Model for “kagome”

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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.: $[A_g, E_g, A_u, E_u]$
  - 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.: $[A_g, E_g, A_u, E_u]$
  - Spin (s): `[0, 1]`
- Site-cluster selection:
  - Rank: `[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]`
  - Irrep.: $[A_g, E_g, A_u, E_u]$
- Bond-cluster selection:
  - Type: `[Q, G, M, T]`
  - Rank: `[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]`
  - Irrep.: $[A_g, E_g, A_u, E_u]$
- Max. neighbor: `10`
- Search cell range: `(-2, 3), (-2, 3), (-2, 3)`
- Toroidal priority: `false`

Group and Unit Cell

- Group: SG No. 147 C_{3i}^1 $P\bar{3}$ [trigonal]
- Associated point group: PG No. 147 C_{3i} $\bar{3}$ [trigonal]
- Unit cell:
  $a =$ 1.00000, $b =$ 1.00000, $c =$ 1.00000, $\alpha =$ 90.0, $\beta =$ 90.0, $\gamma =$ 120.0
- Lattice vectors (conventional cell):
  $\boldsymbol{a}_1 =$ [1.00000, 0.00000, 0.00000]
  $\boldsymbol{a}_2 =$ [-0.50000, 0.86603, 0.00000]
  $\boldsymbol{a}_3 =$ [0.00000, 0.00000, 1.00000]

Symmetry Operation

Table 1: Symmetry operation

#	SO	#	SO	#	SO	#	SO	#	SO
1	$\{1\|0\}$	2	$\{3^{+}_{001}\|0\}$	3	$\{3^{-}_{001}\|0\}$	4	$\{-1\|0\}$	5	$\{-3^{+}_{001}\|0\}$
6	$\{-3^{-}_{001}\|0\}$								

Harmonics

Table 2: Harmonics

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
1	$\mathbb{Q}_0(A_g)$	A_g	0	Q, T	-	-	1
2	$\mathbb{G}_1(A_g)$	A_g	1	G, M	-	-	z
3	$\mathbb{Q}_2(A_g)$	A_g	2	Q, T	-	-	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
4	$\mathbb{G}_3(A_g, 1)$	A_g	3	G, M	1	-	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
5	$\mathbb{G}_3(A_g, 2)$	A_g	3	G, M	2	-	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
6	$\mathbb{G}_3(A_g, 3)$	A_g	3	G, M	3	-	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
7	$\mathbb{Q}_4(A_g, 2)$	A_g	4	Q, T	2	-	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
8	$\mathbb{Q}_4(A_g, 3)$	A_g	4	Q, T	3	-	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
9	$\mathbb{G}_0(A_u)$	A_u	0	G, M	-	-	1

continued ...

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
10	$\mathbb{Q}_1(A_u)$	A_u	1	Q, T	-	-	z
11	$\mathbb{G}_2(A_u)$	A_u	2	G, M	-	-	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
12	$\mathbb{Q}_3(A_u,1)$	A_u	3	Q, T	1	-	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
13	$\mathbb{Q}_3(A_u,2)$	A_u	3	Q, T	2	-	$\frac{\sqrt{10}y(3x^2-y^2)}{4}$
14	$\mathbb{Q}_3(A_u,3)$	A_u	3	Q, T	3	-	$\frac{\sqrt{10}x(x^2-3y^2)}{4}$
15	$\mathbb{G}_4(A_u,1)$	A_u	4	G, M	1	-	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
16	$\mathbb{G}_4(A_u,2)$	A_u	4	G, M	2	-	$\frac{\sqrt{70}xz(x^2-3y^2)}{4}$
17	$\mathbb{G}_4(A_u,3)$	A_u	4	G, M	3	-	$\frac{\sqrt{70}yz(3x^2-y^2)}{4}$
18	$\mathbb{G}_{1,1}(E_g)$	E_g	1	G, M	-	1	x
19	$\mathbb{G}_{1,2}(E_g)$					2	y
20	$\mathbb{Q}_{2,1}(E_g,1)$	E_g	2	Q, T	1	1	$\sqrt{3}yz$
21	$\mathbb{Q}_{2,2}(E_g,1)$					2	$-\sqrt{3}xz$
22	$\mathbb{Q}_{2,1}(E_g,2)$	E_g	2	Q, T	2	1	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
23	$\mathbb{Q}_{2,2}(E_g,2)$					2	$-\sqrt{3}xy$
24	$\mathbb{G}_{3,1}(E_g,1)$	E_g	3	G, M	1	1	$-\frac{\sqrt{6}x(x^2+y^2-4z^2)}{4}$
25	$\mathbb{G}_{3,2}(E_g,1)$					2	$-\frac{\sqrt{6}y(x^2+y^2-4z^2)}{4}$
26	$\mathbb{G}_{3,1}(E_g,2)$	E_g	3	G, M	2	1	$\sqrt{15}xyz$
27	$\mathbb{G}_{3,2}(E_g,2)$					2	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
28	$\mathbb{Q}_{4,1}(E_g,1)$	E_g	4	Q, T	1	1	$-\frac{\sqrt{10}yz(3x^2+3y^2-4z^2)}{4}$
29	$\mathbb{Q}_{4,2}(E_g,1)$					2	$\frac{\sqrt{10}xz(3x^2+3y^2-4z^2)}{4}$
30	$\mathbb{Q}_{4,1}(E_g,2)$	E_g	4	Q, T	2	1	$\frac{\sqrt{35}(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$

continued ...

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
31	$\mathbb{Q}_{4,2}(E_g,2)$					2	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
32	$\mathbb{Q}_{4,1}(E_g,3)$	E_g	4	Q, T	3	1	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
33	$\mathbb{Q}_{4,2}(E_g,3)$					2	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
34	$\mathbb{Q}_{1,1}(E_u)$	E_u	1	Q, T	-	1	x
35	$\mathbb{Q}_{1,2}(E_u)$					2	y
36	$\mathbb{G}_{2,1}(E_u,1)$	E_u	2	G, M	1	1	$\sqrt{3}yz$
37	$\mathbb{G}_{2,2}(E_u,1)$					2	$-\sqrt{3}xz$
38	$\mathbb{G}_{2,1}(E_u,2)$	E_u	2	G, M	2	1	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
39	$\mathbb{G}_{2,2}(E_u,2)$					2	$-\sqrt{3}xy$
40	$\mathbb{Q}_{3,1}(E_u,1)$	E_u	3	Q, T	1	1	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
41	$\mathbb{Q}_{3,2}(E_u,1)$					2	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
42	$\mathbb{Q}_{3,1}(E_u,2)$	E_u	3	Q, T	2	1	$\sqrt{15}xyz$
43	$\mathbb{Q}_{3,2}(E_u,2)$					2	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
44	$\mathbb{G}_{4,1}(E_u,1)$	E_u	4	G, M	1	1	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
45	$\mathbb{G}_{4,2}(E_u,1)$					2	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
46	$\mathbb{G}_{4,1}(E_u,2)$	E_u	4	G, M	2	1	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
47	$\mathbb{G}_{4,2}(E_u,2)$					2	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
48	$\mathbb{G}_{4,1}(E_u,3)$	E_u	4	G, M	3	1	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
49	$\mathbb{G}_{4,2}(E_u,3)$					2	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

Basis in full matrix

Table 3: dimension = 24

#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)
0	$\lvert s,\uparrow\rangle$ @A(1)	1	$\lvert s,\downarrow\rangle$ @A(1)	2	$\lvert p_x,\uparrow\rangle$ @A(1)	3	$\lvert p_x,\downarrow\rangle$ @A(1)	4	$\lvert p_y,\uparrow\rangle$ @A(1)
5	$\lvert p_y,\downarrow\rangle$ @A(1)	6	$\lvert p_z,\uparrow\rangle$ @A(1)	7	$\lvert p_z,\downarrow\rangle$ @A(1)	8	$\lvert s,\uparrow\rangle$ @A(2)	9	$\lvert s,\downarrow\rangle$ @A(2)
10	$\lvert p_x,\uparrow\rangle$ @A(2)	11	$\lvert p_x,\downarrow\rangle$ @A(2)	12	$\lvert p_y,\uparrow\rangle$ @A(2)	13	$\lvert p_y,\downarrow\rangle$ @A(2)	14	$\lvert p_z,\uparrow\rangle$ @A(2)
15	$\lvert p_z,\downarrow\rangle$ @A(2)	16	$\lvert s,\uparrow\rangle$ @A(3)	17	$\lvert s,\downarrow\rangle$ @A(3)	18	$\lvert p_x,\uparrow\rangle$ @A(3)	19	$\lvert p_x,\downarrow\rangle$ @A(3)
20	$\lvert p_y,\uparrow\rangle$ @A(3)	21	$\lvert p_y,\downarrow\rangle$ @A(3)	22	$\lvert p_z,\uparrow\rangle$ @A(3)	23	$\lvert p_z,\downarrow\rangle$ @A(3)		

