

# Model for “CeCoSi”

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## General Condition

- Basis type: **lgs**
- SAMB selection:
  - Type: **[Q, G]**
  - Rank: **[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]**
  - Irrep.: **[ $A_{1g}$ ,  $A_{2g}$ ,  $B_{1g}$ ,  $B_{2g}$ ,  $E_g$ ,  $A_{1u}$ ,  $A_{2u}$ ,  $B_{1u}$ ,  $B_{2u}$ ,  $E_u$ ]**
  - Spin (s): **[0, 1]**
- Atomic selection:
  - Type: **[Q, G, M, T]**
  - Rank: **[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]**
  - Irrep.: **[ $A_{1g}$ ,  $A_{2g}$ ,  $B_{1g}$ ,  $B_{2g}$ ,  $E_g$ ,  $A_{1u}$ ,  $A_{2u}$ ,  $B_{1u}$ ,  $B_{2u}$ ,  $E_u$ ]**
  - Spin (s): **[0, 1]**
- Site-cluster selection:
  - Rank: **[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]**
  - Irrep.: **[ $A_{1g}$ ,  $A_{2g}$ ,  $B_{1g}$ ,  $B_{2g}$ ,  $E_g$ ,  $A_{1u}$ ,  $A_{2u}$ ,  $B_{1u}$ ,  $B_{2u}$ ,  $E_u$ ]**
- Bond-cluster selection:
  - Type: **[Q, G, M, T]**
  - Rank: **[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]**
  - Irrep.: **[ $A_{1g}$ ,  $A_{2g}$ ,  $B_{1g}$ ,  $B_{2g}$ ,  $E_g$ ,  $A_{1u}$ ,  $A_{2u}$ ,  $B_{1u}$ ,  $B_{2u}$ ,  $E_u$ ]**
- Max. neighbor: **10**
- Search cell range: **(-2, 3), (-2, 3), (-2, 3)**
- Toroidal priority: **false**

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## Group and Unit Cell

- Group: SG No. 129  $D_{4h}^7$   $P4/nmm$  [ tetragonal ]
- Associated point group: PG No. 129  $D_{4h}$   $4/mmm$  [ tetragonal ]
- Unit cell:
  - $a = 4.05700$ ,  $b = 4.05700$ ,  $c = 6.98700$ ,  $\alpha = 90.0$ ,  $\beta = 90.0$ ,  $\gamma = 90.0$
- Lattice vectors (conventional cell):
  - $\mathbf{a}_1 = [ 4.05700, 0.00000, 0.00000 ]$
  - $\mathbf{a}_2 = [ 0.00000, 4.05700, 0.00000 ]$
  - $\mathbf{a}_3 = [ 0.00000, 0.00000, 6.98700 ]$

## Symmetry Operation

Table 1: Symmetry operation

#	SO	#	SO	#	SO	#	SO	#	SO
1	$\{1 0\}$	2	$\{2_{001} \frac{1}{2}\frac{1}{2}0\}$	3	$\{4_{001}^+ \frac{1}{2}00\}$	4	$\{4_{001}^- 0\frac{1}{2}0\}$	5	$\{2_{010} 0\frac{1}{2}0\}$
6	$\{2_{100} \frac{1}{2}00\}$	7	$\{2_{110} \frac{1}{2}\frac{1}{2}0\}$	8	$\{2_{1-10} 0\}$	9	$\{-1 0\}$	10	$\{m_{001} \frac{1}{2}\frac{1}{2}0\}$
11	$\{-4_{001}^+ \frac{1}{2}00\}$	12	$\{-4_{001}^- 0\frac{1}{2}0\}$	13	$\{m_{010} 0\frac{1}{2}0\}$	14	$\{m_{100} \frac{1}{2}00\}$	15	$\{m_{110} \frac{1}{2}\frac{1}{2}0\}$
16	$\{m_{1-10} 0\}$								

## Harmonics

Table 2: Harmonics

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
1	$\mathbb{Q}_0(A_{1g})$	$A_{1g}$	0	$Q, T$	-	-	1
2	$\mathbb{Q}_2(A_{1g})$	$A_{1g}$	2	$Q, T$	-	-	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
3	$\mathbb{Q}_4(A_{1g}, 1)$	$A_{1g}$	4	$Q, T$	1	-	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$
4	$\mathbb{Q}_4(A_{1g}, 2)$	$A_{1g}$	4	$Q, T$	2	-	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
5	$\mathbb{G}_0(A_{1u})$	$A_{1u}$	0	$G, M$	-	-	1
6	$\mathbb{G}_2(A_{1u})$	$A_{1u}$	2	$G, M$	-	-	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$

continued ...

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
7	$\mathbb{G}_4(A_{1u}, 1)$	$A_{1u}$	4	$G, M$	1	-	$\frac{\sqrt{21}(x^4 - 3x^2y^2 - 3x^2z^2 + y^4 - 3y^2z^2 + z^4)}{6}$
8	$\mathbb{G}_4(A_{1u}, 2)$	$A_{1u}$	4	$G, M$	2	-	$-\frac{\sqrt{15}(x^4 - 12x^2y^2 + 6x^2z^2 + y^4 + 6y^2z^2 - 2z^4)}{12}$
9	$\mathbb{Q}_5(A_{1u})$	$A_{1u}$	5	$Q, T$	-	-	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
10	$\mathbb{G}_1(A_{2g})$	$A_{2g}$	1	$G, M$	-	-	$z$
11	$\mathbb{G}_3(A_{2g})$	$A_{2g}$	3	$G, M$	-	-	$-\frac{z(3x^2 + 3y^2 - 2z^2)}{2}$
12	$\mathbb{Q}_4(A_{2g})$	$A_{2g}$	4	$Q, T$	-	-	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
13	$\mathbb{Q}_1(A_{2u})$	$A_{2u}$	1	$Q, T$	-	-	$z$
14	$\mathbb{Q}_3(A_{2u})$	$A_{2u}$	3	$Q, T$	-	-	$-\frac{z(3x^2 + 3y^2 - 2z^2)}{2}$
15	$\mathbb{G}_4(A_{2u})$	$A_{2u}$	4	$G, M$	-	-	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
16	$\mathbb{Q}_2(B_{1g})$	$B_{1g}$	2	$Q, T$	-	-	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
17	$\mathbb{G}_3(B_{1g})$	$B_{1g}$	3	$G, M$	-	-	$\sqrt{15}xyz$
18	$\mathbb{Q}_4(B_{1g})$	$B_{1g}$	4	$Q, T$	-	-	$\frac{\sqrt{5}(x-y)(x+y)(x^2 + y^2 - 6z^2)}{4}$
19	$\mathbb{G}_2(B_{1u})$	$B_{1u}$	2	$G, M$	-	-	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
20	$\mathbb{Q}_3(B_{1u})$	$B_{1u}$	3	$Q, T$	-	-	$\sqrt{15}xyz$
21	$\mathbb{G}_4(B_{1u})$	$B_{1u}$	4	$G, M$	-	-	$\frac{\sqrt{5}(x-y)(x+y)(x^2 + y^2 - 6z^2)}{4}$
22	$\mathbb{Q}_5(B_{1u})$	$B_{1u}$	5	$Q, T$	-	-	$\frac{\sqrt{105}xyz(x^2 + y^2 - 2z^2)}{2}$
23	$\mathbb{Q}_2(B_{2g})$	$B_{2g}$	2	$Q, T$	-	-	$\sqrt{3}xy$
24	$\mathbb{G}_3(B_{2g})$	$B_{2g}$	3	$G, M$	-	-	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
25	$\mathbb{Q}_4(B_{2g})$	$B_{2g}$	4	$Q, T$	-	-	$-\frac{\sqrt{5}xy(x^2 + y^2 - 6z^2)}{2}$
26	$\mathbb{G}_2(B_{2u})$	$B_{2u}$	2	$G, M$	-	-	$\sqrt{3}xy$
27	$\mathbb{Q}_3(B_{2u})$	$B_{2u}$	3	$Q, T$	-	-	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$

continued ...

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
28	$\mathbb{G}_4(B_{2u})$	$B_{2u}$	4	$G, M$	-	-	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
29	$\mathbb{Q}_5(B_{2u})$	$B_{2u}$	5	$Q, T$	-	-	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$
30	$\mathbb{G}_{1,1}(E_g)$	$E_g$	1	$G, M$	-	1	$x$
31	$\mathbb{G}_{1,2}(E_g)$					2	$-y$
32	$\mathbb{Q}_{2,1}(E_g)$	$E_g$	2	$Q, T$	-	1	$\sqrt{3}yz$
33	$\mathbb{Q}_{2,2}(E_g)$					2	$\sqrt{3}xz$
34	$\mathbb{G}_{3,1}(E_g, 1)$	$E_g$	3	$G, M$	1	1	$\frac{x(2x^2-3y^2-3z^2)}{2}$
35	$\mathbb{G}_{3,2}(E_g, 1)$					2	$\frac{y(3x^2-2y^2+3z^2)}{2}$
36	$\mathbb{G}_{3,1}(E_g, 2)$	$E_g$	3	$G, M$	2	1	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
37	$\mathbb{G}_{3,2}(E_g, 2)$					2	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
38	$\mathbb{Q}_{4,1}(E_g, 1)$	$E_g$	4	$Q, T$	1	1	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
39	$\mathbb{Q}_{4,2}(E_g, 1)$					2	$\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
40	$\mathbb{Q}_{4,1}(E_g, 2)$	$E_g$	4	$Q, T$	2	1	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
41	$\mathbb{Q}_{4,2}(E_g, 2)$					2	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$
42	$\mathbb{Q}_{1,1}(E_u)$	$E_u$	1	$Q, T$	-	1	$x$
43	$\mathbb{Q}_{1,2}(E_u)$					2	$y$
44	$\mathbb{G}_{2,1}(E_u)$	$E_u$	2	$G, M$	-	1	$\sqrt{3}yz$
45	$\mathbb{G}_{2,2}(E_u)$					2	$-\sqrt{3}xz$
46	$\mathbb{Q}_{3,1}(E_u, 1)$	$E_u$	3	$Q, T$	1	1	$\frac{x(2x^2-3y^2-3z^2)}{2}$
47	$\mathbb{Q}_{3,2}(E_u, 1)$					2	$-\frac{y(3x^2-2y^2+3z^2)}{2}$
48	$\mathbb{Q}_{3,1}(E_u, 2)$	$E_u$	3	$Q, T$	2	1	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$

continued ...

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
49	$\mathbb{Q}_{3,2}(E_u, 2)$					2	$\frac{\sqrt{15}y(x-z)(x+z)}{2}$
50	$\mathbb{G}_{4,1}(E_u, 1)$	$E_u$	4	$G, M$	1	1	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
51	$\mathbb{G}_{4,2}(E_u, 1)$					2	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
52	$\mathbb{G}_{4,1}(E_u, 2)$	$E_u$	4	$G, M$	2	1	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
53	$\mathbb{G}_{4,2}(E_u, 2)$					2	$\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$

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Basis in full matrix

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Table 3: dimension = 36

#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)
0	$ p_x, \uparrow\rangle @\text{Ce}(1)$	1	$ p_x, \downarrow\rangle @\text{Ce}(1)$	2	$ p_y, \uparrow\rangle @\text{Ce}(1)$	3	$ p_y, \downarrow\rangle @\text{Ce}(1)$	4	$ p_z, \uparrow\rangle @\text{Ce}(1)$
5	$ p_z, \downarrow\rangle @\text{Ce}(1)$	6	$ p_x, \uparrow\rangle @\text{Ce}(2)$	7	$ p_x, \downarrow\rangle @\text{Ce}(2)$	8	$ p_y, \uparrow\rangle @\text{Ce}(2)$	9	$ p_y, \downarrow\rangle @\text{Ce}(2)$
10	$ p_z, \uparrow\rangle @\text{Ce}(2)$	11	$ p_z, \downarrow\rangle @\text{Ce}(2)$	12	$ p_x, \uparrow\rangle @\text{Co}(1)$	13	$ p_x, \downarrow\rangle @\text{Co}(1)$	14	$ p_y, \uparrow\rangle @\text{Co}(1)$
15	$ p_y, \downarrow\rangle @\text{Co}(1)$	16	$ p_z, \uparrow\rangle @\text{Co}(1)$	17	$ p_z, \downarrow\rangle @\text{Co}(1)$	18	$ p_x, \uparrow\rangle @\text{Co}(2)$	19	$ p_x, \downarrow\rangle @\text{Co}(2)$
20	$ p_y, \uparrow\rangle @\text{Co}(2)$	21	$ p_y, \downarrow\rangle @\text{Co}(2)$	22	$ p_z, \uparrow\rangle @\text{Co}(2)$	23	$ p_z, \downarrow\rangle @\text{Co}(2)$	24	$ p_x, \uparrow\rangle @\text{Si}(1)$
25	$ p_x, \downarrow\rangle @\text{Si}(1)$	26	$ p_y, \uparrow\rangle @\text{Si}(1)$	27	$ p_y, \downarrow\rangle @\text{Si}(1)$	28	$ p_z, \uparrow\rangle @\text{Si}(1)$	29	$ p_z, \downarrow\rangle @\text{Si}(1)$
30	$ p_x, \uparrow\rangle @\text{Si}(2)$	31	$ p_x, \downarrow\rangle @\text{Si}(2)$	32	$ p_y, \uparrow\rangle @\text{Si}(2)$	33	$ p_y, \downarrow\rangle @\text{Si}(2)$	34	$ p_z, \uparrow\rangle @\text{Si}(2)$
35	$ p_z, \downarrow\rangle @\text{Si}(2)$								

Table 4: Atomic basis (orbital part only)

orbital	definition
$ p_x\rangle$	$x$
$ p_y\rangle$	$y$
$ p_z\rangle$	$z$

## SAMB

954 (all 954) SAMBs

### • 'Ce' site-cluster : Ce

\* 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:  $|p_x, \uparrow\rangle, |p_x, \downarrow\rangle, |p_y, \uparrow\rangle, |p_y, \downarrow\rangle, |p_z, \uparrow\rangle, |p_z, \downarrow\rangle$

\* wyckoff: 2c

$$\boxed{\text{z1}} \quad \mathbb{Q}_0^{(c)}(A_{1g}) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z2}} \quad \mathbb{Q}_2^{(c)}(A_{1g}) = \mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z3}} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}) = \mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z4}} \quad \mathbb{Q}_0^{(1,1;c)}(A_{1g}) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z67}} \quad \mathbb{G}_0^{(1,0;c)}(A_{1u}) = \mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_1^{(s)}(A_{2u})$$

$$\boxed{\text{z124}} \quad \mathbb{G}_1^{(1,0;c)}(A_{2g}) = \mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\begin{aligned}
\boxed{\text{z125}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, a) &= \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_1^{(s)}(A_{2u}) \\
\boxed{\text{z184}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, b) &= \mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_1^{(s)}(A_{2u}) \\
\boxed{\text{z185}} \quad \mathbb{Q}_1^{(1, -1; c)}(A_{2u}) &= \mathbb{Q}_2^{(1, -1; a)}(A_{1g})\mathbb{Q}_1^{(s)}(A_{2u}) \\
\boxed{\text{z244}} \quad \mathbb{Q}_1^{(1, 1; c)}(A_{2u}) &= \mathbb{Q}_0^{(1, 1; a)}(A_{1g})\mathbb{Q}_1^{(s)}(A_{2u}) \\
\boxed{\text{z245}} \quad \mathbb{Q}_2^{(c)}(B_{1g}) &= \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_0^{(s)}(A_{1g}) \\
\boxed{\text{z246}} \quad \mathbb{Q}_2^{(1, -1; c)}(B_{1g}) &= \mathbb{Q}_2^{(1, -1; a)}(B_{1g})\mathbb{Q}_0^{(s)}(A_{1g}) \\
\boxed{\text{z247}} \quad \mathbb{Q}_3^{(c)}(B_{1u}) &= \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_1^{(s)}(A_{2u}) \\
\boxed{\text{z248}} \quad \mathbb{Q}_3^{(1, -1; c)}(B_{1u}) &= \mathbb{Q}_2^{(1, -1; a)}(B_{2g})\mathbb{Q}_1^{(s)}(A_{2u}) \\
\boxed{\text{z249}} \quad \mathbb{Q}_2^{(c)}(B_{2g}) &= \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_0^{(s)}(A_{1g}) \\
\boxed{\text{z478}} \quad \mathbb{Q}_2^{(1, -1; c)}(B_{2g}) &= \mathbb{Q}_2^{(1, -1; a)}(B_{2g})\mathbb{Q}_0^{(s)}(A_{1g}) \\
\boxed{\text{z536}} \quad \mathbb{Q}_3^{(c)}(B_{2u}) &= \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_1^{(s)}(A_{2u}) \\
\boxed{\text{z537}} \quad \mathbb{Q}_3^{(1, -1; c)}(B_{2u}) &= \mathbb{Q}_2^{(1, -1; a)}(B_{1g})\mathbb{Q}_1^{(s)}(A_{2u}) \\
\boxed{\text{z538}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2} \\
\boxed{\text{z539}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2} \\
\boxed{\text{z600}} \quad \mathbb{Q}_{2,1}^{(1, -1; c)}(E_g) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1, -1; a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2} \\
\boxed{\text{z601}} \quad \mathbb{Q}_{2,2}^{(1, -1; c)}(E_g) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1, -1; a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2} \\
\boxed{\text{z659}} \quad \mathbb{G}_{1,1}^{(1, 0; c)}(E_g) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1, 0; a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}
\end{aligned}$$

$$\boxed{\text{z660}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g) = \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$$

$$\boxed{\text{z721}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

$$\boxed{\text{z722}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

$$\boxed{\text{z723}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

$$\boxed{\text{z724}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

$$\boxed{\text{z725}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(E_u) = -\frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

$$\boxed{\text{z726}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(E_u) = -\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

