------------------------------|-------------------------------|------------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|-----------------------------|------------------------------|-------------------------------|------------------------------|--|
| $\mathbb{M}_5^{(1,1;a)}(B, 6)$ | 0 | 0 | 0 | $\frac{\sqrt{143}i}{156}$ | 0 | $\frac{\sqrt{143}}{156}$ | 0 | 0 | 0 | $\frac{\sqrt{2145}i}{572}$ | 0 | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | |
| | 0 | 0 | $-\frac{\sqrt{143}i}{156}$ | 0 | $\frac{\sqrt{143}}{156}$ | 0 | 0 | 0 | $-\frac{\sqrt{2145}i}{572}$ | 0 | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | 0 | |
| | 0 | $\frac{\sqrt{143}i}{156}$ | $\frac{5\sqrt{2145}}{1716}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2145}}{312}$ | $\frac{17\sqrt{143}}{1716}$ | 0 | 0 | 0 | 0 | $-\frac{37\sqrt{143}}{3432}$ | |
| | $-\frac{\sqrt{143}i}{156}$ | 0 | 0 | $-\frac{5\sqrt{2145}}{1716}$ | 0 | 0 | $\frac{\sqrt{2145}}{312}$ | 0 | 0 | $-\frac{17\sqrt{143}}{1716}$ | 0 | 0 | $-\frac{37\sqrt{143}}{3432}$ | 0 | |
| | 0 | $\frac{\sqrt{143}}{156}$ | 0 | 0 | $-\frac{5\sqrt{2145}}{1716}$ | 0 | 0 | $\frac{\sqrt{2145}i}{312}$ | 0 | 0 | $\frac{17\sqrt{143}}{1716}$ | 0 | 0 | $\frac{37\sqrt{143}i}{3432}$ | |
| | $\frac{\sqrt{143}}{156}$ | 0 | 0 | 0 | 0 | $\frac{5\sqrt{2145}}{1716}$ | $-\frac{\sqrt{2145}i}{312}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{143}}{1716}$ | $-\frac{37\sqrt{143}i}{3432}$ | 0 | |
| | 0 | 0 | 0 | $\frac{\sqrt{2145}}{312}$ | 0 | $\frac{\sqrt{2145}i}{312}$ | 0 | 0 | 0 | $\frac{7\sqrt{143}}{3432}$ | 0 | $-\frac{7\sqrt{143}i}{3432}$ | $\frac{8\sqrt{143}}{429}$ | 0 | |
| | 0 | 0 | $\frac{\sqrt{2145}}{312}$ | 0 | $-\frac{\sqrt{2145}i}{312}$ | 0 | 0 | 0 | $\frac{7\sqrt{143}}{3432}$ | 0 | $\frac{7\sqrt{143}i}{3432}$ | 0 | 0 | $-\frac{8\sqrt{143}}{429}$ | |
| | 0 | $\frac{\sqrt{2145}i}{572}$ | $\frac{17\sqrt{143}}{1716}$ | 0 | 0 | 0 | 0 | $\frac{7\sqrt{143}}{3432}$ | $\frac{\sqrt{2145}}{572}$ | 0 | 0 | 0 | 0 | $-\frac{\sqrt{2145}}{312}$ | |
| | $-\frac{\sqrt{2145}i}{572}$ | 0 | 0 | $-\frac{17\sqrt{143}}{1716}$ | 0 | 0 | $\frac{7\sqrt{143}}{3432}$ | 0 | 0 | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | $-\frac{\sqrt{2145}}{312}$ | 0 | |
| | 0 | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | $\frac{17\sqrt{143}}{1716}$ | 0 | 0 | $-\frac{7\sqrt{143}i}{3432}$ | 0 | 0 | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | $-\frac{\sqrt{2145}i}{312}$ | |
| | $-\frac{\sqrt{2145}}{572}$ | 0 | 0 | 0 | 0 | $-\frac{17\sqrt{143}}{1716}$ | $\frac{7\sqrt{143}i}{3432}$ | 0 | 0 | 0 | 0 | $\frac{\sqrt{2145}}{572}$ | $\frac{\sqrt{2145}i}{312}$ | 0 | |
| | 0 | 0 | 0 | $-\frac{37\sqrt{143}}{3432}$ | 0 | $\frac{37\sqrt{143}i}{3432}$ | $\frac{8\sqrt{143}}{429}$ | 0 | 0 | $-\frac{\sqrt{2145}}{312}$ | 0 | $-\frac{\sqrt{2145}i}{312}$ | 0 | 0 | |
| | 0 | 0 | $-\frac{37\sqrt{143}}{3432}$ | 0 | $-\frac{37\sqrt{143}i}{3432}$ | 0 | 0 | $-\frac{8\sqrt{143}}{429}$ | $-\frac{\sqrt{2145}}{312}$ | 0 | $\frac{\sqrt{2145}i}{312}$ | 0 | 0 | 0 | |