Table 4: Atomic basis (orbital part only)

orbital	definition
$\lvert s\rangle$	1
$\lvert p_x\rangle$	x
$\lvert p_y\rangle$	y
$\lvert p_z\rangle$	z

SAMB: 468 (all 468)

- `A` : '`A`' site-cluster
  - * bra: $\langle s,\uparrow\rvert$, $\langle s,\downarrow\rvert$
  - * ket: $\lvert s,\uparrow\rangle$, $\lvert s,\downarrow\rangle$
  - * wyckoff: `3e`

  $\boxed{\text{z1}}$ $\mathbb{Q}_0^{(c)}(A_g) = \mathbb{Q}_0^{(a)}(A_g)\mathbb{Q}_0^{(s)}(A_g)$

$\boxed{\text{z81}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g,1) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z82}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g,1) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

- `A` : '`A`' site-cluster
  * bra: $\langle s,\uparrow|$, $\langle s,\downarrow|$
  * ket: $|p_x,\uparrow\rangle$, $|p_x,\downarrow\rangle$, $|p_y,\uparrow\rangle$, $|p_y,\downarrow\rangle$, $|p_z,\uparrow\rangle$, $|p_z,\downarrow\rangle$
  * wyckoff: `3e`

$\boxed{\text{z241}}$ $\mathbb{Q}_{1}^{(c)}(A_u,a) = \mathbb{Q}_{1}^{(a)}(A_u)\mathbb{Q}_{0}^{(s)}(A_g)$

$\boxed{\text{z242}}$ $\mathbb{Q}_{1}^{(c)}(A_u,b) = -\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z243}}$ $\mathbb{Q}_{1}^{(1,-1;c)}(A_u) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z244}}$ $\mathbb{Q}_{3}^{(1,-1;c)}(A_u,2) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z245}}$ $\mathbb{Q}_{3}^{(1,-1;c)}(A_u,3) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z246}}$ $\mathbb{Q}_{1}^{(1,0;c)}(A_u,a) = \mathbb{Q}_{1}^{(1,0;a)}(A_u)\mathbb{Q}_{0}^{(s)}(A_g)$

$\boxed{\text{z247}}$ $\mathbb{Q}_{1}^{(1,0;c)}(A_u,b) = -\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z248}}$ $\mathbb{G}_{2}^{(c)}(A_u) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z249}}$ $\mathbb{G}_{0}^{(1,-1;c)}(A_u) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z250}}$ $\mathbb{G}_{2}^{(1,-1;c)}(A_u) = \mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{0}^{(s)}(A_g)$

$\boxed{\text{z251}}$ $\mathbb{G}_{2}^{(1,0;c)}(A_u) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z252}}$ $\mathbb{G}_{0}^{(1,1;c)}(A_u) = \mathbb{G}_{0}^{(1,1;a)}(A_u)\mathbb{Q}_{0}^{(s)}(A_g)$

$\boxed{\text{z317}}$ $\mathbb{Q}_{1,1}^{(c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$

$\boxed{\text{z318}}$ $\mathbb{Q}_{1,2}^{(c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$

$\boxed{\text{z319}}$ $\mathbb{Q}_{1,1}^{(c)}(E_u, b) = -\frac{\sqrt{2}\mathbb{Q}_{1}^{(a)}(A_u)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{2}$

$\boxed{\text{z320}}$ $\mathbb{Q}_{1,2}^{(c)}(E_u, b) = \frac{\sqrt{2}\mathbb{Q}_{1}^{(a)}(A_u)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{2}$

$\boxed{\text{z321}}$ $\mathbb{Q}_{3,1}^{(c)}(E_u, 2) = \frac{\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{2}$

$\boxed{\text{z322}}$ $\mathbb{Q}_{3,2}^{(c)}(E_u, 2) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{2}$

$\boxed{\text{z323}}$ $\mathbb{Q}_{1,1}^{(1,-1;c)}(E_u) = -\frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{10} + \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{10} - \frac{\sqrt{30}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{10}$

$\boxed{\text{z324}}$ $\mathbb{Q}_{1,2}^{(1,-1;c)}(E_u) = \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{10} + \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{10} - \frac{\sqrt{30}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{10}$

$\boxed{\text{z325}}$ $\mathbb{Q}_{3,1}^{(1,-1;c)}(E_u, 1) = \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{5}$

$\boxed{\text{z326}}$ $\mathbb{Q}_{3,2}^{(1,-1;c)}(E_u, 1) = -\frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{5}$

$\boxed{\text{z327}}$ $\mathbb{Q}_{1,1}^{(1,0;c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$

$\boxed{\text{z328}}$ $\mathbb{Q}_{1,2}^{(1,0;c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$

$\boxed{\text{z329}}$ $\mathbb{Q}_{1,1}^{(1,0;c)}(E_u, b) = -\frac{\sqrt{2}\mathbb{Q}_{1}^{(1,0;a)}(A_u)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{2}$

$\boxed{\text{z330}}$ $\mathbb{Q}_{1,2}^{(1,0;c)}(E_u, b) = \frac{\sqrt{2}\mathbb{Q}_{1}^{(1,0;a)}(A_u)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{2}$

$\boxed{\text{z331}}$ $\mathbb{Q}_{3,1}^{(1,0;c)}(E_u, 2) = \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{2}$

$\boxed{\text{z332}}$ $\mathbb{Q}_{3,2}^{(1,0;c)}(E_u, 2) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{2}$

$\boxed{\text{z333}}$ $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, 1) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$

$\boxed{\text{z334}}$ $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, 1) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$

$\boxed{\text{z335}}$ $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, 2a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$

$\boxed{\text{z336}}$ $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, 2a) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$

$\boxed{\text{z337}}$ $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, 2b) = -\frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{2} + \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{2}$

$\boxed{\text{z338}}$ $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, 2b) = \frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{2} + \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{2}$

$\boxed{\text{z339}}$ $\mathbb{G}_{2,1}^{(1,1;c)}(E_u, 1) = \frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_u)\mathbb{Q}_{2,1}^{(s)}(E_g, 1)}{2}$

$\boxed{\text{z340}}$ $\mathbb{G}_{2,2}^{(1,1;c)}(E_u, 1) = \frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_u)\mathbb{Q}_{2,2}^{(s)}(E_g, 1)}{2}$

- `A` : '`A`' site-cluster
  * 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: `3e`

$\boxed{\text{z2}}$ $\mathbb{Q}_{0}^{(c)}(A_g, a) = \mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{0}^{(s)}(A_g)$

$\boxed{\text{z3}}$ $\mathbb{Q}_0^{(c)}(A_g,b)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}+\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z4}}$ $\mathbb{Q}_2^{(c)}(A_g)=\mathbb{Q}_2^{(a)}(A_g)\mathbb{Q}_0^{(s)}(A_g)$

$\boxed{\text{z5}}$ $\mathbb{Q}_4^{(c)}(A_g,2)=-\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}+\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z6}}$ $\mathbb{Q}_4^{(c)}(A_g,3)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}+\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z7}}$ $\mathbb{Q}_0^{(1,-1;c)}(A_g)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}+\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z8}}$ $\mathbb{Q}_2^{(1,-1;c)}(A_g)=\mathbb{Q}_2^{(1,-1;a)}(A_g)\mathbb{Q}_0^{(s)}(A_g)$

$\boxed{\text{z9}}$ $\mathbb{Q}_4^{(1,-1;c)}(A_g,2)=-\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}+\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z10}}$ $\mathbb{Q}_4^{(1,-1;c)}(A_g,3)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}+\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z11}}$ $\mathbb{Q}_2^{(1,0;c)}(A_g)=\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}+\frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

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

$\boxed{\text{z13}}$ $\mathbb{G}_1^{(c)}(A_g)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}-\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z14}}$ $\mathbb{G}_1^{(1,-1;c)}(A_g)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}-\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z15}}$ $\mathbb{G}_1^{(1,0;c)}(A_g,a)=\mathbb{G}_1^{(1,0;a)}(A_g)\mathbb{Q}_0^{(s)}(A_g)$

$\boxed{\text{z16}}$ $\mathbb{G}_1^{(1,0;c)}(A_g,b)=-\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}+\frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z83}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g,1a)=\frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z84}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g,1a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z85}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g,1b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_0^{(s)}(A_g)}{2}$

$\boxed{\text{z86}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g,1b) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_0^{(s)}(A_g)}{2}$

$\boxed{\text{z87}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g,1c) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_2^{(a)}(A_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{14}$

$\boxed{\text{z88}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g,1c) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_2^{(a)}(A_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{14}$

$\boxed{\text{z89}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_0^{(s)}(A_g)}{2}$

$\boxed{\text{z90}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_0^{(s)}(A_g)}{2}$

$\boxed{\text{z91}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g,2b) = -\frac{\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z92}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g,2b) = \frac{\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$

$\boxed{\text{z93}}$ $\mathbb{Q}_{4,1}^{(c)}(E_g,1) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_2^{(a)}(A_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{7}$