• 'Co' site-cluster : Co

\* 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:  $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

\* wyckoff: **2a**

$$\boxed{\text{z5}} \quad \mathbb{Q}_0^{(c)}(A_{1g}) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z6}} \quad \mathbb{Q}_2^{(c)}(A_{1g}) = \mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z7}} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}) = \mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z8}} \quad \mathbb{Q}_0^{(1,1;c)}(A_{1g}) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z68}} \quad \mathbb{Q}_5^{(c)}(A_{1u}) = \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_3^{(s)}(B_{2u})$$

$$\boxed{\text{z126}} \quad \mathbb{Q}_5^{(1,-1;c)}(A_{1u}) = \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_3^{(s)}(B_{2u})$$

$$\boxed{\text{z127}} \quad \mathbb{G}_1^{(1,0;c)}(A_{2g}) = \mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_0^{(s)}(A_{1g})$$



$$\begin{aligned}
\boxed{\text{z186}} \quad \mathbb{Q}_1^{(c)}(A_{2u}) &= \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_3^{(s)}(B_{2u}) \\
\boxed{\text{z187}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}) &= \mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_3^{(s)}(B_{2u}) \\
\boxed{\text{z250}} \quad \mathbb{Q}_2^{(c)}(B_{1g}) &= \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_0^{(s)}(A_{1g}) \\
\boxed{\text{z251}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}) &= \mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_0^{(s)}(A_{1g}) \\
\boxed{\text{z252}} \quad \mathbb{Q}_3^{(1,0;c)}(B_{1u}) &= \mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_3^{(s)}(B_{2u}) \\
\boxed{\text{z253}} \quad \mathbb{Q}_2^{(c)}(B_{2g}) &= \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_0^{(s)}(A_{1g}) \\
\boxed{\text{z254}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}) &= \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_0^{(s)}(A_{1g}) \\
\boxed{\text{z255}} \quad \mathbb{Q}_3^{(c)}(B_{2u}) &= \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_3^{(s)}(B_{2u}) \\
\boxed{\text{z479}} \quad \mathbb{Q}_5^{(c)}(B_{2u}) &= \mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_3^{(s)}(B_{2u}) \\
\boxed{\text{z480}} \quad \mathbb{Q}_5^{(1,-1;c)}(B_{2u}) &= \mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_3^{(s)}(B_{2u}) \\
\boxed{\text{z540}} \quad \mathbb{Q}_3^{(1,1;c)}(B_{2u}) &= \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_3^{(s)}(B_{2u}) \\
\boxed{\text{z541}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2} \\
\boxed{\text{z602}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2} \\
\boxed{\text{z661}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2} \\
\boxed{\text{z662}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2} \\
\boxed{\text{z663}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2} \\
\boxed{\text{z664}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g) &= \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}
\end{aligned}$$

$$\boxed{\text{z727}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_3^{(s)}(B_{2u})}{2}$$

$$\boxed{\text{z728}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_3^{(s)}(B_{2u})}{2}$$

$$\boxed{\text{z729}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_3^{(s)}(B_{2u})}{2}$$

$$\boxed{\text{z730}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_3^{(s)}(B_{2u})}{2}$$

$$\boxed{\text{z731}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(E_u, 1) = -\frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_3^{(s)}(B_{2u})}{2}$$

$$\boxed{\text{z732}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(E_u, 1) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_3^{(s)}(B_{2u})}{2}$$

• 'Si' site-cluster : Si

\* 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:  $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

\* wyckoff: 2c

$$\boxed{\text{z9}} \quad \mathbb{Q}_0^{(c)}(A_{1g}) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z10}} \quad \mathbb{Q}_2^{(c)}(A_{1g}) = \mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z11}} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}) = \mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z12}} \quad \mathbb{Q}_0^{(1,1;c)}(A_{1g}) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z69}} \quad \mathbb{G}_0^{(1,0;c)}(A_{1u}) = \mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_1^{(s)}(A_{2u})$$

$$\boxed{\text{z128}} \quad \mathbb{G}_1^{(1,0;c)}(A_{2g}) = \mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z129}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_1^{(s)}(A_{2u})$$

$$\boxed{\text{z188}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, b) = \mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_1^{(s)}(A_{2u})$$

$$\boxed{\text{z189}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}) = \mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_1^{(s)}(A_{2u})$$

$$\boxed{\text{z256}} \quad \mathbb{Q}_1^{(1,1;c)}(A_{2u}) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_1^{(s)}(A_{2u})$$

$$\boxed{\text{z257}} \quad \mathbb{Q}_2^{(c)}(B_{1g}) = \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z258}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}) = \mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z259}} \quad \mathbb{Q}_3^{(c)}(B_{1u}) = \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_1^{(s)}(A_{2u})$$

$$\boxed{\text{z260}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{1u}) = \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_1^{(s)}(A_{2u})$$

$$\boxed{\text{z261}} \quad \mathbb{Q}_2^{(c)}(B_{2g}) = \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z481}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}) = \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_0^{(s)}(A_{1g})$$

$$\boxed{\text{z542}} \quad \mathbb{Q}_3^{(c)}(B_{2u}) = \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_1^{(s)}(A_{2u})$$

$$\boxed{\text{z543}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{2u}) = \mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_1^{(s)}(A_{2u})$$

$$\boxed{\text{z544}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$$

$$\boxed{\text{z545}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$$

$$\boxed{\text{z603}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$$

$$\boxed{\text{z604}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$$

$$\boxed{\text{z665}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$$

$$\boxed{\text{z666}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g) = \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(s)}(A_{1g})}{2}$$

$$\boxed{\text{z733}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

$$\boxed{\text{z734}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

$$\boxed{\text{z735}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

$$\boxed{\text{z736}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

$$\boxed{\text{z737}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(E_u) = -\frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

$$\boxed{\text{z738}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(E_u) = -\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(s)}(A_{2u})}{2}$$

• 'Ce'-'Co' bond-cluster : **Co;Ce\_001\_1**

\* 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:  $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

\* wyckoff: **8a@8i**

$$\boxed{\text{z13}} \quad \mathbb{Q}_0^{(c)}(A_{1g}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z14}} \quad \mathbb{Q}_0^{(c)}(A_{1g}, b) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z15}} \quad \mathbb{Q}_2^{(c)}(A_{1g}, a) = \mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z16}} \quad \mathbb{Q}_2^{(c)}(A_{1g}, b) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z17}} \quad \mathbb{Q}_2^{(c)}(A_{1g}, c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z18}} \quad \mathbb{Q}_0^{(1,-1;c)}(A_{1g}) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z19}} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, a) = \mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\begin{aligned}
\boxed{\text{z20}} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, b) &= \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{3} \\
\boxed{\text{z21}} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, c) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z22}} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, d) &= -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} - \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{5}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{3} \\
\boxed{\text{z23}} \quad \mathbb{Q}_4^{(1,-1;c)}(A_{1g}, 1) &= \frac{\sqrt{195}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{78} - \frac{\sqrt{13}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{195}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{78} - \frac{\sqrt{13}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} + \frac{5\sqrt{13}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{39} \\
\boxed{\text{z24}} \quad \mathbb{Q}_4^{(1,-1;c)}(A_{1g}, 2) &= -\frac{\sqrt{65}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{13} - \frac{\sqrt{65}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{13} + \frac{\sqrt{39}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{13} \\
\boxed{\text{z25}} \quad \mathbb{Q}_0^{(1,0;c)}(A_{1g}) &= \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{3} \\
\boxed{\text{z26}} \quad \mathbb{Q}_2^{(1,0;c)}(A_{1g}, a) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z27}} \quad \mathbb{Q}_2^{(1,0;c)}(A_{1g}, b) &= \mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_0^{(b)}(A_{1g}) \\
\boxed{\text{z28}} \quad \mathbb{Q}_2^{(1,0;c)}(A_{1g}, c) &= \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{3} \\
\boxed{\text{z29}} \quad \mathbb{Q}_0^{(1,1;c)}(A_{1g}) &= \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g}) \\
\boxed{\text{z30}} \quad \mathbb{Q}_2^{(1,1;c)}(A_{1g}) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z70}} \quad \mathbb{Q}_5^{(c)}(A_{1u}) &= \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_3^{(b)}(B_{2u}) \\
\boxed{\text{z71}} \quad \mathbb{Q}_5^{(1,-1;c)}(A_{1u}, a) &= \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_3^{(b)}(B_{2u}) \\
\boxed{\text{z72}} \quad \mathbb{Q}_5^{(1,-1;c)}(A_{1u}, b) &= \mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{M}_2^{(b)}(B_{2u}) \\
\boxed{\text{z73}} \quad \mathbb{G}_0^{(c)}(A_{1u}) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}
\end{aligned}$$

$$\begin{aligned}
\boxed{\text{z74}} \quad \mathbb{G}_2^{(c)}(A_{1u}, a) &= -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z75}} \quad \mathbb{G}_2^{(c)}(A_{1u}, b) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z76}} \quad \mathbb{G}_0^{(1,-1;c)}(A_{1u}) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z77}} \quad \mathbb{G}_2^{(1,-1;c)}(A_{1u}, a) &= -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z78}} \quad \mathbb{G}_2^{(1,-1;c)}(A_{1u}, b) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z79}} \quad \mathbb{G}_2^{(1,-1;c)}(A_{1u}, c) &= -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} - \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{7} \\
\boxed{\text{z80}} \quad \mathbb{G}_4^{(1,-1;c)}(A_{1u}, 1) &= \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z81}} \quad \mathbb{G}_4^{(1,-1;c)}(A_{1u}, 2) &= -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{42} + \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{42} \\
&\quad - \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{105}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{21} \\
\boxed{\text{z82}} \quad \mathbb{G}_0^{(1,0;c)}(A_{1u}, a) &= \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z83}} \quad \mathbb{G}_0^{(1,0;c)}(A_{1u}, b) &= \mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{M}_2^{(b)}(B_{2u}) \\
\boxed{\text{z84}} \quad \mathbb{G}_2^{(1,0;c)}(A_{1u}, a) &= -\frac{\sqrt{6}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z85}} \quad \mathbb{G}_2^{(1,0;c)}(A_{1u}, b) &= -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z86}} \quad \mathbb{G}_0^{(1,1;c)}(A_{1u}) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}
\end{aligned}$$

$$\boxed{\text{z87}} \quad \mathbb{G}_2^{(1,1;c)}(A_{1u}) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z130}} \quad \mathbb{Q}_4^{(c)}(A_{2g}) = \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_2^{(b)}(B_{1g})$$

$$\boxed{\text{z131}} \quad \mathbb{Q}_4^{(1,-1;c)}(A_{2g}, a) = \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_2^{(b)}(B_{1g})$$

$$\boxed{\text{z132}} \quad \mathbb{Q}_4^{(1,-1;c)}(A_{2g}, b) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{8} + \frac{3\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{8} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} - \frac{3\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} + \frac{\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{2}$$

$$\boxed{\text{z133}} \quad \mathbb{Q}_4^{(1,0;c)}(A_{2g}) = \mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_2^{(b)}(B_{1g})$$

$$\boxed{\text{z134}} \quad \mathbb{G}_1^{(c)}(A_{2g}, a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z135}} \quad \mathbb{G}_1^{(c)}(A_{2g}, b) = \mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z136}} \quad \mathbb{G}_1^{(c)}(A_{2g}, c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z137}} \quad \mathbb{G}_1^{(1,-1;c)}(A_{2g}, a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z138}} \quad \mathbb{G}_1^{(1,-1;c)}(A_{2g}, b) = \mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z139}} \quad \mathbb{G}_1^{(1,-1;c)}(A_{2g}, c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z140}} \quad \mathbb{G}_1^{(1,-1;c)}(A_{2g}, d) = -\frac{11\sqrt{237}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{632} - \frac{19\sqrt{395}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{632} + \frac{11\sqrt{237}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{632} \\ + \frac{19\sqrt{395}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{632} + \frac{3\sqrt{395}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{158}$$

$$\boxed{\text{z141}} \quad \mathbb{G}_3^{(1,-1;c)}(A_{2g}, a) = \mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z142}} \quad \mathbb{G}_3^{(1,-1;c)}(A_{2g}, b) = -\frac{7\sqrt{395}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{316} - \frac{\sqrt{237}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{316} + \frac{7\sqrt{395}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{316} \\ + \frac{\sqrt{237}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{316} - \frac{4\sqrt{237}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{79}$$

$$\boxed{\text{z143}} \quad \mathbb{G}_1^{(1,0;c)}(A_{2g}, a) = \mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z144}} \quad \mathbb{G}_1^{(1,0;c)}(A_{2g}, b) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z145}} \quad \mathbb{G}_1^{(1,0;c)}(A_{2g}, c) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z146}} \quad \mathbb{G}_1^{(1,1;c)}(A_{2g}, a) = \mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z147}} \quad \mathbb{G}_1^{(1,1;c)}(A_{2g}, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z190}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})$$

$$\boxed{\text{z191}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, b) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5}$$

$$\boxed{\text{z192}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, c) = \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_3^{(b)}(B_{2u})$$

$$\boxed{\text{z193}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, d) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z194}} \quad \mathbb{Q}_3^{(c)}(A_{2u}) = -\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5} - \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5}$$

$$\boxed{\text{z195}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, a) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5}$$

$$\boxed{\text{z196}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, b) = \mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_3^{(b)}(B_{2u})$$

$$\boxed{\text{z197}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z198}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, d) = \mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{M}_2^{(b)}(B_{2u})$$

$$\boxed{\text{z199}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}, a) = -\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5} - \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5}$$



$$\text{z200} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}, b) = -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{4}$$

$$\text{z201} \quad \mathbb{Q}_1^{(1,0;c)}(A_{2u}, a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$$\text{z202} \quad \mathbb{Q}_1^{(1,0;c)}(A_{2u}, b) = \frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{30}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{5}$$

$$\text{z203} \quad \mathbb{Q}_1^{(1,0;c)}(A_{2u}, c) = \mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{M}_2^{(b)}(B_{2u})$$

$$\text{z204} \quad \mathbb{Q}_3^{(1,0;c)}(A_{2u}) = -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{5} - \frac{\sqrt{5}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{5} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{5}$$

$$\text{z205} \quad \mathbb{Q}_1^{(1,1;c)}(A_{2u}, a) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})$$

$$\text{z206} \quad \mathbb{Q}_1^{(1,1;c)}(A_{2u}, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\text{z207} \quad \mathbb{G}_4^{(1,-1;c)}(A_{2u}) = \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{4}$$

$$\text{z262} \quad \mathbb{Q}_2^{(c)}(B_{1g}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g})$$

$$\text{z263} \quad \mathbb{Q}_2^{(c)}(B_{1g}, b) = \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\text{z264} \quad \mathbb{Q}_2^{(c)}(B_{1g}, c) = -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{5}$$

$$\text{z265} \quad \mathbb{Q}_2^{(c)}(B_{1g}, d) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\text{z266} \quad \mathbb{Q}_4^{(c)}(B_{1g}) = \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{5} - \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{5} - \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{5}$$

$$\text{z267} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}, a) = \mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\text{z268} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}, b) = -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{5}$$

$$\begin{aligned}
\text{z269} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}, c) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\text{z270} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}, d) &= -\frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} + \frac{\sqrt{30}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{8} - \frac{\sqrt{30}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{8} \\
\text{z271} \quad \mathbb{Q}_4^{(1,-1;c)}(B_{1g}, a) &= \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{5} - \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{5} - \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{5} \\
\text{z272} \quad \mathbb{Q}_4^{(1,-1;c)}(B_{1g}, b) &= -\frac{\sqrt{30}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} - \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} + \frac{\sqrt{30}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{8} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{8} \\
\text{z273} \quad \mathbb{Q}_2^{(1,0;c)}(B_{1g}, a) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\text{z274} \quad \mathbb{Q}_2^{(1,0;c)}(B_{1g}, b) &= \mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_0^{(b)}(A_{1g}) \\
\text{z275} \quad \mathbb{Q}_2^{(1,0;c)}(B_{1g}, c) &= -\frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{5} \\
\text{z276} \quad \mathbb{Q}_4^{(1,0;c)}(B_{1g}) &= \frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{5} - \frac{\sqrt{5}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{5} - \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{5} \\
\text{z277} \quad \mathbb{Q}_2^{(1,1;c)}(B_{1g}, a) &= \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g}) \\
\text{z278} \quad \mathbb{Q}_2^{(1,1;c)}(B_{1g}, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\text{z279} \quad \mathbb{G}_3^{(1,-1;c)}(B_{1g}) &= \mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_0^{(b)}(A_{1g}) \\
\text{z280} \quad \mathbb{Q}_3^{(c)}(B_{1u}, a) &= \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\text{z281} \quad \mathbb{Q}_3^{(c)}(B_{1u}, b) &= \mathbb{M}_1^{(a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{2u}) \\
\text{z282} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{1u}, a) &= \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\text{z283} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{1u}, b) &= \mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{2u})
\end{aligned}$$