$\boxed{\text{z94}}$ $\mathbb{Q}_{4,2}^{(c)}(E_g,1) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_2^{(a)}(A_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{7}$

$\boxed{\text{z95}}$ $\mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,1a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_0^{(s)}(A_g)}{2}$

$\boxed{\text{z96}}$ $\mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,1a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_0^{(s)}(A_g)}{2}$

$\boxed{\text{z97}}$ $\mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,1b) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_2^{(1,-1;a)}(A_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{14}$

$$\boxed{\text{z98}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,1b) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{14}$$

$$\boxed{\text{z99}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$$

$$\boxed{\text{z100}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$$

$$\boxed{\text{z101}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,2b) = -\frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$$

$$\boxed{\text{z102}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,2b) = \frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$$

$$\boxed{\text{z103}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g,1) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{7}$$

$$\boxed{\text{z104}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g,1) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{7}$$

$$\boxed{\text{z105}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g,1) = -\frac{\sqrt{2}\mathbb{G}_{1}^{(1,0;a)}(A_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$$

$$\boxed{\text{z106}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g,1) = \frac{\sqrt{2}\mathbb{G}_{1}^{(1,0;a)}(A_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$$

$$\boxed{\text{z107}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E_g,2) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$$

$$\boxed{\text{z108}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E_g,2) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$$

$$\boxed{\text{z109}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E_g,1) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_g)\mathbb{Q}_{2,1}^{(s)}(E_g,1)}{2}$$

$$\boxed{\text{z110}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E_g,1) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_g)\mathbb{Q}_{2,2}^{(s)}(E_g,1)}{2}$$

$$\boxed{\text{z111}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(E_g) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$$

$\boxed{\text{z112}}$ $\mathbb{G}_{1,2}^{(1,0;c)}(E_g) = \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{0}^{(s)}(A_g)}{2}$

- `A;A_001_1` : '`A`'-'`A`' bond-cluster
  * bra: $\langle s,\uparrow|$, $\langle s,\downarrow|$
  * ket: $|s,\uparrow\rangle$, $|s,\downarrow\rangle$
  * wyckoff: `6a@6g`

$\boxed{\text{z17}}$ $\mathbb{Q}_{0}^{(c)}(A_g) = \mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{0}^{(b)}(A_g)$

$\boxed{\text{z18}}$ $\mathbb{Q}_{0}^{(1,-1;c)}(A_g) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z19}}$ $\mathbb{G}_{1}^{(1,-1;c)}(A_g,a) = \mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{0}^{(b)}(A_g)$

$\boxed{\text{z20}}$ $\mathbb{G}_{1}^{(1,-1;c)}(A_g,b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z113}}$ $\mathbb{Q}_{1}^{(c)}(A_u) = \mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{1}^{(b)}(A_u)$

$\boxed{\text{z114}}$ $\mathbb{Q}_{1}^{(1,-1;c)}(A_u) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z115}}$ $\mathbb{G}_{0}^{(1,-1;c)}(A_u) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{1}^{(b)}(A_u)}{3}$

$\boxed{\text{z116}}$ $\mathbb{G}_{2}^{(1,-1;c)}(A_u) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{1}^{(b)}(A_u)}{3}$

$\boxed{\text{z117}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g,1) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z118}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g,1) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z119}}$ $\mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,1) = \frac{\sqrt{2}\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z120}}$ $\mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,1) = -\frac{\sqrt{2}\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$$\boxed{\text{z253}}\quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,2)=\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}-\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z254}}\quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,2)=-\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}-\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z255}}\quad \mathbb{G}_{1,1}^{(1,-1;c)}(E_g)=\frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{0}^{(b)}(A_g)}{2}$$

$$\boxed{\text{z256}}\quad \mathbb{G}_{1,2}^{(1,-1;c)}(E_g)=\frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{0}^{(b)}(A_g)}{2}$$

$$\boxed{\text{z341}}\quad \mathbb{Q}_{1,1}^{(c)}(E_u)=\frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z342}}\quad \mathbb{Q}_{1,2}^{(c)}(E_u)=\frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z343}}\quad \mathbb{Q}_{1,1}^{(1,-1;c)}(E_u)=\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2}-\frac{\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z344}}\quad \mathbb{Q}_{1,2}^{(1,-1;c)}(E_u)=-\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2}+\frac{\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z345}}\quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u,1)=\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2}+\frac{\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z346}}\quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u,1)=-\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2}-\frac{\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z347}}\quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u,2)=\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}-\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z348}}\quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u,2)=-\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}-\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

- `A;A_001_1` : '`A`'-'`A`' bond-cluster
  * bra: $\langle s,\uparrow|$, $\langle s,\downarrow|$
  * ket: $|p_x,\uparrow\rangle$, $|p_x,\downarrow\rangle$, $|p_y,\uparrow\rangle$, $|p_y,\downarrow\rangle$, $|p_z,\uparrow\rangle$, $|p_z,\downarrow\rangle$

* wyckoff: `6a@6g`

$\boxed{\text{z21}}$ $$\mathbb{Q}_{0}^{(c)}(A_g,a)=\frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3}+\frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3}+\frac{\sqrt{3}\mathbb{Q}_{1}^{(a)}(A_u)\mathbb{Q}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z22}}$ $$\mathbb{Q}_{0}^{(c)}(A_g,b)=\frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{3}+\frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{3}+\frac{\sqrt{3}\mathbb{T}_{1}^{(a)}(A_u)\mathbb{T}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z23}}$ $$\mathbb{Q}_{2}^{(c)}(A_g,a)=-\frac{\sqrt{6}\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}-\frac{\sqrt{6}\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}+\frac{\sqrt{6}\mathbb{Q}_{1}^{(a)}(A_u)\mathbb{Q}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z24}}$ $$\mathbb{Q}_{2}^{(c)}(A_g,b)=-\frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{6}-\frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{6}+\frac{\sqrt{6}\mathbb{T}_{1}^{(a)}(A_u)\mathbb{T}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z25}}$ $$\mathbb{Q}_{2}^{(1,-1;c)}(A_g,a)=-\frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z26}}$ $$\mathbb{Q}_{2}^{(1,-1;c)}(A_g,b)=-\frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z27}}$ $$\mathbb{Q}_{0}^{(1,0;c)}(A_g,a)=\frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3}+\frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3}+\frac{\sqrt{3}\mathbb{Q}_{1}^{(1,0;a)}(A_u)\mathbb{Q}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z28}}$ $$\mathbb{Q}_{0}^{(1,0;c)}(A_g,b)=\frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{3}+\frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{3}+\frac{\sqrt{3}\mathbb{T}_{1}^{(1,0;a)}(A_u)\mathbb{T}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z29}}$ $$\mathbb{Q}_{2}^{(1,0;c)}(A_g,a)=-\frac{\sqrt{6}\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}-\frac{\sqrt{6}\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}+\frac{\sqrt{6}\mathbb{Q}_{1}^{(1,0;a)}(A_u)\mathbb{Q}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z30}}$ $$\mathbb{Q}_{2}^{(1,0;c)}(A_g,b)=-\frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{6}-\frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{6}+\frac{\sqrt{6}\mathbb{T}_{1}^{(1,0;a)}(A_u)\mathbb{T}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z31}}$ $$\mathbb{G}_{1}^{(c)}(A_g,a)=\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z32}}$ $$\mathbb{G}_{1}^{(c)}(A_g,b)=\frac{\sqrt{2}\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z33}}$ $$\mathbb{G}_{1}^{(1,-1;c)}(A_g,a)=\frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10}-\frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10}+\frac{\sqrt{10}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{1}^{(b)}(A_u)}{5}$$

$\boxed{\text{z34}}$ $\mathbb{G}_1^{(1,-1;c)}(A_g,b)=\frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{10}-\frac{\sqrt{30}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{10}+\frac{\sqrt{10}\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{T}_{1}^{(b)}(A_u)}{5}$

$\boxed{\text{z35}}$ $\mathbb{G}_3^{(1,-1;c)}(A_g,1a)=-\frac{\sqrt{5}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5}+\frac{\sqrt{5}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5}+\frac{\sqrt{15}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{1}^{(b)}(A_u)}{5}$

$\boxed{\text{z36}}$ $\mathbb{G}_3^{(1,-1;c)}(A_g,1b)=-\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{5}+\frac{\sqrt{5}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{5}+\frac{\sqrt{15}\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{T}_{1}^{(b)}(A_u)}{5}$

$\boxed{\text{z37}}$ $\mathbb{G}_3^{(1,-1;c)}(A_g,2a)=\frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z38}}$ $\mathbb{G}_3^{(1,-1;c)}(A_g,2b)=\frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z39}}$ $\mathbb{G}_3^{(1,-1;c)}(A_g,3a)=\frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}+\frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z40}}$ $\mathbb{G}_3^{(1,-1;c)}(A_g,3b)=\frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}+\frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z41}}$ $\mathbb{G}_1^{(1,0;c)}(A_g,a)=\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z42}}$ $\mathbb{G}_1^{(1,0;c)}(A_g,b)=\frac{\sqrt{2}\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z43}}$ $\mathbb{G}_1^{(1,1;c)}(A_g,a)=\mathbb{G}_0^{(1,1;a)}(A_u)\mathbb{Q}_1^{(b)}(A_u)$

$\boxed{\text{z44}}$ $\mathbb{G}_1^{(1,1;c)}(A_g,b)=\mathbb{M}_0^{(1,1;a)}(A_u)\mathbb{T}_1^{(b)}(A_u)$

$\boxed{\text{z121}}$ $\mathbb{Q}_1^{(c)}(A_u,a)=\mathbb{Q}_1^{(a)}(A_u)\mathbb{Q}_0^{(b)}(A_g)$

$\boxed{\text{z122}}$ $\mathbb{Q}_1^{(c)}(A_u,b)=-\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}+\frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z123}}$ $\mathbb{Q}_1^{(c)}(A_u,c)=\mathbb{T}_1^{(a)}(A_u)\mathbb{T}_0^{(b)}(A_g)$

$\boxed{\text{z124}}$ $\mathbb{Q}_1^{(c)}(A_u,d)=\frac{\sqrt{2}\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}-\frac{\sqrt{2}\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z125}}$ $\mathbb{Q}_1^{(1,-1;c)}(A_u,a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z126}}$ $\mathbb{Q}_1^{(1,-1;c)}(A_u,b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z127}}$ $\mathbb{Q}_3^{(1,-1;c)}(A_u,2a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z128}}$ $\mathbb{Q}_3^{(1,-1;c)}(A_u,2b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z129}}$ $\mathbb{Q}_3^{(1,-1;c)}(A_u,3a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z130}}$ $\mathbb{Q}_3^{(1,-1;c)}(A_u,3b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z131}}$ $\mathbb{Q}_1^{(1,0;c)}(A_u,a) = \mathbb{Q}_1^{(1,0;a)}(A_u)\mathbb{Q}_0^{(b)}(A_g)$

$\boxed{\text{z132}}$ $\mathbb{Q}_1^{(1,0;c)}(A_u,b) = -\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z133}}$ $\mathbb{Q}_1^{(1,0;c)}(A_u,c) = \mathbb{T}_1^{(1,0;a)}(A_u)\mathbb{T}_0^{(b)}(A_g)$

$\boxed{\text{z134}}$ $\mathbb{Q}_1^{(1,0;c)}(A_u,d) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z135}}$ $\mathbb{G}_0^{(c)}(A_u) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z136}}$ $\mathbb{G}_2^{(c)}(A_u) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z137}}$ $\mathbb{G}_0^{(1,-1;c)}(A_u) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z138}}$ $\mathbb{G}_2^{(1,-1;c)}(A_u,a) = \mathbb{G}_2^{(1,-1;a)}(A_u)\mathbb{Q}_0^{(b)}(A_g)$

$\boxed{\text{z139}}$ $\mathbb{G}_2^{(1,-1;c)}(A_u,b) = \mathbb{M}_2^{(1,-1;a)}(A_u)\mathbb{T}_0^{(b)}(A_g)$

$\boxed{\text{z140}}$ $\mathbb{G}_2^{(1,-1;c)}(A_u,c) = -\frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z141}}$ $\mathbb{G}_0^{(1,0;c)}(A_u) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z142}}$ $\mathbb{G}_2^{(1,0;c)}(A_u) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z143}}$ $\mathbb{G}_0^{(1,1;c)}(A_u,a) = \mathbb{G}_0^{(1,1;a)}(A_u)\mathbb{Q}_0^{(b)}(A_g)$

$\boxed{\text{z144}}$ $\mathbb{G}_0^{(1,1;c)}(A_u,b) = \mathbb{M}_0^{(1,1;a)}(A_u)\mathbb{T}_0^{(b)}(A_g)$

$\boxed{\text{z145}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g,1a) = \frac{\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_1^{(b)}(A_u)}{2} + \frac{\mathbb{Q}_1^{(a)}(A_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z146}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g,1a) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_1^{(b)}(A_u)}{2} - \frac{\mathbb{Q}_1^{(a)}(A_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z147}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g,1b) = \frac{\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{T}_1^{(b)}(A_u)}{2} + \frac{\mathbb{T}_1^{(a)}(A_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z148}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g,1b) = -\frac{\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{T}_1^{(b)}(A_u)}{2} - \frac{\mathbb{T}_1^{(a)}(A_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z149}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g,2a) = \frac{\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z150}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g,2a) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z151}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g,2b) = \frac{\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z152}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g,2b) = -\frac{\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z153}}$ $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,1a)=\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}+\frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1}^{(b)}(A_u)}{6}-\frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}+\frac{\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z154}}$ $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,1a)=-\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1}^{(b)}(A_u)}{6}-\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}-\frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}+\frac{\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z155}}$ $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,1b)=\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{6}+\frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1}^{(b)}(A_u)}{6}-\frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{6}+\frac{\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z156}}$ $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,1b)=-\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1}^{(b)}(A_u)}{6}-\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{6}-\frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{6}+\frac{\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z157}}$ $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,2a)=-\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}+\frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}-\frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z158}}$ $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,2a)=\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}+\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1}^{(b)}(A_u)}{3}+\frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}$$

$\boxed{\text{z159}}$ $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,2b)=-\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{6}+\frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{6}-\frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z160}}$ $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,2b)=\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{6}+\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1}^{(b)}(A_u)}{3}+\frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{6}$$

$\boxed{\text{z161}}$ $$\mathbb{Q}_{2,1}^{(1,0;c)}(E_g,1a)=\frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{1}^{(b)}(A_u)}{2}+\frac{\mathbb{Q}_{1}^{(1,0;a)}(A_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z162}}$ $$\mathbb{Q}_{2,2}^{(1,0;c)}(E_g,1a)=-\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{1}^{(b)}(A_u)}{2}-\frac{\mathbb{Q}_{1}^{(1,0;a)}(A_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z163}}$ $$\mathbb{Q}_{2,1}^{(1,0;c)}(E_g,1b)=\frac{\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{T}_{1}^{(b)}(A_u)}{2}+\frac{\mathbb{T}_{1}^{(1,0;a)}(A_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z164}}$ $$\mathbb{Q}_{2,2}^{(1,0;c)}(E_g,1b)=-\frac{\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{T}_{1}^{(b)}(A_u)}{2}-\frac{\mathbb{T}_{1}^{(1,0;a)}(A_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z165}}$ $$\mathbb{Q}_{2,1}^{(1,0;c)}(E_g,2a)=\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}-\frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z166}}$ $$\mathbb{Q}_{2,2}^{(1,0;c)}(E_g,2a)=-\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}-\frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z167}}$ $\mathbb{Q}_{2,1}^{(1,0;c)}(E_g,2b) = \frac{\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z168}}$ $\mathbb{Q}_{2,2}^{(1,0;c)}(E_g,2b) = -\frac{\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z257}}$ $\mathbb{G}_{1,1}^{(c)}(E_g,a) = \frac{\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{1}^{(b)}(A_u)}{2} - \frac{\mathbb{Q}_{1}^{(a)}(A_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z258}}$ $\mathbb{G}_{1,2}^{(c)}(E_g,a) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{1}^{(b)}(A_u)}{2} + \frac{\mathbb{Q}_{1}^{(a)}(A_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z259}}$ $\mathbb{G}_{1,1}^{(c)}(E_g,b) = \frac{\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{T}_{1}^{(b)}(A_u)}{2} - \frac{\mathbb{T}_{1}^{(a)}(A_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z260}}$ $\mathbb{G}_{1,2}^{(c)}(E_g,b) = -\frac{\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{T}_{1}^{(b)}(A_u)}{2} + \frac{\mathbb{T}_{1}^{(a)}(A_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z261}}$ $\mathbb{G}_{1,1}^{(1,-1;c)}(E_g,a) = \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1}^{(b)}(A_u)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10}$

$\boxed{\text{z262}}$ $\mathbb{G}_{1,2}^{(1,-1;c)}(E_g,a) = \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1}^{(b)}(A_u)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10}$

$\boxed{\text{z263}}$ $\mathbb{G}_{1,1}^{(1,-1;c)}(E_g,b) = \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1}^{(b)}(A_u)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{10}$

$\boxed{\text{z264}}$ $\mathbb{G}_{1,2}^{(1,-1;c)}(E_g,b) = \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1}^{(b)}(A_u)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{10} - \frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{10}$

$\boxed{\text{z265}}$ $\mathbb{G}_{3,1}^{(1,-1;c)}(E_g,1a) = -\frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{30} - \frac{2\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1}^{(b)}(A_u)}{15} + \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{30} + \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5}$

$\boxed{\text{z266}}$ $\mathbb{G}_{3,2}^{(1,-1;c)}(E_g,1a) = \frac{2\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{Q}_{1}^{(b)}(A_u)}{15} + \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{30} + \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{30} + \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5}$