$$\boxed{\text{z284}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{1u}, c) = -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z285}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{1u}, d) = -\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{2u})$$

$$\boxed{\text{z286}} \quad \mathbb{Q}_3^{(1,0;c)}(B_{1u}, a) = \mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_3^{(b)}(B_{2u})$$

$$\boxed{\text{z287}} \quad \mathbb{Q}_3^{(1,0;c)}(B_{1u}, b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z288}} \quad \mathbb{Q}_3^{(1,1;c)}(B_{1u}) = \mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{2u})$$

$$\boxed{\text{z289}} \quad \mathbb{G}_2^{(c)}(B_{1u}, a) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z290}} \quad \mathbb{G}_2^{(c)}(B_{1u}, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z291}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{1u}, a) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z292}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{1u}, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z293}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{1u}, c) = \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} - \frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{42} + \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} \\ - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{42} + \frac{\sqrt{105}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{21}$$

$$\boxed{\text{z294}} \quad \mathbb{G}_4^{(1,-1;c)}(B_{1u}) = \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} - \frac{\sqrt{21}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{7}$$

$$\boxed{\text{z295}} \quad \mathbb{G}_2^{(1,0;c)}(B_{1u}, a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z296}} \quad \mathbb{G}_2^{(1,0;c)}(B_{1u}, b) = -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z297}} \quad \mathbb{G}_2^{(1,1;c)}(B_{1u}) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z298}} \quad \mathbb{Q}_2^{(c)}(B_{2g}, a) = \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z299}} \quad \mathbb{Q}_2^{(c)}(B_{2g}, b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z300}} \quad \mathbb{Q}_2^{(c)}(B_{2g}, c) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z301}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, a) = \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z302}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z303}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, c) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z304}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, d) = -\frac{2\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{3} - \frac{2\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{3} - \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z305}} \quad \mathbb{Q}_4^{(1,-1;c)}(B_{2g}) = -\frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{12} - \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{12} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{4} + \frac{\sqrt{5}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z306}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{2g}, a) = -\frac{\sqrt{6}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z307}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{2g}, b) = \mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z308}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{2g}, c) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z309}} \quad \mathbb{Q}_2^{(1,1;c)}(B_{2g}) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z310}} \quad \mathbb{G}_3^{(c)}(B_{2g}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z311}} \quad \mathbb{G}_3^{(1,-1;c)}(B_{2g}, a) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z312}} \quad \mathbb{G}_3^{(1,-1;c)}(B_{2g}, b) = \mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z313}} \quad \mathbb{G}_3^{(1,-1;c)}(B_{2g}, c) = \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{12} - \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{4} + \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{12} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{4} - \frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z314}} \quad \mathbb{G}_3^{(1,0;c)}(B_{2g}) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z315}} \quad \mathbb{G}_3^{(1,1;c)}(B_{2g}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z316}} \quad \mathbb{Q}_3^{(c)}(B_{2u}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{2u})$$

$$\boxed{\text{z317}} \quad \mathbb{Q}_3^{(c)}(B_{2u}, b) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z318}} \quad \mathbb{Q}_5^{(c)}(B_{2u}) = \mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{2u})$$

$$\boxed{\text{z319}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{2u}, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z320}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{2u}, b) = \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{12} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z321}} \quad \mathbb{Q}_5^{(1,-1;c)}(B_{2u}) = \mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{2u})$$

$$\boxed{\text{z322}} \quad \mathbb{Q}_3^{(1,0;c)}(B_{2u}, a) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z323}} \quad \mathbb{Q}_3^{(1,0;c)}(B_{2u}, b) = -\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{M}_2^{(b)}(B_{2u})$$

$$\boxed{\text{z324}} \quad \mathbb{Q}_3^{(1,1;c)}(B_{2u}) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{2u})$$

$$\boxed{\text{z325}} \quad \mathbb{G}_2^{(c)}(B_{2u}, a) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z326}} \quad \mathbb{G}_2^{(c)}(B_{2u}, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\begin{aligned}
\text{z327} \quad \mathbb{G}_2^{(1,-1;c)}(B_{2u}, a) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\text{z328} \quad \mathbb{G}_2^{(1,-1;c)}(B_{2u}, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\text{z329} \quad \mathbb{G}_2^{(1,-1;c)}(B_{2u}, c) &= -\frac{\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{7} + \frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{21} + \frac{\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{7} \\
&\quad - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{21} + \frac{\sqrt{105}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{21} \\
\text{z330} \quad \mathbb{G}_4^{(1,-1;c)}(B_{2u}) &= -\frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{28} - \frac{3\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{28} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{28} + \frac{3\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{28} + \frac{\sqrt{21}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{7} \\
\text{z331} \quad \mathbb{G}_2^{(1,0;c)}(B_{2u}, a) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} \\
\text{z332} \quad \mathbb{G}_2^{(1,0;c)}(B_{2u}, b) &= -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\text{z333} \quad \mathbb{G}_2^{(1,1;c)}(B_{2u}) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\text{z482} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\text{z483} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\text{z484} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\text{z485} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\text{z486} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, c) &= -\frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} \\
\text{z487} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, c) &= \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10}
\end{aligned}$$

$$\begin{aligned}
\text{z488} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, d) &= -\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\text{z489} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, d) &= \frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2} \\
\text{z490} \quad \mathbb{Q}_{4,1}^{(c)}(E_g, 1) &= -\frac{7\sqrt{235}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{470} - \frac{7\sqrt{235}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{470} - \frac{3\sqrt{235}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{470} \\
\text{z491} \quad \mathbb{Q}_{4,2}^{(c)}(E_g, 1) &= \frac{7\sqrt{235}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{470} + \frac{7\sqrt{235}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{470} - \frac{3\sqrt{235}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{470} \\
\text{z492} \quad \mathbb{Q}_{4,1}^{(c)}(E_g, 2) &= \frac{3\sqrt{47}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{47} + \frac{3\sqrt{47}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{94} + \frac{4\sqrt{47}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{47} \\
\text{z493} \quad \mathbb{Q}_{4,2}^{(c)}(E_g, 2) &= -\frac{3\sqrt{47}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{47} - \frac{3\sqrt{47}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{94} + \frac{4\sqrt{47}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{47} \\
\text{z494} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\text{z495} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\text{z496} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, b) &= -\frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} \\
\text{z497} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, b) &= \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} \\
\text{z498} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, c) &= -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\text{z499} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, c) &= \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2} \\
\text{z546} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, d) &= \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{8} - \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{8} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\text{z547} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, d) &= -\frac{\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{8} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{8} - \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2}
\end{aligned}$$

$$\begin{aligned}
\text{z548} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 1a) &= -\frac{7\sqrt{235}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{470} - \frac{7\sqrt{235}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{470} - \frac{3\sqrt{235}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{470} \\
\text{z549} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 1a) &= \frac{7\sqrt{235}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{470} + \frac{7\sqrt{235}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{470} - \frac{3\sqrt{235}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{470} \\
\text{z550} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 1b) &= \frac{\sqrt{5055}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{2696} - \frac{47\sqrt{337}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{2696} - \frac{3\sqrt{5055}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{674} \\
&\quad - \frac{8\sqrt{337}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{337} - \frac{6\sqrt{337}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{337} \\
\text{z551} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 1b) &= -\frac{\sqrt{5055}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{2696} + \frac{47\sqrt{337}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{2696} + \frac{3\sqrt{5055}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{674} \\
&\quad + \frac{8\sqrt{337}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{337} - \frac{6\sqrt{337}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{337} \\
\text{z552} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 2a) &= \frac{3\sqrt{47}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{47} + \frac{3\sqrt{47}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{94} + \frac{4\sqrt{47}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{47} \\
\text{z553} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 2a) &= -\frac{3\sqrt{47}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{47} - \frac{3\sqrt{47}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{94} + \frac{4\sqrt{47}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{47} \\
\text{z554} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 2b) &= -\frac{55\sqrt{10110}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{10784} - \frac{111\sqrt{674}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{10784} \\
&\quad - \frac{7\sqrt{10110}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{5392} + \frac{75\sqrt{674}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{5392} - \frac{7\sqrt{674}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{1348} \\
\text{z555} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 2b) &= \frac{55\sqrt{10110}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{10784} + \frac{111\sqrt{674}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{10784} \\
&\quad + \frac{7\sqrt{10110}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{5392} - \frac{75\sqrt{674}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{5392} - \frac{7\sqrt{674}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{1348} \\
\text{z556} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, a) &= -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\text{z557} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, a) &= \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\text{z558} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}
\end{aligned}$$



$$\begin{aligned}
\text{z559} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2} \\
\text{z560} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, c) &= -\frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{10} \\
\text{z561} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, c) &= \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{10} \\
\text{z562} \quad \mathbb{Q}_{4,1}^{(1,0;c)}(E_g, 1) &= -\frac{7\sqrt{235}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{470} - \frac{7\sqrt{235}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{470} - \frac{3\sqrt{235}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{470} \\
\text{z563} \quad \mathbb{Q}_{4,2}^{(1,0;c)}(E_g, 1) &= \frac{7\sqrt{235}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{470} + \frac{7\sqrt{235}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{470} - \frac{3\sqrt{235}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{470} \\
\text{z605} \quad \mathbb{Q}_{4,1}^{(1,0;c)}(E_g, 2) &= \frac{3\sqrt{47}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{47} + \frac{3\sqrt{47}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{94} + \frac{4\sqrt{47}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{47} \\
\text{z606} \quad \mathbb{Q}_{4,2}^{(1,0;c)}(E_g, 2) &= -\frac{3\sqrt{47}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{47} - \frac{3\sqrt{47}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{94} + \frac{4\sqrt{47}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{47} \\
\text{z607} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\text{z608} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\text{z609} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E_g, b) &= -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\text{z610} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E_g, b) &= \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2} \\
\text{z611} \quad \mathbb{G}_{1,1}^{(c)}(E_g, a) &= \frac{\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\text{z612} \quad \mathbb{G}_{1,2}^{(c)}(E_g, a) &= -\frac{\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\text{z613} \quad \mathbb{G}_{1,1}^{(c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}
\end{aligned}$$

$$\boxed{\text{z614}} \quad \mathbb{G}_{1,2}^{(c)}(E_g, b) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z615}} \quad \mathbb{G}_{1,1}^{(c)}(E_g, c) = \frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z616}} \quad \mathbb{G}_{1,2}^{(c)}(E_g, c) = -\frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z617}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(E_g, a) = \frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z618}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(E_g, a) = -\frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z619}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z620}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z621}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(E_g, c) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z622}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(E_g, c) = -\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z667}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(E_g, d) = \frac{43\sqrt{474}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{2528} - \frac{25\sqrt{790}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{2528} - \frac{21\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{1264} \\ + \frac{13\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{1264} + \frac{3\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{316}$$

$$\boxed{\text{z668}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(E_g, d) = -\frac{43\sqrt{474}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{2528} + \frac{25\sqrt{790}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{2528} + \frac{21\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{1264} \\ - \frac{13\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{1264} + \frac{3\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{316}$$

$$\boxed{\text{z669}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(E_g, 1a) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z670}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(E_g, 1a) = \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z671}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(E_g, 1b) = -\frac{13\sqrt{790}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{1264} - \frac{7\sqrt{474}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{1264} - \frac{\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{632} \\ - \frac{9\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{632} + \frac{2\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{79}$$

$$\boxed{\text{z672}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(E_g, 1b) = \frac{13\sqrt{790}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{1264} + \frac{7\sqrt{474}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{1264} + \frac{\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{632} \\ + \frac{9\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{632} + \frac{2\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{79}$$

$$\boxed{\text{z673}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(E_g, 2) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z674}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(E_g, 2) = \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z675}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z676}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z677}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g, b) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z678}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g, b) = -\frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z679}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g, c) = \frac{\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z680}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g, c) = -\frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z681}} \quad \mathbb{G}_{1,1}^{(1,1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z682}} \quad \mathbb{G}_{1,2}^{(1,1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z683}} \quad \mathbb{G}_{1,1}^{(1,1;c)}(E_g, b) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z684}} \quad \mathbb{G}_{1,2}^{(1,1;c)}(E_g, b) = -\frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z739}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z740}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z741}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, b) = \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10}$$

$$\boxed{\text{z742}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, b) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10}$$

$$\boxed{\text{z743}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, c) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2}$$

$$\boxed{\text{z744}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, c) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2}$$

$$\boxed{\text{z745}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, d) = -\frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z746}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, d) = -\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z747}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, e) = -\frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2}$$

$$\boxed{\text{z748}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, e) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2}$$

$$\boxed{\text{z749}} \quad \mathbb{Q}_{3,1}^{(c)}(E_u, 1) = -\frac{\sqrt{10}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{20} + \frac{3\sqrt{10}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10}$$

$$\begin{aligned}
\boxed{\text{z750}} \quad \mathbb{Q}_{3,2}^{(c)}(Eu, 1) &= -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{20} - \frac{3\sqrt{10}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{10} \\
\boxed{\text{z751}} \quad \mathbb{Q}_{3,1}^{(c)}(Eu, 2) &= -\frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{4} - \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6} \\
\boxed{\text{z752}} \quad \mathbb{Q}_{3,2}^{(c)}(Eu, 2) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{4} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6} \\
\boxed{\text{z753}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(Eu, a) &= \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{10} \\
\boxed{\text{z754}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(Eu, a) &= \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{10} \\
\boxed{\text{z755}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(Eu, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2} \\
\boxed{\text{z756}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(Eu, b) &= -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2} \\
\boxed{\text{z757}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(Eu, c) &= -\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{2} \\
\boxed{\text{z758}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(Eu, c) &= -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{2} \\
\boxed{\text{z759}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(Eu, d) &= -\frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2} \\
\boxed{\text{z760}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(Eu, d) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2} \\
\boxed{\text{z761}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(Eu, e) &= \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{2u})}{4} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{2u})}{4} \\
\boxed{\text{z762}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(Eu, e) &= -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{2u})}{4} + \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{2u})}{4} \\
\boxed{\text{z763}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(Eu, 1a) &= -\frac{\sqrt{10}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{20} + \frac{3\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{10}
\end{aligned}$$

$$\begin{aligned}
\text{z764} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 1a) &= -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{20} - \frac{3\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} \\
\text{z765} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 1b) &= \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{8} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{8} \\
\text{z766} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 1b) &= \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{8} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{8} \\
\text{z767} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 2a) &= -\frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} \\
\text{z768} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 2a) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} \\
\text{z769} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 2b) &= -\frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{24} + \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{8} + \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{24} \\
\text{z770} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 2b) &= -\frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{24} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{24} \\
\text{z771} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 2c) &= -\frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{2u})}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{2u})}{4} \\
\text{z772} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 2c) &= \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{2u})}{4} + \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{2u})}{4} \\
\text{z773} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(E_u, a) &= -\frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\text{z774} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(E_u, a) &= -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} \\
\text{z775} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(E_u, b) &= \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} \\
\text{z776} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(E_u, b) &= \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} \\
\text{z777} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(E_u, c) &= -\frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2}
\end{aligned}$$

$$\begin{aligned}
\boxed{\text{z778}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(E_u, c) &= \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2} \\
\boxed{\text{z779}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(E_u, 1a) &= -\frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2} \\
\boxed{\text{z780}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(E_u, 1a) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2} \\
\boxed{\text{z781}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(E_u, 1b) &= -\frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{20} + \frac{3\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} \\
\boxed{\text{z782}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(E_u, 1b) &= -\frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{20} - \frac{3\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} \\
\boxed{\text{z783}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(E_u, 2) &= -\frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6} \\
\boxed{\text{z784}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(E_u, 2) &= -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6} \\
\boxed{\text{z785}} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(E_u, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} \\
\boxed{\text{z786}} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(E_u, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z787}} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(E_u, b) &= -\frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z788}} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(E_u, b) &= -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\boxed{\text{z789}} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(E_u, c) &= -\frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2} \\
\boxed{\text{z790}} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(E_u, c) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2} \\
\boxed{\text{z791}} \quad \mathbb{G}_{2,1}^{(c)}(E_u, a) &= -\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}
\end{aligned}$$

$$\begin{aligned}
\boxed{\text{z792}} \quad \mathbb{G}_{2,2}^{(c)}(Eu, a) &= -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{2} - \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6} \\
\boxed{\text{z793}} \quad \mathbb{G}_{2,1}^{(c)}(Eu, b) &= -\frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{2} \\
\boxed{\text{z794}} \quad \mathbb{G}_{2,2}^{(c)}(Eu, b) &= -\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{2} \\
\boxed{\text{z795}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(Eu, a) &= -\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{2} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6} \\
\boxed{\text{z796}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(Eu, a) &= -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{2} - \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6} \\
\boxed{\text{z797}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(Eu, b) &= -\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{2} \\
\boxed{\text{z798}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(Eu, b) &= -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{2} \\
\boxed{\text{z799}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(Eu, c) &= \frac{\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{14} + \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{42} - \frac{\sqrt{14}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{14} + \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(Eu)}{42} - \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{42} \\
\boxed{\text{z800}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(Eu, c) &= \frac{\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{14} + \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{42} + \frac{\sqrt{14}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{14} - \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(Eu)}{42} - \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{42} \\
\boxed{\text{z801}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(Eu, 1) &= -\frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{8} \\
\boxed{\text{z802}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(Eu, 1) &= -\frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{8} \\
\boxed{\text{z803}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(Eu, 2) &= \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{56} - \frac{3\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{56} - \frac{\sqrt{70}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{56} + \frac{\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(Eu)}{14} + \frac{3\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{56} \\
\boxed{\text{z804}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(Eu, 2) &= \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{56} - \frac{3\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{56} + \frac{\sqrt{70}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{56} - \frac{\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(Eu)}{14} + \frac{3\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{56} \\
\boxed{\text{z805}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(Eu, a) &= -\frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{2}
\end{aligned}$$



$$\begin{aligned}
\text{z806} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E_u, a) &= -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} \\
\text{z807} \quad \mathbb{G}_{2,1}^{(1,0;c)}(E_u, b) &= -\frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6} \\
\text{z808} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E_u, b) &= -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6} \\
\text{z809} \quad \mathbb{G}_{2,1}^{(1,1;c)}(E_u) &= -\frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2} \\
\text{z810} \quad \mathbb{G}_{2,2}^{(1,1;c)}(E_u) &= -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2}
\end{aligned}$$