$\boxed{\text{z267}}$ $\mathbb{G}_{3,1}^{(1,-1;c)}(E_g,1b) = -\frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{30} - \frac{2\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1}^{(b)}(A_u)}{15} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{30} + \frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{5}$

$\boxed{\text{z268}}$ $\mathbb{G}_{3,2}^{(1,-1;c)}(E_g,1b) = \frac{2\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{T}_{1}^{(b)}(A_u)}{15} + \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{30} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{30} + \frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{5}$

$\boxed{\text{z269}}$ $\mathbb{G}_{3,1}^{(1,-1;c)}(E_g, 2a) = \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{1}^{(b)}(A_u)}{6}$

$\boxed{\text{z270}}$ $\mathbb{G}_{3,2}^{(1,-1;c)}(E_g, 2a) = -\frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_{1}^{(b)}(A_u)}{6} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}$

$\boxed{\text{z271}}$ $\mathbb{G}_{3,1}^{(1,-1;c)}(E_g, 2b) = \frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 2)\mathbb{T}_{1}^{(b)}(A_u)}{6}$

$\boxed{\text{z272}}$ $\mathbb{G}_{3,2}^{(1,-1;c)}(E_g, 2b) = -\frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 2)\mathbb{T}_{1}^{(b)}(A_u)}{6} - \frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{6}$

$\boxed{\text{z273}}$ $\mathbb{G}_{1,1}^{(1,0;c)}(E_g, a) = \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{1}^{(b)}(A_u)}{2} - \frac{\mathbb{Q}_{1}^{(1,0;a)}(A_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z274}}$ $\mathbb{G}_{1,2}^{(1,0;c)}(E_g, a) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{1}^{(b)}(A_u)}{2} + \frac{\mathbb{Q}_{1}^{(1,0;a)}(A_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z275}}$ $\mathbb{G}_{1,1}^{(1,0;c)}(E_g, b) = \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{T}_{1}^{(b)}(A_u)}{2} - \frac{\mathbb{T}_{1}^{(1,0;a)}(A_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z276}}$ $\mathbb{G}_{1,2}^{(1,0;c)}(E_g, b) = -\frac{\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{T}_{1}^{(b)}(A_u)}{2} + \frac{\mathbb{T}_{1}^{(1,0;a)}(A_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z277}}$ $\mathbb{G}_{1,1}^{(1,1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_u)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z278}}$ $\mathbb{G}_{1,2}^{(1,1;c)}(E_g, a) = \frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_u)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z279}}$ $\mathbb{G}_{1,1}^{(1,1;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{M}_{0}^{(1,1;a)}(A_u)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z280}}$ $\mathbb{G}_{1,2}^{(1,1;c)}(E_g, b) = \frac{\sqrt{2}\mathbb{M}_{0}^{(1,1;a)}(A_u)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z349}}$ $\mathbb{Q}_{1,1}^{(c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z350}}$ $\mathbb{Q}_{1,2}^{(c)}(E_u, a) = \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z351}}$ $\mathbb{Q}_{1,1}^{(c)}(E_u,b) = -\frac{\sqrt{2}\mathbb{Q}_{1}^{(a)}(A_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z352}}$ $\mathbb{Q}_{1,2}^{(c)}(E_u,b) = \frac{\sqrt{2}\mathbb{Q}_{1}^{(a)}(A_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z353}}$ $\mathbb{Q}_{1,1}^{(c)}(E_u,c) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{T}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z354}}$ $\mathbb{Q}_{1,2}^{(c)}(E_u,c) = \frac{\sqrt{2}\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{T}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z355}}$ $\mathbb{Q}_{1,1}^{(c)}(E_u,d) = -\frac{\sqrt{2}\mathbb{T}_{1}^{(a)}(A_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z356}}$ $\mathbb{Q}_{1,2}^{(c)}(E_u,d) = \frac{\sqrt{2}\mathbb{T}_{1}^{(a)}(A_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z357}}$ $\mathbb{Q}_{3,1}^{(c)}(E_u,2) = \frac{\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z358}}$ $\mathbb{Q}_{3,2}^{(c)}(E_u,2) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z359}}$ $\mathbb{Q}_{1,1}^{(1,-1;c)}(E_u,a) = -\frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{10} + \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{10} - \frac{\sqrt{30}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{10}$

$\boxed{\text{z360}}$ $\mathbb{Q}_{1,2}^{(1,-1;c)}(E_u,a) = \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{10} + \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{10} - \frac{\sqrt{30}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{10}$

$\boxed{\text{z361}}$ $\mathbb{Q}_{1,1}^{(1,-1;c)}(E_u,b) = \frac{\sqrt{42}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{14} - \frac{\sqrt{42}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{14} - \frac{\sqrt{14}\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{14}$

$\boxed{\text{z362}}$ $\mathbb{Q}_{1,2}^{(1,-1;c)}(E_u,b) = -\frac{\sqrt{42}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{14} - \frac{\sqrt{42}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{14} - \frac{\sqrt{14}\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{14}$

$\boxed{\text{z363}}$ $\mathbb{Q}_{3,1}^{(1,-1;c)}(E_u,1a) = \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{5}$

$\boxed{\text{z364}}$ $\mathbb{Q}_{3,2}^{(1,-1;c)}(E_u,1a) = -\frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{5}$

$\boxed{\text{z365}}$ $\mathbb{Q}_{3,1}^{(1,-1;c)}(E_u,1b) = \frac{\sqrt{7}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{14} - \frac{\sqrt{7}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{14} + \frac{\sqrt{21}\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{7}$

$\boxed{\text{z366}}$ $\mathbb{Q}_{3,2}^{(1,-1;c)}(E_u,1b) = -\frac{\sqrt{7}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{14} - \frac{\sqrt{7}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{14} + \frac{\sqrt{21}\mathbb{M}_{2}^{(1,-1;a)}(A_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{7}$

$\boxed{\text{z367}}$ $\mathbb{Q}_{3,1}^{(1,-1;c)}(E_u,2) = \frac{\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z368}}$ $\mathbb{Q}_{3,2}^{(1,-1;c)}(E_u,2) = -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z369}}$ $\mathbb{Q}_{1,1}^{(1,0;c)}(E_u,a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z370}}$ $\mathbb{Q}_{1,2}^{(1,0;c)}(E_u,a) = \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z371}}$ $\mathbb{Q}_{1,1}^{(1,0;c)}(E_u,b) = -\frac{\sqrt{2}\mathbb{Q}_{1}^{(1,0;a)}(A_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z372}}$ $\mathbb{Q}_{1,2}^{(1,0;c)}(E_u,b) = \frac{\sqrt{2}\mathbb{Q}_{1}^{(1,0;a)}(A_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z373}}$ $\mathbb{Q}_{1,1}^{(1,0;c)}(E_u,c) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{T}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z374}}$ $\mathbb{Q}_{1,2}^{(1,0;c)}(E_u,c) = \frac{\sqrt{2}\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{T}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z375}}$ $\mathbb{Q}_{1,1}^{(1,0;c)}(E_u,d) = -\frac{\sqrt{2}\mathbb{T}_{1}^{(1,0;a)}(A_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z376}}$ $\mathbb{Q}_{1,2}^{(1,0;c)}(E_u,d) = \frac{\sqrt{2}\mathbb{T}_{1}^{(1,0;a)}(A_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z377}}$ $\mathbb{Q}_{3,1}^{(1,0;c)}(E_u,2) = \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z378}}$ $\mathbb{Q}_{3,2}^{(1,0;c)}(E_u,2) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z379}}$ $\mathbb{Q}_{1,1}^{(1,1;c)}(E_u) = \frac{\sqrt{2}\mathbb{M}_0^{(1,1;a)}(A_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z380}}$ $\mathbb{Q}_{1,2}^{(1,1;c)}(E_u) = \frac{\sqrt{2}\mathbb{M}_0^{(1,1;a)}(A_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z381}}$ $\mathbb{G}_{2,1}^{(c)}(E_u, 2) = \frac{\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z382}}$ $\mathbb{G}_{2,2}^{(c)}(E_u, 2) = -\frac{\mathbb{T}_{1,1}^{(a)}(E_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(E_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z383}}$ $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, 1a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z384}}$ $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, 1a) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z385}}$ $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, 1b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 1)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z386}}$ $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, 1b) = \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 1)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z387}}$ $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, 2a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z388}}$ $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, 2a) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 2)\mathbb{Q}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z389}}$ $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, 2b) = -\frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{2,1}^{(b)}(E_g, 1)}{2} + \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{2,2}^{(b)}(E_g, 1)}{2}$

$\boxed{\text{z390}}$ $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, 2b) = \frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{2,2}^{(b)}(E_g, 1)}{2} + \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E_u, 1)\mathbb{Q}_{2,1}^{(b)}(E_g, 1)}{2}$