• 'Ce'-'Si' bond-cluster : Si;Ce\_001\_1

\* 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:  $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

\* wyckoff: 8a08j

$$\begin{aligned}
\text{z31} \quad \mathbb{Q}_0^{(c)}(A_{1g}, a) &= \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g}) \\
\text{z32} \quad \mathbb{Q}_0^{(c)}(A_{1g}, b) &= \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_2^{(b)}(B_{2g})}{3} \\
\text{z33} \quad \mathbb{Q}_0^{(c)}(A_{1g}, c) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} \\
\text{z34} \quad \mathbb{Q}_2^{(c)}(A_{1g}, a) &= \mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g}) \\
\text{z35} \quad \mathbb{Q}_2^{(c)}(A_{1g}, b) &= \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_2^{(b)}(B_{2g})}{3} \\
\text{z36} \quad \mathbb{Q}_0^{(1,-1;c)}(A_{1g}, a) &= \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_2^{(b)}(B_{2g})}{3} \\
\text{z37} \quad \mathbb{Q}_0^{(1,-1;c)}(A_{1g}, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} \\
\text{z38} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, a) &= \mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})
\end{aligned}$$

$$\boxed{\text{z39}} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, b) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_2^{(b)}(B_{2g})}{3}$$

$$\boxed{\text{z40}} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, c) = \mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_2^{(b)}(B_{2g})$$

$$\boxed{\text{z41}} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, d) = -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,2}^{(b)}(E_g)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,2}^{(b)}(E_g)}{4}$$

$$\boxed{\text{z42}} \quad \mathbb{Q}_4^{(1,-1;c)}(A_{1g}, 1) = \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} + \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,2}^{(b)}(E_g)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,2}^{(b)}(E_g)}{4}$$

$$\boxed{\text{z43}} \quad \mathbb{Q}_0^{(1,0;c)}(A_{1g}) = \mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_2^{(b)}(B_{2g})$$

$$\boxed{\text{z44}} \quad \mathbb{Q}_2^{(1,0;c)}(A_{1g}, a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z45}} \quad \mathbb{Q}_2^{(1,0;c)}(A_{1g}, b) = \mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z46}} \quad \mathbb{Q}_2^{(1,0;c)}(A_{1g}, c) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z47}} \quad \mathbb{Q}_0^{(1,1;c)}(A_{1g}, a) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z48}} \quad \mathbb{Q}_0^{(1,1;c)}(A_{1g}, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z88}} \quad \mathbb{Q}_5^{(c)}(A_{1u}) = \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_3^{(b)}(B_{1u})$$

$$\boxed{\text{z89}} \quad \mathbb{Q}_5^{(1,-1;c)}(A_{1u}, a) = \mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_3^{(b)}(B_{1u})$$

$$\boxed{\text{z90}} \quad \mathbb{Q}_5^{(1,-1;c)}(A_{1u}, b) = \mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{M}_2^{(b)}(B_{1u})$$

$$\boxed{\text{z91}} \quad \mathbb{G}_0^{(c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z92}} \quad \mathbb{G}_2^{(c)}(A_{1u}, a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z93}} \quad \mathbb{G}_2^{(c)}(A_{1u}, b) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\begin{aligned}
\boxed{\text{z94}} \quad \mathbb{G}_0^{(1,-1;c)}(A_{1u}) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z95}} \quad \mathbb{G}_2^{(1,-1;c)}(A_{1u},a) &= -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z96}} \quad \mathbb{G}_2^{(1,-1;c)}(A_{1u},b) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z97}} \quad \mathbb{G}_2^{(1,-1;c)}(A_{1u},c) &= -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} - \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{7} \\
\boxed{\text{z98}} \quad \mathbb{G}_4^{(1,-1;c)}(A_{1u},1) &= \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z99}} \quad \mathbb{G}_4^{(1,-1;c)}(A_{1u},2) &= -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{42} + \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{42} \\
&\quad - \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{105}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{21} \\
\boxed{\text{z100}} \quad \mathbb{G}_0^{(1,0;c)}(A_{1u},a) &= \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z101}} \quad \mathbb{G}_0^{(1,0;c)}(A_{1u},b) &= \mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{M}_2^{(b)}(B_{1u}) \\
\boxed{\text{z102}} \quad \mathbb{G}_2^{(1,0;c)}(A_{1u},a) &= -\frac{\sqrt{6}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z103}} \quad \mathbb{G}_2^{(1,0;c)}(A_{1u},b) &= -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z104}} \quad \mathbb{G}_0^{(1,1;c)}(A_{1u}) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z105}} \quad \mathbb{G}_2^{(1,1;c)}(A_{1u}) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z148}} \quad \mathbb{Q}_4^{(c)}(A_{2g}) &= \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_2^{(b)}(B_{2g})
\end{aligned}$$

$$\begin{aligned}
\text{z149} \quad & \mathbb{Q}_4^{(1,-1;c)}(A_{2g}, a) = \mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_2^{(b)}(B_{2g}) \\
\text{z150} \quad & \mathbb{Q}_4^{(1,-1;c)}(A_{2g}, b) = -\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{2g}) \\
\text{z151} \quad & \mathbb{Q}_4^{(1,-1;c)}(A_{2g}, c) = -\frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,2}^{(b)}(E_g)}{4} + \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,2}^{(b)}(E_g)}{4} + \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} \\
\text{z152} \quad & \mathbb{Q}_4^{(1,0;c)}(A_{2g}) = \mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{2g}) \\
\text{z153} \quad & \mathbb{G}_1^{(c)}(A_{2g}, a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\text{z154} \quad & \mathbb{G}_1^{(c)}(A_{2g}, b) = \mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g}) \\
\text{z155} \quad & \mathbb{G}_1^{(c)}(A_{2g}, c) = -\frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} \\
\text{z156} \quad & \mathbb{G}_1^{(1,-1;c)}(A_{2g}, a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\text{z157} \quad & \mathbb{G}_1^{(1,-1;c)}(A_{2g}, b) = \mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g}) \\
\text{z158} \quad & \mathbb{G}_1^{(1,-1;c)}(A_{2g}, c) = -\frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} \\
\text{z159} \quad & \mathbb{G}_3^{(1,-1;c)}(A_{2g}, a) = \mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g}) \\
\text{z160} \quad & \mathbb{G}_3^{(1,-1;c)}(A_{2g}, b) = \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,2}^{(b)}(E_g)}{4} + \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,2}^{(b)}(E_g)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} \\
\text{z161} \quad & \mathbb{G}_1^{(1,0;c)}(A_{2g}, a) = \mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_0^{(b)}(A_{1g}) \\
\text{z162} \quad & \mathbb{G}_1^{(1,0;c)}(A_{2g}, b) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\text{z163} \quad & \mathbb{G}_1^{(1,0;c)}(A_{2g}, c) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}
\end{aligned}$$

$$\boxed{\text{z164}} \quad \mathbb{G}_1^{(1,1;c)}(A_{2g}, a) = \mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z165}} \quad \mathbb{G}_1^{(1,1;c)}(A_{2g}, b) = -\frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z208}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})$$

$$\boxed{\text{z209}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, b) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5}$$

$$\boxed{\text{z210}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, c) = \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_3^{(b)}(B_{1u})$$

$$\boxed{\text{z211}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, d) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z212}} \quad \mathbb{Q}_3^{(c)}(A_{2u}) = -\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5} - \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5}$$

$$\boxed{\text{z213}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, a) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5}$$

$$\boxed{\text{z214}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, b) = \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_3^{(b)}(B_{1u})$$

$$\boxed{\text{z215}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z216}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, d) = \mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{M}_2^{(b)}(B_{1u})$$

$$\boxed{\text{z217}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}, a) = -\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5} - \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5}$$

$$\boxed{\text{z218}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}, b) = -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{4}$$

$$\boxed{\text{z219}} \quad \mathbb{Q}_1^{(1,0;c)}(A_{2u}, a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z220}} \quad \mathbb{Q}_1^{(1,0;c)}(A_{2u}, b) = \frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{30}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{5}$$

$$\begin{aligned}
\boxed{\text{z221}} \quad \mathbb{Q}_1^{(1,0;c)}(A_{2u}, c) &= -\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{M}_2^{(b)}(B_{1u}) \\
\boxed{\text{z222}} \quad \mathbb{Q}_3^{(1,0;c)}(A_{2u}) &= -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{5} - \frac{\sqrt{5}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{5} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{5} \\
\boxed{\text{z223}} \quad \mathbb{Q}_1^{(1,1;c)}(A_{2u}, a) &= \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u}) \\
\boxed{\text{z224}} \quad \mathbb{Q}_1^{(1,1;c)}(A_{2u}, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\boxed{\text{z225}} \quad \mathbb{G}_4^{(1,-1;c)}(A_{2u}) &= \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} \\
\boxed{\text{z334}} \quad \mathbb{Q}_2^{(c)}(B_{1g}, a) &= \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_0^{(b)}(A_{1g}) \\
\boxed{\text{z335}} \quad \mathbb{Q}_2^{(c)}(B_{1g}, b) &= -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z336}} \quad \mathbb{Q}_2^{(c)}(B_{1g}, c) &= -\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{2g}) \\
\boxed{\text{z337}} \quad \mathbb{Q}_2^{(c)}(B_{1g}, d) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z338}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}, a) &= \mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_0^{(b)}(A_{1g}) \\
\boxed{\text{z339}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}, b) &= -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z340}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}, c) &= -\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{2g}) \\
\boxed{\text{z341}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}, d) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z342}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}, e) &= \mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{2g}) \\
\boxed{\text{z343}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g}, f) &= \frac{3\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,1}^{(b)}(E_g)}{8} - \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,1}^{(b)}(E_g)}{8} - \frac{3\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,2}^{(b)}(E_g)}{8} + \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,2}^{(b)}(E_g)}{8}
\end{aligned}$$

$$\boxed{\text{z344}} \quad \mathbb{Q}_4^{(1,-1;c)}(B_{1g}) = \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,1}^{(b)}(E_g)}{8} + \frac{3\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,1}^{(b)}(E_g)}{8} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,2}^{(b)}(E_g)}{8} - \frac{3\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,2}^{(b)}(E_g)}{8}$$

$$\boxed{\text{z345}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{1g}, a) = \frac{\sqrt{6}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_2^{(b)}(B_{2g})}{3}$$

$$\boxed{\text{z346}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{1g}, b) = \mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z347}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{1g}, c) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z348}} \quad \mathbb{Q}_2^{(1,1;c)}(B_{1g}, a) = -\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{2g})$$

$$\boxed{\text{z349}} \quad \mathbb{Q}_2^{(1,1;c)}(B_{1g}, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z350}} \quad \mathbb{G}_3^{(1,-1;c)}(B_{1g}) = \mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z351}} \quad \mathbb{G}_3^{(1,0;c)}(B_{1g}) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{3} - \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_2^{(b)}(B_{2g})}{3}$$

$$\boxed{\text{z352}} \quad \mathbb{Q}_3^{(c)}(B_{1u}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{1u})$$

$$\boxed{\text{z353}} \quad \mathbb{Q}_3^{(c)}(B_{1u}, b) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z354}} \quad \mathbb{Q}_5^{(c)}(B_{1u}) = -\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{1u})$$

$$\boxed{\text{z355}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{1u}, a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z356}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{1u}, b) = -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z357}} \quad \mathbb{Q}_5^{(1,-1;c)}(B_{1u}) = -\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{1u})$$

$$\boxed{\text{z358}} \quad \mathbb{Q}_3^{(1,0;c)}(B_{1u}, a) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z359}} \quad \mathbb{Q}_3^{(1,0;c)}(B_{1u}, b) = \mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{M}_2^{(b)}(B_{1u})$$

$$\boxed{\text{z360}} \quad \mathbb{Q}_3^{(1,1;c)}(B_{1u}) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{1u})$$

$$\boxed{\text{z361}} \quad \mathbb{G}_2^{(c)}(B_{1u}, a) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z362}} \quad \mathbb{G}_2^{(c)}(B_{1u}, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z363}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{1u}, a) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z364}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{1u}, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z365}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{1u}, c) = \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} - \frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{42} + \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} \\ - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{42} + \frac{\sqrt{105}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{21}$$

$$\boxed{\text{z366}} \quad \mathbb{G}_4^{(1,-1;c)}(B_{1u}) = \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} - \frac{\sqrt{21}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{7}$$

$$\boxed{\text{z367}} \quad \mathbb{G}_2^{(1,0;c)}(B_{1u}, a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z368}} \quad \mathbb{G}_2^{(1,0;c)}(B_{1u}, b) = -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z369}} \quad \mathbb{G}_2^{(1,1;c)}(B_{1u}) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z370}} \quad \mathbb{Q}_2^{(c)}(B_{2g}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{2g})$$

$$\boxed{\text{z371}} \quad \mathbb{Q}_2^{(c)}(B_{2g}, b) = \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z372}} \quad \mathbb{Q}_2^{(c)}(B_{2g}, c) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{2g})}{5}$$



$$\begin{aligned}
\text{z373} \quad \mathbb{Q}_2^{(c)}(B_{2g}, d) &= -\frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} \\
\text{z374} \quad \mathbb{Q}_4^{(c)}(B_{2g}) &= \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{5} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{2g})}{5} \\
\text{z375} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, a) &= \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_0^{(b)}(A_{1g}) \\
\text{z376} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, b) &= \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{2g})}{5} \\
\text{z377} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, c) &= -\frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} \\
\text{z378} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, d) &= \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,2}^{(b)}(E_g)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,2}^{(b)}(E_g)}{4} + \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} \\
\text{z379} \quad \mathbb{Q}_4^{(1,-1;c)}(B_{2g}, a) &= \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{5} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{2g})}{5} \\
\text{z380} \quad \mathbb{Q}_4^{(1,-1;c)}(B_{2g}, b) &= \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,2}^{(b)}(E_g)}{4} + \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,2}^{(b)}(E_g)}{4} + \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} + \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_{1,1}^{(b)}(E_g)}{4} \\
\text{z381} \quad \mathbb{Q}_2^{(1,0;c)}(B_{2g}, a) &= -\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\text{z382} \quad \mathbb{Q}_2^{(1,0;c)}(B_{2g}, b) &= \mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_0^{(b)}(A_{1g}) \\
\text{z383} \quad \mathbb{Q}_2^{(1,0;c)}(B_{2g}, c) &= -\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_2^{(b)}(B_{2g}) \\
\text{z384} \quad \mathbb{Q}_2^{(1,0;c)}(B_{2g}, d) &= \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} \\
\text{z385} \quad \mathbb{Q}_2^{(1,1;c)}(B_{2g}, a) &= \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{2g}) \\
\text{z386} \quad \mathbb{Q}_2^{(1,1;c)}(B_{2g}, b) &= -\frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} \\
\text{z387} \quad \mathbb{G}_3^{(1,-1;c)}(B_{2g}) &= \mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_0^{(b)}(A_{1g})
\end{aligned}$$

$$\boxed{\text{z388}} \quad \mathbb{Q}_3^{(c)}(B_{2u}, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z389}} \quad \mathbb{Q}_3^{(c)}(B_{2u}, b) = \mathbb{M}_1^{(a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{1u})$$

$$\boxed{\text{z390}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{2u}, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z391}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{2u}, b) = \mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{1u})$$

$$\boxed{\text{z392}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{2u}, c) = \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{12} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z393}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{2u}, d) = -\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{1u})$$

$$\boxed{\text{z394}} \quad \mathbb{Q}_3^{(1,0;c)}(B_{2u}, a) = -\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_3^{(b)}(B_{1u})$$

$$\boxed{\text{z395}} \quad \mathbb{Q}_3^{(1,0;c)}(B_{2u}, b) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z396}} \quad \mathbb{Q}_3^{(1,1;c)}(B_{2u}) = \mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{1u})$$