$\boxed{\text{z391}}$ $\mathbb{G}_{2,1}^{(1,-1;c)}(E_u, 2c) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E_u, 2)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z392}}$ $\mathbb{G}_{2,2}^{(1,-1;c)}(E_u, 2c) = \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E_u, 2)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z393}}$ $\mathbb{G}_{2,1}^{(1,0;c)}(E_u,2) = \frac{\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z394}}$ $\mathbb{G}_{2,2}^{(1,0;c)}(E_u,2) = -\frac{\mathbb{T}_{1,1}^{(1,0;a)}(E_u)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E_u)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z395}}$ $\mathbb{G}_{2,1}^{(1,1;c)}(E_u,1) = \frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_u)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z396}}$ $\mathbb{G}_{2,2}^{(1,1;c)}(E_u,1) = \frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_u)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

- `A;A_001_1` : '`A`'-'`A`' bond-cluster
  * 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: `6a@6g`

$\boxed{\text{z45}}$ $\mathbb{Q}_{0}^{(c)}(A_g,a) = \mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{0}^{(b)}(A_g)$

$\boxed{\text{z46}}$ $\mathbb{Q}_{0}^{(c)}(A_g,b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z47}}$ $\mathbb{Q}_{0}^{(c)}(A_g,c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z48}}$ $\mathbb{Q}_{2}^{(c)}(A_g) = \mathbb{Q}_{2}^{(a)}(A_g)\mathbb{Q}_{0}^{(b)}(A_g)$

$\boxed{\text{z49}}$ $\mathbb{Q}_{4}^{(c)}(A_g,2) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z50}}$ $\mathbb{Q}_{4}^{(c)}(A_g,3) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z51}}$ $\mathbb{Q}_{0}^{(1,-1;c)}(A_g,a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z52}}$ $\mathbb{Q}_{0}^{(1,-1;c)}(A_g,b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z53}}$ $\mathbb{Q}_{2}^{(1,-1;c)}(A_g,a) = \mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{0}^{(b)}(A_g)$

$\boxed{\text{z54}}$ $\mathbb{Q}_2^{(1,-1;c)}(A_g,b) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z55}}$ $\mathbb{Q}_4^{(1,-1;c)}(A_g,2a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z56}}$ $\mathbb{Q}_4^{(1,-1;c)}(A_g,2b) = -\frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z57}}$ $\mathbb{Q}_4^{(1,-1;c)}(A_g,3a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z58}}$ $\mathbb{Q}_4^{(1,-1;c)}(A_g,3b) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z59}}$ $\mathbb{Q}_2^{(1,0;c)}(A_g,a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z60}}$ $\mathbb{Q}_2^{(1,0;c)}(A_g,b) = \mathbb{T}_2^{(1,0;a)}(A_g)\mathbb{T}_0^{(b)}(A_g)$

$\boxed{\text{z61}}$ $\mathbb{Q}_2^{(1,0;c)}(A_g,c) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z62}}$ $\mathbb{Q}_0^{(1,1;c)}(A_g,a) = \mathbb{Q}_0^{(1,1;a)}(A_g)\mathbb{Q}_0^{(b)}(A_g)$

$\boxed{\text{z63}}$ $\mathbb{Q}_0^{(1,1;c)}(A_g,b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z64}}$ $\mathbb{G}_1^{(c)}(A_g,a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z65}}$ $\mathbb{G}_1^{(c)}(A_g,b) = \mathbb{M}_1^{(a)}(A_g)\mathbb{T}_0^{(b)}(A_g)$

$\boxed{\text{z66}}$ $\mathbb{G}_1^{(c)}(A_g,c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z67}}$ $\mathbb{G}_1^{(1,-1;c)}(A_g,a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z68}}$ $\mathbb{G}_1^{(1,-1;c)}(A_g, b) = \mathbb{M}_1^{(1,-1;a)}(A_g)\mathbb{T}_0^{(b)}(A_g)$

$\boxed{\text{z69}}$ $\mathbb{G}_1^{(1,-1;c)}(A_g, c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z70}}$ $\mathbb{G}_3^{(1,-1;c)}(A_g, 1a) = \mathbb{M}_3^{(1,-1;a)}(A_g, 1)\mathbb{T}_0^{(b)}(A_g)$

$\boxed{\text{z71}}$ $\mathbb{G}_3^{(1,-1;c)}(A_g, 1b) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g, 1)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z72}}$ $\mathbb{G}_3^{(1,-1;c)}(A_g, 2) = \mathbb{M}_3^{(1,-1;a)}(A_g, 2)\mathbb{T}_0^{(b)}(A_g)$

$\boxed{\text{z73}}$ $\mathbb{G}_3^{(1,-1;c)}(A_g, 3) = \mathbb{M}_3^{(1,-1;a)}(A_g, 3)\mathbb{T}_0^{(b)}(A_g)$

$\boxed{\text{z74}}$ $\mathbb{G}_1^{(1,0;c)}(A_g, a) = \mathbb{G}_1^{(1,0;a)}(A_g)\mathbb{Q}_0^{(b)}(A_g)$

$\boxed{\text{z75}}$ $\mathbb{G}_1^{(1,0;c)}(A_g, b) = -\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g, 1)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g, 1)}{2}$

$\boxed{\text{z76}}$ $\mathbb{G}_1^{(1,0;c)}(A_g, c) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 1)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 1)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z77}}$ $\mathbb{G}_3^{(1,0;c)}(A_g, 2) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 2)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z78}}$ $\mathbb{G}_3^{(1,0;c)}(A_g, 3) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 2)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z79}}$ $\mathbb{G}_1^{(1,1;c)}(A_g, a) = \mathbb{M}_1^{(1,1;a)}(A_g)\mathbb{T}_0^{(b)}(A_g)$

$\boxed{\text{z80}}$ $\mathbb{G}_1^{(1,1;c)}(A_g, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z169}}$ $\mathbb{Q}_1^{(c)}(A_u, a) = \mathbb{Q}_0^{(a)}(A_g)\mathbb{Q}_1^{(b)}(A_u)$

$\boxed{\text{z170}}$ $\mathbb{Q}_1^{(c)}(A_u, b) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(E_g, 1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E_g, 1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} + \frac{\sqrt{10}\mathbb{Q}_2^{(a)}(A_g)\mathbb{Q}_1^{(b)}(A_u)}{5}$

$\boxed{\text{z171}}$ $\mathbb{Q}_1^{(c)}(A_u,c)=\frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z172}}$ $\mathbb{Q}_3^{(c)}(A_u,1)=-\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5}+\frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5}+\frac{\sqrt{15}\mathbb{Q}_2^{(a)}(A_g)\mathbb{Q}_1^{(b)}(A_u)}{5}$

$\boxed{\text{z173}}$ $\mathbb{Q}_3^{(c)}(A_u,2)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z174}}$ $\mathbb{Q}_3^{(c)}(A_u,3)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}+\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z175}}$ $\mathbb{Q}_1^{(1,-1;c)}(A_u,a)=\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10}-\frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10}+\frac{\sqrt{10}\mathbb{Q}_2^{(1,-1;a)}(A_g)\mathbb{Q}_1^{(b)}(A_u)}{5}$

$\boxed{\text{z176}}$ $\mathbb{Q}_1^{(1,-1;c)}(A_u,b)=\frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z177}}$ $\mathbb{Q}_3^{(1,-1;c)}(A_u,1a)=-\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5}+\frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5}+\frac{\sqrt{15}\mathbb{Q}_2^{(1,-1;a)}(A_g)\mathbb{Q}_1^{(b)}(A_u)}{5}$

$\boxed{\text{z178}}$ $\mathbb{Q}_3^{(1,-1;c)}(A_u,1b)=\frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z179}}$ $\mathbb{Q}_3^{(1,-1;c)}(A_u,2a)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z180}}$ $\mathbb{Q}_3^{(1,-1;c)}(A_u,2b)=-\frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{4}+\frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{4}-\frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(A_g,3)\mathbb{T}_1^{(b)}(A_u)}{2}$

$\boxed{\text{z181}}$ $\mathbb{Q}_3^{(1,-1;c)}(A_u,3a)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}+\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z182}}$ $\mathbb{Q}_3^{(1,-1;c)}(A_u,3b)=-\frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{4}-\frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{4}+\frac{\sqrt{3}\mathbb{M}_3^{(1,-1;a)}(A_g,2)\mathbb{T}_1^{(b)}(A_u)}{2}$

$\boxed{\text{z183}}$ $\mathbb{Q}_1^{(1,0;c)}(A_u,a)=\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}-\frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z184}}$ $\mathbb{Q}_1^{(1,0;c)}(A_u,b)=\frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{10}-\frac{\sqrt{30}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{10}+\frac{\sqrt{10}\mathbb{T}_2^{(1,0;a)}(A_g)\mathbb{T}_1^{(b)}(A_u)}{5}$

$\boxed{\text{z185}}$ $\mathbb{Q}_3^{(1,0;c)}(A_u,1) = -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{5} + \frac{\sqrt{5}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{5} + \frac{\sqrt{15}\mathbb{T}_{2}^{(1,0;a)}(A_g)\mathbb{T}_{1}^{(b)}(A_u)}{5}$

$\boxed{\text{z186}}$ $\mathbb{Q}_3^{(1,0;c)}(A_u,2) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z187}}$ $\mathbb{Q}_3^{(1,0;c)}(A_u,3) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z188}}$ $\mathbb{Q}_1^{(1,1;c)}(A_u,a) = \mathbb{Q}_0^{(1,1;a)}(A_g)\mathbb{Q}_1^{(b)}(A_u)$

$\boxed{\text{z189}}$ $\mathbb{Q}_1^{(1,1;c)}(A_u,b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z190}}$ $\mathbb{G}_0^{(c)}(A_u) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(a)}(A_g)\mathbb{T}_{1}^{(b)}(A_u)}{3}$

$\boxed{\text{z191}}$ $\mathbb{G}_2^{(c)}(A_u,a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z192}}$ $\mathbb{G}_2^{(c)}(A_u,b) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(a)}(A_g)\mathbb{T}_{1}^{(b)}(A_u)}{3}$

$\boxed{\text{z193}}$ $\mathbb{G}_0^{(1,-1;c)}(A_u) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{1}^{(b)}(A_u)}{3}$

$\boxed{\text{z194}}$ $\mathbb{G}_2^{(1,-1;c)}(A_u,a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z195}}$ $\mathbb{G}_2^{(1,-1;c)}(A_u,b) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{1}^{(b)}(A_u)}{3}$

$\boxed{\text{z196}}$ $\mathbb{G}_2^{(1,-1;c)}(A_u,c) = \frac{\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{7} + \frac{\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{7} + \frac{\sqrt{21}\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{7}$

$\boxed{\text{z197}}$ $\mathbb{G}_4^{(1,-1;c)}(A_u,1) = -\frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} - \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{2\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{7}$

$\boxed{\text{z198}}$ $\mathbb{G}_4^{(1,-1;c)}(A_u,2) = -\frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,3)\mathbb{T}_{1}^{(b)}(A_u)}{2}$

$\boxed{\text{z199}}$ $$\mathbb{G}_{4}^{(1,-1;c)}(A_u,3) = \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{4} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{4} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,2)\mathbb{T}_{1}^{(b)}(A_u)}{2}$$

$\boxed{\text{z200}}$ $$\mathbb{G}_{0}^{(1,0;c)}(A_u) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{G}_{1}^{(1,0;a)}(A_g)\mathbb{Q}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z201}}$ $$\mathbb{G}_{2}^{(1,0;c)}(A_u,a) = -\frac{\sqrt{6}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{G}_{1}^{(1,0;a)}(A_g)\mathbb{Q}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z202}}$ $$\mathbb{G}_{2}^{(1,0;c)}(A_u,b) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z203}}$ $$\mathbb{G}_{0}^{(1,1;c)}(A_u) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(1,1;a)}(A_g)\mathbb{T}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z204}}$ $$\mathbb{G}_{2}^{(1,1;c)}(A_u) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(1,1;a)}(A_g)\mathbb{T}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z205}}$ $$\mathbb{Q}_{2,1}^{(c)}(E_g,1a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$$

$\boxed{\text{z206}}$ $$\mathbb{Q}_{2,2}^{(c)}(E_g,1a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_g)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$$

$\boxed{\text{z207}}$ $$\mathbb{Q}_{2,1}^{(c)}(E_g,1b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$$

$\boxed{\text{z208}}$ $$\mathbb{Q}_{2,2}^{(c)}(E_g,1b) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$$

$\boxed{\text{z209}}$ $$\mathbb{Q}_{2,1}^{(c)}(E_g,1c) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(a)}(A_g)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{14}$$

$\boxed{\text{z210}}$ $$\mathbb{Q}_{2,2}^{(c)}(E_g,1c) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(a)}(A_g)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{14}$$

$\boxed{\text{z211}}$ $$\mathbb{Q}_{2,1}^{(c)}(E_g,1d) = \frac{\sqrt{2}\mathbb{M}_{1}^{(a)}(A_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$$

$\boxed{\text{z212}}$ $$\mathbb{Q}_{2,2}^{(c)}(E_g,1d) = -\frac{\sqrt{2}\mathbb{M}_{1}^{(a)}(A_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$$

$\boxed{\text{z213}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g, 2a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E_g, 2)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z214}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g, 2a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E_g, 2)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z215}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g, 2b) = -\frac{\mathbb{Q}_{2,1}^{(a)}(E_g, 1)\mathbb{Q}_{2,1}^{(b)}(E_g, 1)}{2} + \frac{\mathbb{Q}_{2,2}^{(a)}(E_g, 1)\mathbb{Q}_{2,2}^{(b)}(E_g, 1)}{2}$

$\boxed{\text{z216}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g, 2b) = \frac{\mathbb{Q}_{2,1}^{(a)}(E_g, 1)\mathbb{Q}_{2,2}^{(b)}(E_g, 1)}{2} + \frac{\mathbb{Q}_{2,2}^{(a)}(E_g, 1)\mathbb{Q}_{2,1}^{(b)}(E_g, 1)}{2}$

$\boxed{\text{z217}}$ $\mathbb{Q}_{2,1}^{(c)}(E_g, 2c) = \frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z218}}$ $\mathbb{Q}_{2,2}^{(c)}(E_g, 2c) = -\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z219}}$ $\mathbb{Q}_{4,1}^{(c)}(E_g, 1) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E_g, 2)\mathbb{Q}_{2,1}^{(b)}(E_g, 1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E_g, 2)\mathbb{Q}_{2,2}^{(b)}(E_g, 1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(a)}(A_g)\mathbb{Q}_{2,1}^{(b)}(E_g, 1)}{7}$

$\boxed{\text{z220}}$ $\mathbb{Q}_{4,2}^{(c)}(E_g, 1) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E_g, 2)\mathbb{Q}_{2,2}^{(b)}(E_g, 1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E_g, 2)\mathbb{Q}_{2,1}^{(b)}(E_g, 1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(a)}(A_g)\mathbb{Q}_{2,2}^{(b)}(E_g, 1)}{7}$

$\boxed{\text{z221}}$ $\mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, 1a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g, 1)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z222}}$ $\mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, 1a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g, 1)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z223}}$ $\mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, 1b) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g, 2)\mathbb{Q}_{2,1}^{(b)}(E_g, 1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g, 2)\mathbb{Q}_{2,2}^{(b)}(E_g, 1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{2,1}^{(b)}(E_g, 1)}{14}$

$\boxed{\text{z224}}$ $\mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, 1b) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g, 2)\mathbb{Q}_{2,2}^{(b)}(E_g, 1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g, 2)\mathbb{Q}_{2,1}^{(b)}(E_g, 1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{2,2}^{(b)}(E_g, 1)}{14}$

$\boxed{\text{z225}}$ $\mathbb{Q}_{2,1}^{(1,-1;c)}(E_g, 1c) = \frac{\sqrt{2}\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z226}}$ $\mathbb{Q}_{2,2}^{(1,-1;c)}(E_g, 1c) = -\frac{\sqrt{2}\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$$\boxed{\text{z227}}\quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,1d)=\frac{\sqrt{130}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{26}-\frac{\sqrt{130}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{26}-\frac{\sqrt{78}\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{26}$$

$$\boxed{\text{z228}}\quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,1d)=-\frac{\sqrt{130}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{26}-\frac{\sqrt{130}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{26}+\frac{\sqrt{78}\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{26}$$

$$\boxed{\text{z229}}\quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,2a)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$$

$$\boxed{\text{z230}}\quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,2a)=\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{0}^{(b)}(A_g)}{2}$$

$$\boxed{\text{z231}}\quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,2b)=-\frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}+\frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$$

$$\boxed{\text{z232}}\quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,2b)=\frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}+\frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$$

$$\boxed{\text{z233}}\quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,2c)=\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}-\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z234}}\quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,2c)=-\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}-\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$$

$$\boxed{\text{z235}}\quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E_g,2d)=-\frac{\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{8}+\frac{\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{8}+\frac{\sqrt{15}\mathbb{M}_{3}^{(1,-1;a)}(A_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{8}+\frac{\sqrt{15}\mathbb{M}_{3}^{(1,-1;a)}(A_g,3)\mathbb{M}_{1,1}^{(b)}(E_g)}{8}$$

$$\boxed{\text{z236}}\quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E_g,2d)=\frac{\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{8}+\frac{\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{8}-\frac{\sqrt{15}\mathbb{M}_{3}^{(1,-1;a)}(A_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{8}+\frac{\sqrt{15}\mathbb{M}_{3}^{(1,-1;a)}(A_g,3)\mathbb{M}_{1,2}^{(b)}(E_g)}{8}$$

$$\boxed{\text{z237}}\quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g,1a)=\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{14}-\frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{14}+\frac{\sqrt{21}\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{7}$$

$$\boxed{\text{z238}}\quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g,1a)=-\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{14}-\frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{14}+\frac{\sqrt{21}\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{7}$$

$$\boxed{\text{z239}}\quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E_g,1b)=\frac{\sqrt{39}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{26}-\frac{\sqrt{39}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{26}+\frac{\sqrt{65}\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{13}$$

$$\boxed{\text{z240}}\quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E_g,1b)=-\frac{\sqrt{39}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{26}-\frac{\sqrt{39}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{26}-\frac{\sqrt{65}\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{13}$$