$$\boxed{\text{z397}} \quad \mathbb{G}_2^{(c)}(B_{2u}, a) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z398}} \quad \mathbb{G}_2^{(c)}(B_{2u}, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z399}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{2u}, a) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z400}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{2u}, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z401}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{2u}, c) = -\frac{\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{7} + \frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{21} + \frac{\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{7} \\ - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{21} + \frac{\sqrt{105}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{21}$$

$$\begin{aligned}
\boxed{\text{z402}} \quad \mathbb{G}_4^{(1,-1;c)}(B_{2u}) &= -\frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{28} - \frac{3\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{28} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{28} + \frac{3\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{28} + \frac{\sqrt{21}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{7} \\
\boxed{\text{z403}} \quad \mathbb{G}_2^{(1,0;c)}(B_{2u}, a) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} \\
\boxed{\text{z404}} \quad \mathbb{G}_2^{(1,0;c)}(B_{2u}, b) &= -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z405}} \quad \mathbb{G}_2^{(1,1;c)}(B_{2u}) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\boxed{\text{z500}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\boxed{\text{z501}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z502}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z503}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z504}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, c) &= \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} \\
\boxed{\text{z505}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, c) &= \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} \\
\boxed{\text{z506}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, d) &= \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_2^{(b)}(B_{2g})}{2} \\
\boxed{\text{z507}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, d) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_2^{(b)}(B_{2g})}{2} \\
\boxed{\text{z508}} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, e) &= -\frac{\sqrt{2}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z509}} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, e) &= \frac{\sqrt{2}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{2}
\end{aligned}$$

$$\begin{aligned}
\boxed{\text{z510}} \quad \mathbb{Q}_{4,1}^{(c)}(E_g, 1) &= -\frac{\sqrt{6}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{4} - \frac{\sqrt{2}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{4} \\
\boxed{\text{z511}} \quad \mathbb{Q}_{4,2}^{(c)}(E_g, 1) &= -\frac{\sqrt{6}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{4} + \frac{\sqrt{2}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{4} \\
\boxed{\text{z512}} \quad \mathbb{Q}_{4,1}^{(c)}(E_g, 2) &= \frac{\sqrt{10}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{20} + \frac{3\sqrt{10}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{20} + \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} \\
\boxed{\text{z513}} \quad \mathbb{Q}_{4,2}^{(c)}(E_g, 2) &= \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{20} - \frac{3\sqrt{10}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{20} + \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} \\
\boxed{\text{z514}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z515}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z516}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, b) &= \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} \\
\boxed{\text{z517}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, b) &= \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} \\
\boxed{\text{z564}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, c) &= \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{2g})}{2} \\
\boxed{\text{z565}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, c) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{2g})}{2} \\
\boxed{\text{z566}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, d) &= -\frac{\sqrt{2}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z567}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, d) &= \frac{\sqrt{2}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{2} \\
\boxed{\text{z568}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, e) &= \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{2g})}{2} \\
\boxed{\text{z569}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, e) &= \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{2g})}{2}
\end{aligned}$$

$$\begin{aligned}
\text{z570} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, f) &= \frac{\sqrt{78}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{26} + \frac{\sqrt{130}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{M}_{1,1}^{(b)}(E_g)}{26} + \frac{\sqrt{130}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{26} \\
\text{z571} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, f) &= -\frac{\sqrt{78}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{26} - \frac{\sqrt{130}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{M}_{1,2}^{(b)}(E_g)}{26} + \frac{\sqrt{130}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{26} \\
\text{z572} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 1a) &= -\frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{4} - \frac{\sqrt{2}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{4} \\
\text{z573} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 1a) &= -\frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{4} + \frac{\sqrt{2}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{4} \\
\text{z574} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 1b) &= \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{2g})}{2} \\
\text{z575} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 1b) &= \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{2g})}{2} \\
\text{z576} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 1c) &= \frac{7\sqrt{1430}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{572} - \frac{5\sqrt{858}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{M}_{1,1}^{(b)}(E_g)}{286} + \frac{3\sqrt{858}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{572} \\
\text{z577} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 1c) &= -\frac{7\sqrt{1430}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{572} + \frac{5\sqrt{858}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{M}_{1,2}^{(b)}(E_g)}{286} + \frac{3\sqrt{858}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{572} \\
\text{z578} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 2a) &= \frac{\sqrt{10}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{20} + \frac{3\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{20} + \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} \\
\text{z579} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 2a) &= \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{20} - \frac{3\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{20} + \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} \\
\text{z580} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 2b) &= \frac{\sqrt{330}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{44} + \frac{\sqrt{22}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{M}_{1,1}^{(b)}(E_g)}{22} - \frac{5\sqrt{22}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{44} \\
\text{z581} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 2b) &= -\frac{\sqrt{330}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{44} - \frac{\sqrt{22}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{M}_{1,2}^{(b)}(E_g)}{22} - \frac{5\sqrt{22}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{44} \\
\text{z623} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, a) &= \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\text{z624} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, a) &= \frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}
\end{aligned}$$

$$\boxed{\text{z625}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z626}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z627}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, c) = \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{2g})}{2}$$

$$\boxed{\text{z628}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, c) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{2g})}{2}$$

$$\boxed{\text{z629}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, d) = \frac{\sqrt{30}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{M}_{1,1}^{(b)}(E_g)}{10} + \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{M}_{1,1}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{10}$$

$$\boxed{\text{z630}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, d) = \frac{\sqrt{30}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{M}_{1,2}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{M}_{1,2}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{10}$$

$$\boxed{\text{z631}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z632}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z633}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{2g})}{2}$$

$$\boxed{\text{z634}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{2g})}{2}$$

$$\boxed{\text{z635}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E_g, c) = -\frac{\sqrt{2}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z636}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E_g, c) = \frac{\sqrt{2}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z637}} \quad \mathbb{G}_{1,1}^{(c)}(E_g, a) = -\frac{\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{2} + \frac{\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z638}} \quad \mathbb{G}_{1,2}^{(c)}(E_g, a) = -\frac{\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{2} + \frac{\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\begin{aligned}
\boxed{\text{z639}} \quad \mathbb{G}_{1,1}^{(c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z640}} \quad \mathbb{G}_{1,2}^{(c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z685}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(E_g, a) &= -\frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{2} + \frac{\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z686}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(E_g, a) &= -\frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{2} + \frac{\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\boxed{\text{z687}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z688}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z689}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(E_g, 1) &= \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z690}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(E_g, 1) &= \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z691}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(E_g, 2) &= \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z692}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(E_g, 2) &= \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z693}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z694}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\boxed{\text{z695}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g, b) &= -\frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z696}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g, b) &= -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{2g})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}
\end{aligned}$$

$$\boxed{\text{z697}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g, c) = -\frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{M}_{1,1}^{(b)}(E_g)}{5} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{M}_{1,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{10}$$

$$\boxed{\text{z698}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g, c) = -\frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{M}_{1,2}^{(b)}(E_g)}{5} - \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{M}_{1,2}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{10}$$

$$\boxed{\text{z699}} \quad \mathbb{G}_{3,1}^{(1,0;c)}(E_g, 1) = \frac{\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z700}} \quad \mathbb{G}_{3,2}^{(1,0;c)}(E_g, 1) = -\frac{\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{M}_{1,2}^{(b)}(E_g)}{2} + \frac{\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z701}} \quad \mathbb{G}_{1,1}^{(1,1;c)}(E_g) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z702}} \quad \mathbb{G}_{1,2}^{(1,1;c)}(E_g) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z811}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z812}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z813}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, b) = \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10}$$

$$\boxed{\text{z814}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, b) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10}$$

$$\boxed{\text{z815}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, c) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_3^{(b)}(B_{1u})}{2}$$

$$\boxed{\text{z816}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, c) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_3^{(b)}(B_{1u})}{2}$$

$$\boxed{\text{z817}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, d) = -\frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z818}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, d) = -\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$



$$\begin{aligned}
\boxed{\text{z819}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, e) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{M}_2^{(b)}(B_{1u})}{2} \\
\boxed{\text{z820}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, e) &= \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{M}_2^{(b)}(B_{1u})}{2} \\
\boxed{\text{z821}} \quad \mathbb{Q}_{3,1}^{(c)}(E_u, 1) &= -\frac{\sqrt{10}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{20} + \frac{3\sqrt{10}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} \\
\boxed{\text{z822}} \quad \mathbb{Q}_{3,2}^{(c)}(E_u, 1) &= -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{20} - \frac{3\sqrt{10}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} \\
\boxed{\text{z823}} \quad \mathbb{Q}_{3,1}^{(c)}(E_u, 2) &= -\frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} \\
\boxed{\text{z824}} \quad \mathbb{Q}_{3,2}^{(c)}(E_u, 2) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} \\
\boxed{\text{z825}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u, a) &= \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} \\
\boxed{\text{z826}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u, a) &= \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} \\
\boxed{\text{z827}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{1u})}{2} \\
\boxed{\text{z828}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{1u})}{2} \\
\boxed{\text{z829}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u, c) &= -\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z830}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u, c) &= -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\boxed{\text{z831}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u, d) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{1u})}{2} \\
\boxed{\text{z832}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u, d) &= \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{1u})}{2}
\end{aligned}$$

$$\begin{aligned}
\text{z833} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u, e) &= \frac{3\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{1u})}{8} - \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{1u})}{8} \\
\text{z834} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u, e) &= \frac{3\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{1u})}{8} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{1u})}{8} \\
\text{z835} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 1a) &= -\frac{\sqrt{10}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{20} + \frac{3\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} \\
\text{z836} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 1a) &= -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{20} - \frac{3\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} \\
\text{z837} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 1b) &= \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{8} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{8} \\
\text{z838} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 1b) &= \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{8} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{8} \\
\text{z839} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 1c) &= \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{1u})}{8} + \frac{3\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{1u})}{8} \\
\text{z840} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 1c) &= \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{1u})}{8} + \frac{3\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{1u})}{8} \\
\text{z841} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 2a) &= -\frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} \\
\text{z842} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 2a) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} \\
\text{z843} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 2b) &= -\frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{24} + \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{8} + \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{24} \\
\text{z844} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 2b) &= -\frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{24} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{24} \\
\text{z845} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(E_u, a) &= -\frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\text{z846} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(E_u, a) &= -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}
\end{aligned}$$

$$\begin{aligned}
\boxed{\text{z847}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(E_u, b) &= \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} \\
\boxed{\text{z848}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(E_u, b) &= \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} \\
\boxed{\text{z849}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(E_u, c) &= \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_2^{(b)}(B_{1u})}{2} \\
\boxed{\text{z850}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(E_u, c) &= \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_2^{(b)}(B_{1u})}{2} \\
\boxed{\text{z851}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(E_u, 1) &= -\frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{20} + \frac{3\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} \\
\boxed{\text{z852}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(E_u, 1) &= -\frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{20} - \frac{3\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} \\
\boxed{\text{z853}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(E_u, 2a) &= -\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{1u})}{2} \\
\boxed{\text{z854}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(E_u, 2a) &= -\frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{1u})}{2} \\
\boxed{\text{z855}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(E_u, 2b) &= -\frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6} \\
\boxed{\text{z856}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(E_u, 2b) &= -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6} \\
\boxed{\text{z857}} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(E_u, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} \\
\boxed{\text{z858}} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(E_u, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z859}} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(E_u, b) &= -\frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z860}} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(E_u, b) &= -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2}
\end{aligned}$$

$$\boxed{\text{z861}} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(Eu, c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{1u})}{2}$$

$$\boxed{\text{z862}} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(Eu, c) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{1u})}{2}$$

$$\boxed{\text{z863}} \quad \mathbb{G}_{2,1}^{(c)}(Eu, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{2} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6}$$

$$\boxed{\text{z864}} \quad \mathbb{G}_{2,2}^{(c)}(Eu, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{2} - \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6}$$

$$\boxed{\text{z865}} \quad \mathbb{G}_{2,1}^{(c)}(Eu, b) = -\frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{2}$$

$$\boxed{\text{z866}} \quad \mathbb{G}_{2,2}^{(c)}(Eu, b) = -\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{2}$$

$$\boxed{\text{z867}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(Eu, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{2} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6}$$

$$\boxed{\text{z868}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(Eu, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{2} - \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6}$$

$$\boxed{\text{z869}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(Eu, b) = -\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{2}$$

$$\boxed{\text{z870}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(Eu, b) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{2}$$

$$\boxed{\text{z871}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(Eu, c) = \frac{\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{14} + \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{42} - \frac{\sqrt{14}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{14} + \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(Eu)}{42} - \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{42}$$

$$\boxed{\text{z872}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(Eu, c) = \frac{\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{14} + \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{42} + \frac{\sqrt{14}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{14} - \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(Eu)}{42} - \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{42}$$

$$\boxed{\text{z873}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(Eu, 1) = -\frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{8}$$

$$\boxed{\text{z874}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(Eu, 1) = -\frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{8}$$

$$\boxed{\text{z875}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(E_u, 2) = \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{56} - \frac{3\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{56} - \frac{\sqrt{70}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{56} + \frac{\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{3\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{56}$$

$$\boxed{\text{z876}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(E_u, 2) = \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{56} - \frac{3\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{56} + \frac{\sqrt{70}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{56} - \frac{\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{3\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{56}$$

$$\boxed{\text{z877}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(E_u, a) = -\frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z878}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E_u, a) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z879}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(E_u, b) = -\frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6}$$

$$\boxed{\text{z880}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E_u, b) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6}$$

$$\boxed{\text{z881}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(E_u) = -\frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z882}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(E_u) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

• 'Co'-'Si' bond-cluster : Si;Co\_001\_1

\* 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:  $|p_x, \uparrow \rangle, |p_x, \downarrow \rangle, |p_y, \uparrow \rangle, |p_y, \downarrow \rangle, |p_z, \uparrow \rangle, |p_z, \downarrow \rangle$

\* wyckoff: 8a08i

$$\boxed{\text{z49}} \quad \mathbb{Q}_0^{(c)}(A_{1g}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z50}} \quad \mathbb{Q}_0^{(c)}(A_{1g}, b) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z51}} \quad \mathbb{Q}_2^{(c)}(A_{1g}, a) = \mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z52}} \quad \mathbb{Q}_2^{(c)}(A_{1g}, b) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{3}$$

$$\begin{aligned}
\text{z53} \quad \mathbb{Q}_2^{(c)}(A_{1g}, c) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\text{z54} \quad \mathbb{Q}_0^{(1,-1;c)}(A_{1g}) &= \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{3} \\
\text{z55} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, a) &= \mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g}) \\
\text{z56} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, b) &= \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{3} \\
\text{z57} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, c) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\text{z58} \quad \mathbb{Q}_2^{(1,-1;c)}(A_{1g}, d) &= -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} - \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{5}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{3} \\
\text{z59} \quad \mathbb{Q}_4^{(1,-1;c)}(A_{1g}, 1) &= \frac{\sqrt{195}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{78} - \frac{\sqrt{13}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{195}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{78} - \frac{\sqrt{13}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} + \frac{5\sqrt{13}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{39} \\
\text{z60} \quad \mathbb{Q}_4^{(1,-1;c)}(A_{1g}, 2) &= -\frac{\sqrt{65}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{13} - \frac{\sqrt{65}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{13} + \frac{\sqrt{39}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{13} \\
\text{z61} \quad \mathbb{Q}_0^{(1,0;c)}(A_{1g}) &= \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{3} \\
\text{z62} \quad \mathbb{Q}_2^{(1,0;c)}(A_{1g}, a) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\text{z63} \quad \mathbb{Q}_2^{(1,0;c)}(A_{1g}, b) &= \mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_0^{(b)}(A_{1g}) \\
\text{z64} \quad \mathbb{Q}_2^{(1,0;c)}(A_{1g}, c) &= \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{3} \\
\text{z65} \quad \mathbb{Q}_0^{(1,1;c)}(A_{1g}) &= \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_0^{(b)}(A_{1g}) \\
\text{z66} \quad \mathbb{Q}_2^{(1,1;c)}(A_{1g}) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2}
\end{aligned}$$

$$\begin{aligned}
\text{z106} \quad \mathbb{Q}_5^{(c)}(A_{1u}) &= \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_3^{(b)}(B_{2u}) \\
\text{z107} \quad \mathbb{Q}_5^{(1,-1;c)}(A_{1u},a) &= \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_3^{(b)}(B_{2u}) \\
\text{z108} \quad \mathbb{Q}_5^{(1,-1;c)}(A_{1u},b) &= \mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{M}_2^{(b)}(B_{2u}) \\
\text{z109} \quad \mathbb{G}_0^{(c)}(A_{1u}) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\text{z110} \quad \mathbb{G}_2^{(c)}(A_{1u},a) &= -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\text{z111} \quad \mathbb{G}_2^{(c)}(A_{1u},b) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\text{z112} \quad \mathbb{G}_0^{(1,-1;c)}(A_{1u}) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\text{z113} \quad \mathbb{G}_2^{(1,-1;c)}(A_{1u},a) &= -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\text{z114} \quad \mathbb{G}_2^{(1,-1;c)}(A_{1u},b) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\text{z115} \quad \mathbb{G}_2^{(1,-1;c)}(A_{1u},c) &= -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} - \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{7} \\
\text{z116} \quad \mathbb{G}_4^{(1,-1;c)}(A_{1u},1) &= \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\text{z117} \quad \mathbb{G}_4^{(1,-1;c)}(A_{1u},2) &= -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{42} + \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{42} \\
&\quad - \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{105}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{21} \\
\text{z118} \quad \mathbb{G}_0^{(1,0;c)}(A_{1u},a) &= \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\text{z119} \quad \mathbb{G}_0^{(1,0;c)}(A_{1u},b) &= \mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{M}_2^{(b)}(B_{2u})
\end{aligned}$$

$$\boxed{\text{z120}} \quad \mathbb{G}_2^{(1,0;c)}(A_{1u}, a) = -\frac{\sqrt{6}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z121}} \quad \mathbb{G}_2^{(1,0;c)}(A_{1u}, b) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z122}} \quad \mathbb{G}_0^{(1,1;c)}(A_{1u}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z123}} \quad \mathbb{G}_2^{(1,1;c)}(A_{1u}) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z166}} \quad \mathbb{Q}_4^{(c)}(A_{2g}) = \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_2^{(b)}(B_{1g})$$

$$\boxed{\text{z167}} \quad \mathbb{Q}_4^{(1,-1;c)}(A_{2g}, a) = \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_2^{(b)}(B_{1g})$$

$$\boxed{\text{z168}} \quad \mathbb{Q}_4^{(1,-1;c)}(A_{2g}, b) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{8} + \frac{3\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{8} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} - \frac{3\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} + \frac{\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{2}$$

$$\boxed{\text{z169}} \quad \mathbb{Q}_4^{(1,0;c)}(A_{2g}) = \mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_2^{(b)}(B_{1g})$$

$$\boxed{\text{z170}} \quad \mathbb{G}_1^{(c)}(A_{2g}, a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z171}} \quad \mathbb{G}_1^{(c)}(A_{2g}, b) = \mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z172}} \quad \mathbb{G}_1^{(c)}(A_{2g}, c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z173}} \quad \mathbb{G}_1^{(1,-1;c)}(A_{2g}, a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z174}} \quad \mathbb{G}_1^{(1,-1;c)}(A_{2g}, b) = \mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z175}} \quad \mathbb{G}_1^{(1,-1;c)}(A_{2g}, c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z176}} \quad \mathbb{G}_1^{(1,-1;c)}(A_{2g}, d) = -\frac{11\sqrt{237}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{632} - \frac{19\sqrt{395}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{632} + \frac{11\sqrt{237}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{632} \\ + \frac{19\sqrt{395}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{632} + \frac{3\sqrt{395}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{158}$$



$$\begin{aligned}
\boxed{\text{z177}} \quad \mathbb{G}_3^{(1,-1;c)}(A_{2g}, a) &= \mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g}) \\
\boxed{\text{z178}} \quad \mathbb{G}_3^{(1,-1;c)}(A_{2g}, b) &= -\frac{7\sqrt{395}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{316} - \frac{\sqrt{237}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{316} + \frac{7\sqrt{395}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{316} \\
&\quad + \frac{\sqrt{237}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{316} - \frac{4\sqrt{237}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{79} \\
\boxed{\text{z179}} \quad \mathbb{G}_1^{(1,0;c)}(A_{2g}, a) &= \mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_0^{(b)}(A_{1g}) \\
\boxed{\text{z180}} \quad \mathbb{G}_1^{(1,0;c)}(A_{2g}, b) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\boxed{\text{z181}} \quad \mathbb{G}_1^{(1,0;c)}(A_{2g}, c) &= -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} \\
\boxed{\text{z182}} \quad \mathbb{G}_1^{(1,1;c)}(A_{2g}, a) &= \mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_0^{(b)}(A_{1g}) \\
\boxed{\text{z183}} \quad \mathbb{G}_1^{(1,1;c)}(A_{2g}, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} \\
\boxed{\text{z226}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, a) &= \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u}) \\
\boxed{\text{z227}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, b) &= \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5} \\
\boxed{\text{z228}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, c) &= \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_3^{(b)}(B_{2u}) \\
\boxed{\text{z229}} \quad \mathbb{Q}_1^{(c)}(A_{2u}, d) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\boxed{\text{z230}} \quad \mathbb{Q}_3^{(c)}(A_{2u}) &= -\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5} - \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5} \\
\boxed{\text{z231}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, a) &= \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5} \\
\boxed{\text{z232}} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, b) &= \mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_3^{(b)}(B_{2u})
\end{aligned}$$

$$\begin{aligned}
\text{z233} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, c) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\text{z234} \quad \mathbb{Q}_1^{(1,-1;c)}(A_{2u}, d) &= \mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{M}_2^{(b)}(B_{2u}) \\
\text{z235} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}, a) &= -\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5} - \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{5} \\
\text{z236} \quad \mathbb{Q}_3^{(1,-1;c)}(A_{2u}, b) &= -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} \\
\text{z237} \quad \mathbb{Q}_1^{(1,0;c)}(A_{2u}, a) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} \\
\text{z238} \quad \mathbb{Q}_1^{(1,0;c)}(A_{2u}, b) &= \frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{30}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{5} \\
\text{z239} \quad \mathbb{Q}_1^{(1,0;c)}(A_{2u}, c) &= \mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{M}_2^{(b)}(B_{2u}) \\
\text{z240} \quad \mathbb{Q}_3^{(1,0;c)}(A_{2u}) &= -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{5} - \frac{\sqrt{5}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{5} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{5} \\
\text{z241} \quad \mathbb{Q}_1^{(1,1;c)}(A_{2u}, a) &= \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_1^{(b)}(A_{2u}) \\
\text{z242} \quad \mathbb{Q}_1^{(1,1;c)}(A_{2u}, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\text{z243} \quad \mathbb{G}_4^{(1,-1;c)}(A_{2u}) &= \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} \\
\text{z406} \quad \mathbb{Q}_2^{(c)}(B_{1g}, a) &= \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g}) \\
\text{z407} \quad \mathbb{Q}_2^{(c)}(B_{1g}, b) &= \mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_0^{(b)}(A_{1g}) \\
\text{z408} \quad \mathbb{Q}_2^{(c)}(B_{1g}, c) &= -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{5} \\
\text{z409} \quad \mathbb{Q}_2^{(c)}(B_{1g}, d) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2}
\end{aligned}$$

$$\boxed{\text{z410}} \quad \mathbb{Q}_4^{(c)}(B_{1g}) = \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{5} - \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{5} - \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{5}$$

$$\boxed{\text{z411}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g},a) = \mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z412}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g},b) = -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{5}$$

$$\boxed{\text{z413}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g},c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z414}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{1g},d) = -\frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} + \frac{\sqrt{30}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{2,2}^{(b)}(E_g)}{8} - \frac{\sqrt{30}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{2,2}^{(b)}(E_g)}{8}$$

$$\boxed{\text{z415}} \quad \mathbb{Q}_4^{(1,-1;c)}(B_{1g},a) = \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{5} - \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{5} - \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g})}{5}$$

$$\boxed{\text{z416}} \quad \mathbb{Q}_4^{(1,-1;c)}(B_{1g},b) = -\frac{\sqrt{30}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} - \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{2,1}^{(b)}(E_g)}{8} + \frac{\sqrt{30}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{2,2}^{(b)}(E_g)}{8} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{2,2}^{(b)}(E_g)}{8}$$

$$\boxed{\text{z417}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{1g},a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z418}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{1g},b) = \mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z419}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{1g},c) = -\frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{5}$$

$$\boxed{\text{z420}} \quad \mathbb{Q}_4^{(1,0;c)}(B_{1g}) = \frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{5} - \frac{\sqrt{5}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{5} - \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_2^{(b)}(B_{1g})}{5}$$

$$\boxed{\text{z421}} \quad \mathbb{Q}_2^{(1,1;c)}(B_{1g},a) = \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_2^{(b)}(B_{1g})$$

$$\boxed{\text{z422}} \quad \mathbb{Q}_2^{(1,1;c)}(B_{1g},b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z423}} \quad \mathbb{G}_3^{(1,-1;c)}(B_{1g}) = \mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z424}} \quad \mathbb{Q}_3^{(c)}(B_{1u},a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\begin{aligned}
\boxed{\text{z425}} \quad \mathbb{Q}_3^{(c)}(B_{1u}, b) &= \mathbb{M}_1^{(a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{2u}) \\
\boxed{\text{z426}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{1u}, a) &= \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z427}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{1u}, b) &= \mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{2u}) \\
\boxed{\text{z428}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{1u}, c) &= -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} - \frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z429}} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{1u}, d) &= -\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{2u}) \\
\boxed{\text{z430}} \quad \mathbb{Q}_3^{(1,0;c)}(B_{1u}, a) &= \mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_3^{(b)}(B_{2u}) \\
\boxed{\text{z431}} \quad \mathbb{Q}_3^{(1,0;c)}(B_{1u}, b) &= \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z432}} \quad \mathbb{Q}_3^{(1,1;c)}(B_{1u}) &= \mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{M}_2^{(b)}(B_{2u}) \\
\boxed{\text{z433}} \quad \mathbb{G}_2^{(c)}(B_{1u}, a) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z434}} \quad \mathbb{G}_2^{(c)}(B_{1u}, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z435}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{1u}, a) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\boxed{\text{z436}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{1u}, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z437}} \quad \mathbb{G}_2^{(1,-1;c)}(B_{1u}, c) &= \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} - \frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{42} + \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} \\
&\quad - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{42} + \frac{\sqrt{105}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{21} \\
\boxed{\text{z438}} \quad \mathbb{G}_4^{(1,-1;c)}(B_{1u}) &= \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} - \frac{\sqrt{21}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{7}
\end{aligned}$$

$$\boxed{\text{z439}} \quad \mathbb{G}_2^{(1,0;c)}(B_{1u}, a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z440}} \quad \mathbb{G}_2^{(1,0;c)}(B_{1u}, b) = -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\boxed{\text{z441}} \quad \mathbb{G}_2^{(1,1;c)}(B_{1u}) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z442}} \quad \mathbb{Q}_2^{(c)}(B_{2g}, a) = \mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z443}} \quad \mathbb{Q}_2^{(c)}(B_{2g}, b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z444}} \quad \mathbb{Q}_2^{(c)}(B_{2g}, c) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z445}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, a) = \mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z446}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z447}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, c) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z448}} \quad \mathbb{Q}_2^{(1,-1;c)}(B_{2g}, d) = -\frac{2\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{3} - \frac{2\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{3} - \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z449}} \quad \mathbb{Q}_4^{(1,-1;c)}(B_{2g}) = -\frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{12} - \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{4} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{12} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{4} + \frac{\sqrt{5}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z450}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{2g}, a) = -\frac{\sqrt{6}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_2^{(b)}(B_{1g})}{3}$$

$$\boxed{\text{z451}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{2g}, b) = \mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\boxed{\text{z452}} \quad \mathbb{Q}_2^{(1,0;c)}(B_{2g}, c) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\text{z453} \quad \mathbb{Q}_2^{(1,1;c)}(B_{2g}) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{6} + \frac{\sqrt{6}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\text{z454} \quad \mathbb{G}_3^{(c)}(B_{2g}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\text{z455} \quad \mathbb{G}_3^{(1,-1;c)}(B_{2g}, a) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\text{z456} \quad \mathbb{G}_3^{(1,-1;c)}(B_{2g}, b) = \mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_0^{(b)}(A_{1g})$$

$$\text{z457} \quad \mathbb{G}_3^{(1,-1;c)}(B_{2g}, c) = \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,2}^{(b)}(E_g)}{12} - \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,2}^{(b)}(E_g)}{4} + \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{2,1}^{(b)}(E_g)}{12} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{2,1}^{(b)}(E_g)}{4} - \frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\text{z458} \quad \mathbb{G}_3^{(1,0;c)}(B_{2g}) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_2^{(b)}(B_{1g})}{3}$$

$$\text{z459} \quad \mathbb{G}_3^{(1,1;c)}(B_{2g}) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{2,2}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{2,1}^{(b)}(E_g)}{3} + \frac{\sqrt{3}\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_2^{(b)}(B_{1g})}{3}$$

$$\text{z460} \quad \mathbb{Q}_3^{(c)}(B_{2u}, a) = \mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{2u})$$

$$\text{z461} \quad \mathbb{Q}_3^{(c)}(B_{2u}, b) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\text{z462} \quad \mathbb{Q}_5^{(c)}(B_{2u}) = \mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{2u})$$

$$\text{z463} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{2u}, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3}$$

$$\text{z464} \quad \mathbb{Q}_3^{(1,-1;c)}(B_{2u}, b) = \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{12} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\text{z465} \quad \mathbb{Q}_5^{(1,-1;c)}(B_{2u}) = \mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{2u})$$

$$\text{z466} \quad \mathbb{Q}_3^{(1,0;c)}(B_{2u}, a) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{3}$$

$$\text{z467} \quad \mathbb{Q}_3^{(1,0;c)}(B_{2u}, b) = -\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{M}_2^{(b)}(B_{2u})$$

$$\begin{aligned}
\text{z468} \quad \mathbb{Q}_3^{(1,1;c)}(B_{2u}) &= \mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_3^{(b)}(B_{2u}) \\
\text{z469} \quad \mathbb{G}_2^{(c)}(B_{2u}, a) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\text{z470} \quad \mathbb{G}_2^{(c)}(B_{2u}, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\text{z471} \quad \mathbb{G}_2^{(1,-1;c)}(B_{2u}, a) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_1^{(b)}(A_{2u})}{3} \\
\text{z472} \quad \mathbb{G}_2^{(1,-1;c)}(B_{2u}, b) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\text{z473} \quad \mathbb{G}_2^{(1,-1;c)}(B_{2u}, c) &= -\frac{\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{7} + \frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{21} + \frac{\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{7} \\
&\quad - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{21} + \frac{\sqrt{105}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{21} \\
\text{z474} \quad \mathbb{G}_4^{(1,-1;c)}(B_{2u}) &= -\frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{28} - \frac{3\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{28} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{28} \\
&\quad + \frac{3\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{28} + \frac{\sqrt{21}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{7} \\
\text{z475} \quad \mathbb{G}_2^{(1,0;c)}(B_{2u}, a) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} \\
\text{z476} \quad \mathbb{G}_2^{(1,0;c)}(B_{2u}, b) &= -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_1^{(b)}(A_{2u})}{3} \\
\text{z477} \quad \mathbb{G}_2^{(1,1;c)}(B_{2u}) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\text{z518} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2} \\
\text{z519} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2} \\
\text{z520} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}
\end{aligned}$$

$$\begin{aligned}
\text{z521} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\text{z522} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, c) &= -\frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} \\
\text{z523} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, c) &= \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} \\
\text{z524} \quad \mathbb{Q}_{2,1}^{(c)}(E_g, d) &= -\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\text{z525} \quad \mathbb{Q}_{2,2}^{(c)}(E_g, d) &= \frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2} \\
\text{z526} \quad \mathbb{Q}_{4,1}^{(c)}(E_g, 1) &= -\frac{7\sqrt{235}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{470} - \frac{7\sqrt{235}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{470} - \frac{3\sqrt{235}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{470} \\
\text{z527} \quad \mathbb{Q}_{4,2}^{(c)}(E_g, 1) &= \frac{7\sqrt{235}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{470} + \frac{7\sqrt{235}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{470} - \frac{3\sqrt{235}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{470} \\
\text{z528} \quad \mathbb{Q}_{4,1}^{(c)}(E_g, 2) &= \frac{3\sqrt{47}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{47} + \frac{3\sqrt{47}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{94} + \frac{4\sqrt{47}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{47} \\
\text{z529} \quad \mathbb{Q}_{4,2}^{(c)}(E_g, 2) &= -\frac{3\sqrt{47}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{47} - \frac{3\sqrt{47}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{94} + \frac{4\sqrt{47}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{47} \\
\text{z530} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\text{z531} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, a) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2} \\
\text{z532} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, b) &= -\frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} \\
\text{z533} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, b) &= \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{10} \\
\text{z534} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, c) &= -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2}
\end{aligned}$$



$$\begin{aligned}
\boxed{\text{z535}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, c) &= \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g) \mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g}) \mathbb{T}_{2,1}^{(b)}(E_g)}{2} \\
\boxed{\text{z582}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, d) &= \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1) \mathbb{T}_2^{(b)}(B_{1g})}{8} - \frac{\sqrt{15} \mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2) \mathbb{T}_2^{(b)}(B_{1g})}{8} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g}) \mathbb{T}_{2,2}^{(b)}(E_g)}{2} \\
\boxed{\text{z583}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, d) &= -\frac{\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1) \mathbb{T}_2^{(b)}(B_{1g})}{8} + \frac{\sqrt{15} \mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2) \mathbb{T}_2^{(b)}(B_{1g})}{8} - \frac{\mathbb{M}_3^{(1,-1;a)}(A_{2g}) \mathbb{T}_{2,1}^{(b)}(E_g)}{2} \\
\boxed{\text{z584}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 1a) &= -\frac{7\sqrt{235} \mathbb{Q}_{2,1}^{(1,-1;a)}(E_g) \mathbb{Q}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705} \mathbb{Q}_2^{(1,-1;a)}(A_{1g}) \mathbb{Q}_{2,1}^{(b)}(E_g)}{470} - \frac{7\sqrt{235} \mathbb{Q}_2^{(1,-1;a)}(B_{1g}) \mathbb{Q}_{2,1}^{(b)}(E_g)}{470} - \frac{3\sqrt{235} \mathbb{Q}_2^{(1,-1;a)}(B_{2g}) \mathbb{Q}_{2,2}^{(b)}(E_g)}{470} \\
\boxed{\text{z585}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 1a) &= \frac{7\sqrt{235} \mathbb{Q}_{2,2}^{(1,-1;a)}(E_g) \mathbb{Q}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705} \mathbb{Q}_2^{(1,-1;a)}(A_{1g}) \mathbb{Q}_{2,2}^{(b)}(E_g)}{470} + \frac{7\sqrt{235} \mathbb{Q}_2^{(1,-1;a)}(B_{1g}) \mathbb{Q}_{2,2}^{(b)}(E_g)}{470} - \frac{3\sqrt{235} \mathbb{Q}_2^{(1,-1;a)}(B_{2g}) \mathbb{Q}_{2,1}^{(b)}(E_g)}{470} \\
\boxed{\text{z586}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 1b) &= \frac{\sqrt{5055} \mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1) \mathbb{T}_2^{(b)}(B_{1g})}{2696} - \frac{47\sqrt{337} \mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2) \mathbb{T}_2^{(b)}(B_{1g})}{2696} - \frac{3\sqrt{5055} \mathbb{M}_3^{(1,-1;a)}(A_{2g}) \mathbb{T}_{2,2}^{(b)}(E_g)}{674} \\
&\quad - \frac{8\sqrt{337} \mathbb{M}_3^{(1,-1;a)}(B_{1g}) \mathbb{T}_{2,1}^{(b)}(E_g)}{337} - \frac{6\sqrt{337} \mathbb{M}_3^{(1,-1;a)}(B_{2g}) \mathbb{T}_{2,2}^{(b)}(E_g)}{337} \\
\boxed{\text{z587}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 1b) &= -\frac{\sqrt{5055} \mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1) \mathbb{T}_2^{(b)}(B_{1g})}{2696} + \frac{47\sqrt{337} \mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2) \mathbb{T}_2^{(b)}(B_{1g})}{2696} + \frac{3\sqrt{5055} \mathbb{M}_3^{(1,-1;a)}(A_{2g}) \mathbb{T}_{2,1}^{(b)}(E_g)}{674} \\
&\quad + \frac{8\sqrt{337} \mathbb{M}_3^{(1,-1;a)}(B_{1g}) \mathbb{T}_{2,2}^{(b)}(E_g)}{337} - \frac{6\sqrt{337} \mathbb{M}_3^{(1,-1;a)}(B_{2g}) \mathbb{T}_{2,1}^{(b)}(E_g)}{337} \\
\boxed{\text{z588}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 2a) &= \frac{3\sqrt{47} \mathbb{Q}_{2,1}^{(1,-1;a)}(E_g) \mathbb{Q}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141} \mathbb{Q}_2^{(1,-1;a)}(A_{1g}) \mathbb{Q}_{2,1}^{(b)}(E_g)}{47} + \frac{3\sqrt{47} \mathbb{Q}_2^{(1,-1;a)}(B_{1g}) \mathbb{Q}_{2,1}^{(b)}(E_g)}{94} + \frac{4\sqrt{47} \mathbb{Q}_2^{(1,-1;a)}(B_{2g}) \mathbb{Q}_{2,2}^{(b)}(E_g)}{47} \\
\boxed{\text{z589}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 2a) &= -\frac{3\sqrt{47} \mathbb{Q}_{2,2}^{(1,-1;a)}(E_g) \mathbb{Q}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141} \mathbb{Q}_2^{(1,-1;a)}(A_{1g}) \mathbb{Q}_{2,2}^{(b)}(E_g)}{47} - \frac{3\sqrt{47} \mathbb{Q}_2^{(1,-1;a)}(B_{1g}) \mathbb{Q}_{2,2}^{(b)}(E_g)}{94} + \frac{4\sqrt{47} \mathbb{Q}_2^{(1,-1;a)}(B_{2g}) \mathbb{Q}_{2,1}^{(b)}(E_g)}{47} \\
\boxed{\text{z590}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g, 2b) &= -\frac{55\sqrt{10110} \mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1) \mathbb{T}_2^{(b)}(B_{1g})}{10784} - \frac{111\sqrt{674} \mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2) \mathbb{T}_2^{(b)}(B_{1g})}{10784} \\
&\quad - \frac{7\sqrt{10110} \mathbb{M}_3^{(1,-1;a)}(A_{2g}) \mathbb{T}_{2,2}^{(b)}(E_g)}{5392} + \frac{75\sqrt{674} \mathbb{M}_3^{(1,-1;a)}(B_{1g}) \mathbb{T}_{2,1}^{(b)}(E_g)}{5392} - \frac{7\sqrt{674} \mathbb{M}_3^{(1,-1;a)}(B_{2g}) \mathbb{T}_{2,2}^{(b)}(E_g)}{1348} \\
\boxed{\text{z591}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g, 2b) &= \frac{55\sqrt{10110} \mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1) \mathbb{T}_2^{(b)}(B_{1g})}{10784} + \frac{111\sqrt{674} \mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2) \mathbb{T}_2^{(b)}(B_{1g})}{10784} \\
&\quad + \frac{7\sqrt{10110} \mathbb{M}_3^{(1,-1;a)}(A_{2g}) \mathbb{T}_{2,1}^{(b)}(E_g)}{5392} - \frac{75\sqrt{674} \mathbb{M}_3^{(1,-1;a)}(B_{1g}) \mathbb{T}_{2,2}^{(b)}(E_g)}{5392} - \frac{7\sqrt{674} \mathbb{M}_3^{(1,-1;a)}(B_{2g}) \mathbb{T}_{2,1}^{(b)}(E_g)}{1348}
\end{aligned}$$

$$\boxed{\text{z592}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, a) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z593}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, a) = \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z594}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z595}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z596}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g, c) = -\frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{10}$$

$$\boxed{\text{z597}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g, c) = \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{10} + \frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{10}$$

$$\boxed{\text{z598}} \quad \mathbb{Q}_{4,1}^{(1,0;c)}(E_g, 1) = -\frac{7\sqrt{235}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{470} - \frac{7\sqrt{235}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{470} - \frac{3\sqrt{235}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{470}$$

$$\boxed{\text{z599}} \quad \mathbb{Q}_{4,2}^{(1,0;c)}(E_g, 1) = \frac{7\sqrt{235}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{470} - \frac{11\sqrt{705}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{470} + \frac{7\sqrt{235}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{470} - \frac{3\sqrt{235}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{470}$$

$$\boxed{\text{z641}} \quad \mathbb{Q}_{4,1}^{(1,0;c)}(E_g, 2) = \frac{3\sqrt{47}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{47} + \frac{3\sqrt{47}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{94} + \frac{4\sqrt{47}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{47}$$

$$\boxed{\text{z642}} \quad \mathbb{Q}_{4,2}^{(1,0;c)}(E_g, 2) = -\frac{3\sqrt{47}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{94} - \frac{\sqrt{141}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{47} - \frac{3\sqrt{47}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{94} + \frac{4\sqrt{47}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{47}$$

$$\boxed{\text{z643}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z644}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z645}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E_g, b) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z646}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E_g, b) = \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z647}} \quad \mathbb{G}_{1,1}^{(c)}(E_g, a) = \frac{\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z648}} \quad \mathbb{G}_{1,2}^{(c)}(E_g, a) = -\frac{\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z649}} \quad \mathbb{G}_{1,1}^{(c)}(E_g, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z650}} \quad \mathbb{G}_{1,2}^{(c)}(E_g, b) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z651}} \quad \mathbb{G}_{1,1}^{(c)}(E_g, c) = \frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z652}} \quad \mathbb{G}_{1,2}^{(c)}(E_g, c) = -\frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z653}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(E_g, a) = \frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z654}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(E_g, a) = -\frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z655}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z656}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z657}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(E_g, c) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z658}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(E_g, c) = -\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z703}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(E_g, d) = \frac{43\sqrt{474}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{2528} - \frac{25\sqrt{790}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{2528} - \frac{21\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{1264} \\ + \frac{13\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{1264} + \frac{3\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{316}$$

$$\boxed{\text{z704}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(E_g, d) = -\frac{43\sqrt{474}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{2528} + \frac{25\sqrt{790}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{2528} + \frac{21\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{1264} \\ - \frac{13\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{1264} + \frac{3\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{316}$$

$$\boxed{\text{z705}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(E_g, 1a) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z706}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(E_g, 1a) = \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z707}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(E_g, 1b) = -\frac{13\sqrt{790}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{1264} - \frac{7\sqrt{474}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{1264} - \frac{\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{632} \\ - \frac{9\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{632} + \frac{2\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{79}$$

$$\boxed{\text{z708}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(E_g, 1b) = \frac{13\sqrt{790}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_2^{(b)}(B_{1g})}{1264} + \frac{7\sqrt{474}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_2^{(b)}(B_{1g})}{1264} + \frac{\sqrt{790}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{632} \\ + \frac{9\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{632} + \frac{2\sqrt{474}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{79}$$

$$\boxed{\text{z709}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(E_g, 2) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z710}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(E_g, 2) = \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z711}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z712}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z713}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g, b) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z714}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g, b) = -\frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z715}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g, c) = \frac{\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z716}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(E_g, c) = -\frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z717}} \quad \mathbb{G}_{1,1}^{(1,1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z718}} \quad \mathbb{G}_{1,2}^{(1,1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_0^{(b)}(A_{1g})}{2}$$

$$\boxed{\text{z719}} \quad \mathbb{G}_{1,1}^{(1,1;c)}(E_g, b) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} + \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{2,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z720}} \quad \mathbb{G}_{1,2}^{(1,1;c)}(E_g, b) = -\frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_2^{(b)}(B_{1g})}{2} - \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{2,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z883}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z884}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z885}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, b) = \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10}$$

$$\boxed{\text{z886}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, b) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10}$$

$$\boxed{\text{z887}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, c) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2}$$

$$\boxed{\text{z888}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, c) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2}$$

$$\boxed{\text{z889}} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, d) = -\frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z890}} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, d) = -\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\begin{aligned}
\text{z891} \quad \mathbb{Q}_{1,1}^{(c)}(E_u, e) &= -\frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2} \\
\text{z892} \quad \mathbb{Q}_{1,2}^{(c)}(E_u, e) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2} \\
\text{z893} \quad \mathbb{Q}_{3,1}^{(c)}(E_u, 1) &= -\frac{\sqrt{10}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{20} + \frac{3\sqrt{10}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} \\
\text{z894} \quad \mathbb{Q}_{3,2}^{(c)}(E_u, 1) &= -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{20} - \frac{3\sqrt{10}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} \\
\text{z895} \quad \mathbb{Q}_{3,1}^{(c)}(E_u, 2) &= -\frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} \\
\text{z896} \quad \mathbb{Q}_{3,2}^{(c)}(E_u, 2) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} \\
\text{z897} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u, a) &= \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} \\
\text{z898} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u, a) &= \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} \\
\text{z899} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2} \\
\text{z900} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u, b) &= -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2} \\
\text{z901} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u, c) &= -\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2} \\
\text{z902} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u, c) &= -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2} \\
\text{z903} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u, d) &= -\frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2} \\
\text{z904} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u, d) &= \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2}
\end{aligned}$$

$$\begin{aligned}
\text{z905} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u, e) &= \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{2u})}{4} - \frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{2u})}{4} \\
\text{z906} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u, e) &= -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{2u})}{4} + \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{2u})}{4} \\
\text{z907} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 1a) &= -\frac{\sqrt{10}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{20} + \frac{3\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} \\
\text{z908} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 1a) &= -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{20} - \frac{3\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} \\
\text{z909} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 1b) &= \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{8} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{8} \\
\text{z910} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 1b) &= \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{8} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{8} \\
\text{z911} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 2a) &= -\frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} \\
\text{z912} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 2a) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} \\
\text{z913} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 2b) &= -\frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{24} + \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{8} + \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{24} \\
\text{z914} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 2b) &= -\frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{24} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{24} \\
\text{z915} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 2c) &= -\frac{\sqrt{5}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{2u})}{4} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{2u})}{4} \\
\text{z916} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 2c) &= \frac{\sqrt{5}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_2^{(b)}(B_{2u})}{4} + \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{M}_2^{(b)}(B_{2u})}{4} \\
\text{z917} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(E_u, a) &= -\frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\text{z918} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(E_u, a) &= -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}
\end{aligned}$$

$$\begin{aligned}
\text{z919} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(E_u, b) &= \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} \\
\text{z920} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(E_u, b) &= \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{5}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} + \frac{\sqrt{15}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} \\
\text{z921} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(E_u, c) &= -\frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2} \\
\text{z922} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(E_u, c) &= \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2} \\
\text{z923} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(E_u, 1a) &= -\frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2} \\
\text{z924} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(E_u, 1a) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_3^{(b)}(B_{2u})}{2} \\
\text{z925} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(E_u, 1b) &= -\frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{20} + \frac{3\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{10} \\
\text{z926} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(E_u, 1b) &= -\frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{10} - \frac{\sqrt{30}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{20} - \frac{3\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{20} - \frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{10} \\
\text{z927} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(E_u, 2) &= -\frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{4} - \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6} \\
\text{z928} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(E_u, 2) &= -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} - \frac{\sqrt{2}\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6} \\
\text{z929} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(E_u, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} \\
\text{z930} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(E_u, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\text{z931} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(E_u, b) &= -\frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2} \\
\text{z932} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(E_u, b) &= -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2}
\end{aligned}$$



$$\text{z933} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(Eu, c) = -\frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2}$$

$$\text{z934} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(Eu, c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{M}_2^{(b)}(B_{2u})}{2}$$

$$\text{z935} \quad \mathbb{G}_{2,1}^{(c)}(Eu, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{2} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6}$$

$$\text{z936} \quad \mathbb{G}_{2,2}^{(c)}(Eu, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{2} - \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6}$$

$$\text{z937} \quad \mathbb{G}_{2,1}^{(c)}(Eu, b) = -\frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{2}$$

$$\text{z938} \quad \mathbb{G}_{2,2}^{(c)}(Eu, b) = -\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{2}$$

$$\text{z939} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(Eu, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{2} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6}$$

$$\text{z940} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(Eu, a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{Q}_2^{(1,-1;a)}(A_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{2} - \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{1g})\mathbb{Q}_{1,2}^{(b)}(Eu)}{6} + \frac{\sqrt{3}\mathbb{Q}_2^{(1,-1;a)}(B_{2g})\mathbb{Q}_{1,1}^{(b)}(Eu)}{6}$$

$$\text{z941} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(Eu, b) = -\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{2}$$

$$\text{z942} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(Eu, b) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{2}$$

$$\text{z943} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(Eu, c) = \frac{\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{14} + \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{42} - \frac{\sqrt{14}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{14} + \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(Eu)}{42} - \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{42}$$

$$\text{z944} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(Eu, c) = \frac{\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{14} + \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{42} + \frac{\sqrt{14}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{14} - \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(Eu)}{42} - \frac{\sqrt{210}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{42}$$

$$\text{z945} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(Eu, 1) = -\frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(Eu)}{8}$$

$$\text{z946} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(Eu, 1) = -\frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{8} - \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{8} + \frac{\sqrt{10}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{8} - \frac{\sqrt{6}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(Eu)}{8}$$

$$\begin{aligned}
\boxed{\text{z947}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(E_u, 2) &= \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{56} - \frac{3\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{56} - \frac{\sqrt{70}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{56} + \frac{\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{3\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{56} \\
\boxed{\text{z948}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(E_u, 2) &= \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{T}_1^{(b)}(A_{2u})}{56} - \frac{3\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2)\mathbb{T}_1^{(b)}(A_{2u})}{56} + \frac{\sqrt{70}\mathbb{M}_3^{(1,-1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{56} - \frac{\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{3\sqrt{42}\mathbb{M}_3^{(1,-1;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{56} \\
\boxed{\text{z949}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(E_u, a) &= -\frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z950}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E_u, a) &= -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{G}_1^{(1,0;a)}(A_{2g})\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} \\
\boxed{\text{z951}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(E_u, b) &= -\frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6} \\
\boxed{\text{z952}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E_u, b) &= -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{6} + \frac{\mathbb{T}_2^{(1,0;a)}(A_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{1g})\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{T}_2^{(1,0;a)}(B_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{6} \\
\boxed{\text{z953}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(E_u) &= -\frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} + \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,2}^{(b)}(E_u)}{2} \\
\boxed{\text{z954}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(E_u) &= -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_1^{(b)}(A_{2u})}{2} - \frac{\mathbb{M}_1^{(1,1;a)}(A_{2g})\mathbb{T}_{1,1}^{(b)}(E_u)}{2}
\end{aligned}$$

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**Atomic SAMB**

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- 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:  $|p_x, \uparrow\rangle, |p_x, \downarrow\rangle, |p_y, \uparrow\rangle, |p_y, \downarrow\rangle, |p_z, \uparrow\rangle, |p_z, \downarrow\rangle$

$$\boxed{\text{x1}} \quad \mathbb{Q}_0^{(a)}(A_{1g}) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{bmatrix}$$

$$\boxed{\text{x2}} \quad \mathbb{Q}_2^{(a)}(A_{1g}) = \begin{bmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} \end{bmatrix}$$

$$\boxed{\text{x3}} \quad \mathbb{Q}_2^{(a)}(B_{1g}) = \begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x4}} \quad \mathbb{Q}_2^{(a)}(B_{2g}) = \begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x5}} \quad \mathbb{Q}_{2,1}^{(a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x6}} \quad \mathbb{Q}_{2,2}^{(a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x7}} \quad \mathbb{Q}_2^{(1,-1;a)}(A_{1g}) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x8}} \quad \mathbb{Q}_2^{(1,-1;a)}(B_{1g}) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x9}} \quad \mathbb{Q}_2^{(1,-1;a)}(B_{2g}) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x10}} \quad \mathbb{Q}_{2,1}^{(1,-1;a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x11}} \quad \mathbb{Q}_{2,2}^{(1,-1;a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x12}} \quad \mathbb{Q}_0^{(1,1;a)}(A_{1g}) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x13}} \quad \mathbb{G}_1^{(1,0;a)}(A_{2g}) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x14}} \quad \mathbb{G}_{1,1}^{(1,0;a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x15}} \quad \mathbb{G}_{1,2}^{(1,0;a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x16}} \quad \mathbb{M}_1^{(a)}(A_{2g}) = \begin{bmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x17}} \quad \mathbb{M}_{1,1}^{(a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x18}} \quad \mathbb{M}_{1,2}^{(a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x19}} \quad \mathbb{M}_1^{(1,-1;a)}(A_{2g}) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$$

$$\boxed{\text{x20}} \quad \mathbb{M}_3^{(1,-1;a)}(A_{2g}) = \begin{bmatrix} -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{5} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{5} \end{bmatrix}$$

$$\boxed{\text{x21}} \quad \mathbb{M}_3^{(1,-1;a)}(B_{1g}) = \begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x22}} \quad \mathbb{M}_3^{(1,-1;a)}(B_{2g}) = \begin{bmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x23}} \quad \mathbb{M}_{1,1}^{(1,-1;a)}(E_g) = \begin{bmatrix} 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x24}} \quad \mathbb{M}_{1,2}^{(1,-1;a)}(E_g) = \begin{bmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x25}} \quad \mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1) = \begin{bmatrix} 0 & \frac{\sqrt{5}}{5} & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{5}}{10} & 0 \\ \frac{\sqrt{5}}{5} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$$

$$\boxed{\text{x26}} \quad \mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1) = \begin{bmatrix} 0 & -\frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 \\ \frac{\sqrt{5}i}{10} & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{5} & \frac{\sqrt{5}}{10} & 0 \\ \frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{5} & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & -\frac{\sqrt{5}}{10} & \frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$$

$$\boxed{\text{x27}} \quad \mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 2) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x28}} \quad \mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 2) = \begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x29}} \quad \mathbb{M}_1^{(1,1;a)}(A_{2g}) = \begin{bmatrix} -\frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{30} & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \end{bmatrix}$$

$$\boxed{\text{x30}} \quad \mathbb{M}_{1,1}^{(1,1;a)}(E_g) = \begin{bmatrix} 0 & \frac{\sqrt{30}}{15} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{15} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 \end{bmatrix}$$

$$\boxed{\text{x31}} \quad \mathbb{M}_{1,2}^{(1,1;a)}(E_g) = \begin{bmatrix} 0 & -\frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 \\ \frac{\sqrt{30}i}{30} & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{15} & -\frac{\sqrt{30}}{20} & 0 \\ -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{15} & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}i}{30} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{20} & \frac{\sqrt{30}i}{30} & 0 \end{bmatrix}$$

$$\boxed{\text{x32}} \quad \mathbb{T}_2^{(1,0;a)}(A_{1g}) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x33}} \quad \mathbb{T}_2^{(1,0;a)}(B_{1g}) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$$



$$\boxed{\text{x34}} \quad \mathbb{T}_2^{(1,0;a)}(B_{2g}) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x35}} \quad \mathbb{T}_{2,1}^{(1,0;a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x36}} \quad \mathbb{T}_{2,2}^{(1,0;a)}(E_g) = \begin{bmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$$

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### Cluster SAMB

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- Site cluster

\*\* Wyckoff: 2a

$$\boxed{\text{y1}} \quad \mathbb{Q}_0^{(s)}(A_{1g}) = \left[ \frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2} \right]$$

$$\boxed{\text{y2}} \quad \mathbb{Q}_3^{(s)}(B_{2u}) = \left[ \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \right]$$

\*\* Wyckoff: 2c

$$\boxed{\text{y3}} \quad \mathbb{Q}_0^{(s)}(A_{1g}) = \left[ \frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2} \right]$$

$$\boxed{\text{y4}} \quad \mathbb{Q}_1^{(s)}(A_{2u}) = \left[ \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \right]$$

• Bond cluster

\*\* Wyckoff: 8a@8j

$$\boxed{\text{y5}} \quad \mathbb{Q}_0^{(s)}(A_{1g}) = \left[ \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y6}} \quad \mathbb{T}_0^{(s)}(A_{1g}) = \left[ \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4} \right]$$

$$\boxed{\text{y7}} \quad \mathbb{Q}_1^{(s)}(A_{2u}) = \left[ \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y8}} \quad \mathbb{T}_1^{(s)}(A_{2u}) = \left[ \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4} \right]$$

$$\boxed{\text{y9}} \quad \mathbb{M}_2^{(s)}(B_{1u}) = \left[ \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4} \right]$$

$$\boxed{\text{y10}} \quad \mathbb{Q}_3^{(s)}(B_{1u}) = \left[ \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y11}} \quad \mathbb{Q}_2^{(s)}(B_{2g}) = \left[ \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y12}} \quad \mathbb{T}_2^{(s)}(B_{2g}) = \left[ \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4} \right]$$

$$\boxed{\text{y13}} \quad \mathbb{M}_{1,1}^{(s)}(E_g) = \left[ \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4} \right]$$

$$\boxed{\text{y14}} \quad \mathbb{M}_{1,2}^{(s)}(E_g) = \left[ \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4} \right]$$

$$\boxed{\text{y15}} \quad \mathbb{Q}_{2,1}^{(s)}(E_g) = \left[ \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y16}} \quad \mathbb{Q}_{2,2}^{(s)}(E_g) = \left[ \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y17}} \quad \mathbb{Q}_{1,1}^{(s)}(E_u) = \left[ \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y18}} \quad \mathbb{Q}_{1,2}^{(s)}(E_u) = \left[ \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y19}} \quad \mathbb{T}_{1,1}^{(s)}(E_u) = \left[ \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4} \right]$$

$$\boxed{\text{y20}} \quad \mathbb{T}_{1,2}^{(s)}(E_u) = \left[ \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4} \right]$$

\*\* Wyckoff: 8a@8i

$$\boxed{\text{y21}} \quad \mathbb{Q}_0^{(s)}(A_{1g}) = \left[ \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y22}} \quad \mathbb{T}_0^{(s)}(A_{1g}) = \left[ \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4} \right]$$

$$\boxed{\text{y23}} \quad \mathbb{Q}_1^{(s)}(A_{2u}) = \left[ \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y24}} \quad \mathbb{T}_1^{(s)}(A_{2u}) = \left[ \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4} \right]$$

$$\boxed{\text{y25}} \quad \mathbb{Q}_2^{(s)}(B_{1g}) = \left[ \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y26}} \quad \mathbb{T}_2^{(s)}(B_{1g}) = \left[ \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4} \right]$$

$$\boxed{\text{y27}} \quad \mathbb{M}_2^{(s)}(B_{2u}) = \left[ \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, -\frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4}, \frac{\sqrt{2}i}{4} \right]$$

$$\boxed{\text{y28}} \quad \mathbb{Q}_3^{(s)}(B_{2u}) = \left[ \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, -\frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4}, \frac{\sqrt{2}}{4} \right]$$

$$\boxed{\text{y29}} \quad \mathbb{Q}_{2,1}^{(s)}(E_g) = \left[ \frac{1}{2}, -\frac{1}{2}, 0, 0, -\frac{1}{2}, \frac{1}{2}, 0, 0 \right]$$

$$\boxed{\text{y30}} \quad \mathbb{Q}_{2,2}^{(s)}(E_g) = \left[ 0, 0, -\frac{1}{2}, \frac{1}{2}, 0, 0, -\frac{1}{2}, \frac{1}{2} \right]$$

$$\boxed{\text{y31}} \quad \mathbb{T}_{2,1}^{(s)}(E_g) = \left[ \frac{i}{2}, -\frac{i}{2}, 0, 0, -\frac{i}{2}, \frac{i}{2}, 0, 0 \right]$$

$$\boxed{\text{y32}} \quad \mathbb{T}_{2,2}^{(s)}(E_g) = \left[ 0, 0, -\frac{i}{2}, \frac{i}{2}, 0, 0, -\frac{i}{2}, \frac{i}{2} \right]$$

$$\boxed{\text{y33}} \quad \mathbb{Q}_{1,1}^{(s)}(E_u) = \left[ 0, 0, -\frac{1}{2}, \frac{1}{2}, 0, 0, \frac{1}{2}, -\frac{1}{2} \right]$$

$$\boxed{\text{y34}} \quad \mathbb{Q}_{1,2}^{(s)}(E_u) = \left[ \frac{1}{2}, -\frac{1}{2}, 0, 0, \frac{1}{2}, -\frac{1}{2}, 0, 0 \right]$$

$$\boxed{\text{y35}} \quad \mathbb{T}_{1,1}^{(s)}(E_u) = \left[ 0, 0, -\frac{i}{2}, \frac{i}{2}, 0, 0, \frac{i}{2}, -\frac{i}{2} \right]$$

$$\boxed{\text{y36}} \quad \mathbb{T}_{1,2}^{(s)}(E_u) = \left[ \frac{i}{2}, -\frac{i}{2}, 0, 0, \frac{i}{2}, -\frac{i}{2}, 0, 0 \right]$$

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— Site and Bond

Table 5: Orbital of each site

#	site	orbital
1	Ce	$ p_x, \uparrow\rangle,  p_x, \downarrow\rangle,  p_y, \uparrow\rangle,  p_y, \downarrow\rangle,  p_z, \uparrow\rangle,  p_z, \downarrow\rangle$
2	Co	$ p_x, \uparrow\rangle,  p_x, \downarrow\rangle,  p_y, \uparrow\rangle,  p_y, \downarrow\rangle,  p_z, \uparrow\rangle,  p_z, \downarrow\rangle$
3	Si	$ 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 6: Neighbor and bra-ket of each bond

#	head	tail	neighbor	head (bra)	tail (ket)
1	Ce	Co	[1]	[p]	[p]
2	Ce	Si	[1]	[p]	[p]
3	Co	Si	[1]	[p]	[p]

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**Site in Unit Cell**


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Sites in (conventional) cell (no plus set), SL = sublattice

Table 7: 'Ce' (#1) site cluster (2c),  $4mm$

SL	position ( $s$ )	mapping
1	[ 0.25000, 0.25000, 0.67800]	[1,2,3,4,13,14,15,16]
2	[ 0.75000, 0.75000, 0.32200]	[5,6,7,8,9,10,11,12]

Table 8: 'Co' (#2) site cluster (2a),  $-4m2$

SL	position ( $s$ )	mapping
1	[ 0.75000, 0.25000, 0.00000]	[1,2,7,8,11,12,13,14]
2	[ 0.25000, 0.75000, 0.00000]	[3,4,5,6,9,10,15,16]

Table 9: 'Si' (#3) site cluster (2c),  $4mm$

SL	position ( $s$ )	mapping
1	[ 0.25000, 0.25000, 0.17800]	[1,2,3,4,13,14,15,16]
2	[ 0.75000, 0.75000, 0.82200]	[5,6,7,8,9,10,11,12]

Bonds in (conventional) cell (no plus set): tail, head = (SL, plus set), (N)D = (non)directional (listed up to 5th neighbor at most)

Table 10: 1-th 'Ce'-'Co' [1] (#1) bond cluster (8a@8i), D,  $|\mathbf{v}|=3.02927$  (cartesian)

SL	vector ( $\mathbf{v}$ )	center ( $\mathbf{c}$ )	mapping	head	tail	$\mathbf{R}$ (primitive)
1	[ 0.00000, 0.50000, -0.32200]	[ 0.25000, 0.00000, 0.83900]	[1,14]	(1,1)	(2,1)	[0,-1,1]
2	[ 0.00000, -0.50000, -0.32200]	[ 0.25000, 0.50000, 0.83900]	[2,13]	(1,1)	(2,1)	[0,0,1]
3	[-0.50000, 0.00000, -0.32200]	[ 0.50000, 0.25000, 0.83900]	[3,15]	(1,1)	(1,1)	[0,0,1]
4	[ 0.50000, 0.00000, -0.32200]	[ 0.00000, 0.25000, 0.83900]	[4,16]	(1,1)	(1,1)	[-1,0,1]
5	[ 0.00000, 0.50000, 0.32200]	[ 0.75000, 0.50000, 0.16100]	[5,10]	(2,1)	(1,1)	[0,0,0]
6	[ 0.00000, -0.50000, 0.32200]	[ 0.75000, 0.00000, 0.16100]	[6,9]	(2,1)	(1,1)	[0,1,0]
7	[ 0.50000, 0.00000, 0.32200]	[ 0.50000, 0.75000, 0.16100]	[7,11]	(2,1)	(2,1)	[0,0,0]
8	[-0.50000, 0.00000, 0.32200]	[ 0.00000, 0.75000, 0.16100]	[8,12]	(2,1)	(2,1)	[1,0,0]

Table 11: 1-th 'Ce'-'Si' [1] (#2) bond cluster (8a@8j), D,  $|\mathbf{v}|=3.04005$  (cartesian)

SL	vector ( $\mathbf{v}$ )	center ( $\mathbf{c}$ )	mapping	head	tail	$\mathbf{R}$ (primitive)
1	[-0.50000, -0.50000, 0.14400]	[ 0.00000, 0.00000, 0.25000]	[1,16]	(2,1)	(1,1)	[1,1,0]
2	[ 0.50000, 0.50000, 0.14400]	[ 0.50000, 0.50000, 0.25000]	[2,15]	(2,1)	(1,1)	[0,0,0]

*continued ...*

Table 11

SL	vector ( $\boldsymbol{v}$ )	center ( $\boldsymbol{c}$ )	mapping	head	tail	$\boldsymbol{R}$ (primitive)
3	[ 0.50000, -0.50000, 0.14400]	[ 0.50000, 0.00000, 0.25000]	[3,14]	(2,1)	(1,1)	[0,1,0]
4	[-0.50000, 0.50000, 0.14400]	[ 0.00000, 0.50000, 0.25000]	[4,13]	(2,1)	(1,1)	[1,0,0]
5	[ 0.50000, -0.50000, -0.14400]	[ 0.00000, 0.50000, 0.75000]	[5,12]	(1,1)	(2,1)	[-1,0,0]
6	[-0.50000, 0.50000, -0.14400]	[ 0.50000, 0.00000, 0.75000]	[6,11]	(1,1)	(2,1)	[0,-1,0]
7	[-0.50000, -0.50000, -0.14400]	[ 0.50000, 0.50000, 0.75000]	[7,10]	(1,1)	(2,1)	[0,0,0]
8	[ 0.50000, 0.50000, -0.14400]	[ 0.00000, 0.00000, 0.75000]	[8,9]	(1,1)	(2,1)	[-1,-1,0]

Table 12: 1-th 'Co'-'Si' [1] (#3) bond cluster (8a@8i), D,  $|\boldsymbol{v}|= 2.3794$  (cartesian)

SL	vector ( $\boldsymbol{v}$ )	center ( $\boldsymbol{c}$ )	mapping	head	tail	$\boldsymbol{R}$ (primitive)
1	[ 0.00000, 0.50000, -0.17800]	[ 0.25000, 0.50000, 0.08900]	[1,14]	(2,1)	(1,1)	[0,0,0]
2	[ 0.00000, -0.50000, -0.17800]	[ 0.25000, 0.00000, 0.08900]	[2,13]	(2,1)	(1,1)	[0,1,0]
3	[-0.50000, 0.00000, -0.17800]	[ 0.00000, 0.25000, 0.08900]	[3,15]	(1,1)	(1,1)	[1,0,0]
4	[ 0.50000, 0.00000, -0.17800]	[ 0.50000, 0.25000, 0.08900]	[4,16]	(1,1)	(1,1)	[0,0,0]
5	[ 0.00000, 0.50000, 0.17800]	[ 0.75000, 0.00000, 0.91100]	[5,10]	(1,1)	(2,1)	[0,-1,-1]
6	[ 0.00000, -0.50000, 0.17800]	[ 0.75000, 0.50000, 0.91100]	[6,9]	(1,1)	(2,1)	[0,0,-1]
7	[ 0.50000, 0.00000, 0.17800]	[ 0.00000, 0.75000, 0.91100]	[7,11]	(2,1)	(2,1)	[-1,0,-1]
8	[-0.50000, 0.00000, 0.17800]	[ 0.50000, 0.75000, 0.91100]	[8,12]	(2,1)	(2,1)	[0,0,-1]