$\boxed{\text{z281}}$ $\mathbb{Q}_{4,1}^{(1,-1;c)}(E_g,2) = -\frac{\mathbb{M}_3^{(1,-1;a)}(A_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_g,3)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z282}}$ $\mathbb{Q}_{4,2}^{(1,-1;c)}(E_g,2) = \frac{\mathbb{M}_3^{(1,-1;a)}(A_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_g,3)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z283}}$ $\mathbb{Q}_{4,1}^{(1,-1;c)}(E_g,3) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{8} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{8} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{8} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_g,3)\mathbb{M}_{1,1}^{(b)}(E_g)}{8}$

$\boxed{\text{z284}}$ $\mathbb{Q}_{4,2}^{(1,-1;c)}(E_g,3) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{8} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{8} - \frac{\mathbb{M}_3^{(1,-1;a)}(A_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{8} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_g,3)\mathbb{M}_{1,2}^{(b)}(E_g)}{8}$

$\boxed{\text{z285}}$ $\mathbb{Q}_{2,1}^{(1,0;c)}(E_g,1a) = -\frac{\sqrt{2}\mathbb{G}_1^{(1,0;a)}(A_g)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z286}}$ $\mathbb{Q}_{2,2}^{(1,0;c)}(E_g,1a) = \frac{\sqrt{2}\mathbb{G}_1^{(1,0;a)}(A_g)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z287}}$ $\mathbb{Q}_{2,1}^{(1,0;c)}(E_g,1b) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,1)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z288}}$ $\mathbb{Q}_{2,2}^{(1,0;c)}(E_g,1b) = \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z289}}$ $\mathbb{Q}_{2,1}^{(1,0;c)}(E_g,1c) = \frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{T}_2^{(1,0;a)}(A_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{10}$

$\boxed{\text{z290}}$ $\mathbb{Q}_{2,2}^{(1,0;c)}(E_g,1c) = -\frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{10} - \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{10} + \frac{\sqrt{30}\mathbb{T}_2^{(1,0;a)}(A_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{10}$

$\boxed{\text{z291}}$ $\mathbb{Q}_{2,1}^{(1,0;c)}(E_g,2a) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z292}}$ $\mathbb{Q}_{2,2}^{(1,0;c)}(E_g,2a) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z293}}$ $\mathbb{Q}_{2,1}^{(1,0;c)}(E_g,2b) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z294}}$ $\mathbb{Q}_{2,2}^{(1,0;c)}(E_g,2b) = \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z295}}$ $\mathbb{Q}_{2,1}^{(1,0;c)}(E_g,2c) = -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(E_g,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z296}}$ $\mathbb{Q}_{2,2}^{(1,0;c)}(E_g,2c) = \frac{\mathbb{T}_{2,1}^{(1,0;a)}(E_g,1)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z297}}$ $\mathbb{Q}_{2,1}^{(1,1;c)}(E_g,1a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_g)\mathbb{Q}_{2,1}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z298}}$ $\mathbb{Q}_{2,2}^{(1,1;c)}(E_g,1a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_g)\mathbb{Q}_{2,2}^{(b)}(E_g,1)}{2}$

$\boxed{\text{z299}}$ $\mathbb{Q}_{2,1}^{(1,1;c)}(E_g,1b) = \frac{\sqrt{2}\mathbb{M}_{1}^{(1,1;a)}(A_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z300}}$ $\mathbb{Q}_{2,2}^{(1,1;c)}(E_g,1b) = -\frac{\sqrt{2}\mathbb{M}_{1}^{(1,1;a)}(A_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z301}}$ $\mathbb{Q}_{2,1}^{(1,1;c)}(E_g,2) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2}$

$\boxed{\text{z302}}$ $\mathbb{Q}_{2,2}^{(1,1;c)}(E_g,2) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{2}$

$\boxed{\text{z303}}$ $\mathbb{G}_{1,1}^{(c)}(E_g) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z304}}$ $\mathbb{G}_{1,2}^{(c)}(E_g) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z305}}$ $\mathbb{G}_{1,1}^{(1,-1;c)}(E_g) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z306}}$ $\mathbb{G}_{1,2}^{(1,-1;c)}(E_g) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z307}}$ $\mathbb{G}_{3,1}^{(1,-1;c)}(E_g,1) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z308}}$ $\mathbb{G}_{3,2}^{(1,-1;c)}(E_g,1) = \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{0}^{(b)}(A_g)}{2}$

$\boxed{\text{z309}}$ $\mathbb{G}_{3,1}^{(1,-1;c)}(E_g,2) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z310}}$ $\mathbb{G}_{3,2}^{(1,-1;c)}(E_g,2) = \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z311}}$ $\mathbb{G}_{1,1}^{(1,0;c)}(E_g,a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z312}}$ $\mathbb{G}_{1,2}^{(1,0;c)}(E_g,a) = \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z313}}$ $\mathbb{G}_{1,1}^{(1,0;c)}(E_g,b) = \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{10} - \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_g)\mathbb{M}_{1,1}^{(b)}(E_g)}{5}$

$\boxed{\text{z314}}$ $\mathbb{G}_{1,2}^{(1,0;c)}(E_g,b) = -\frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{M}_{1,2}^{(b)}(E_g)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{M}_{1,1}^{(b)}(E_g)}{10} - \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_g)\mathbb{M}_{1,2}^{(b)}(E_g)}{5}$

$\boxed{\text{z315}}$ $\mathbb{G}_{1,1}^{(1,1;c)}(E_g) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z316}}$ $\mathbb{G}_{1,2}^{(1,1;c)}(E_g) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_0^{(b)}(A_g)}{2}$

$\boxed{\text{z397}}$ $\mathbb{Q}_{1,1}^{(c)}(E_u,a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z398}}$ $\mathbb{Q}_{1,2}^{(c)}(E_u,a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z399}}$ $\mathbb{Q}_{1,1}^{(c)}(E_u,b) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{5}\mathbb{Q}_{2}^{(a)}(A_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10}$

$\boxed{\text{z400}}$ $\mathbb{Q}_{1,2}^{(c)}(E_u,b) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} - \frac{\sqrt{5}\mathbb{Q}_{2}^{(a)}(A_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10}$

$\boxed{\text{z401}}$ $\mathbb{Q}_{1,1}^{(c)}(E_u,c) = \frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_u)}{2} - \frac{\mathbb{M}_{1}^{(a)}(A_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z402}}$ $\mathbb{Q}_{1,2}^{(c)}(E_u,c) = -\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_1^{(b)}(A_u)}{2} + \frac{\mathbb{M}_{1}^{(a)}(A_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z403}}$ $$\mathbb{Q}_{3,1}^{(c)}(E_u,1) = -\frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{30} - \frac{2\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(a)}(A_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5}$$

$\boxed{\text{z404}}$ $$\mathbb{Q}_{3,2}^{(c)}(E_u,1) = \frac{2\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{30} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(a)}(A_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5}$$

$\boxed{\text{z405}}$ $$\mathbb{Q}_{3,1}^{(c)}(E_u,2) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{1}^{(b)}(A_u)}{6}$$

$\boxed{\text{z406}}$ $$\mathbb{Q}_{3,2}^{(c)}(E_u,2) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{1}^{(b)}(A_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}$$

$\boxed{\text{z407}}$ $$\mathbb{Q}_{1,1}^{(1,-1;c)}(E_u,a) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10}$$

$\boxed{\text{z408}}$ $$\mathbb{Q}_{1,2}^{(1,-1;c)}(E_u,a) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{10} - \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{10}$$

$\boxed{\text{z409}}$ $$\mathbb{Q}_{1,1}^{(1,-1;c)}(E_u,b) = \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2} - \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z410}}$ $$\mathbb{Q}_{1,2}^{(1,-1;c)}(E_u,b) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2} + \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z411}}$ $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E_u,1a) = -\frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{30} - \frac{2\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{5}$$

$\boxed{\text{z412}}$ $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E_u,1a) = \frac{2\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{30} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{5}$$

$\boxed{\text{z413}}$ $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E_u,1b) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{12} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{12} - \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z414}}$ $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E_u,1b) = -\frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{12} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z415}}$ $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E_u,2a) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1}^{(b)}(A_u)}{6}$$

$\boxed{\text{z416}}$ $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E_u,2a) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1}^{(b)}(A_u)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}$$

$\boxed{\text{z417}}$ $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E_u,2b)=\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{12}-\frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{12}-\frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1}^{(b)}(A_u)}{6}+\frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{4}+\frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,3)\mathbb{T}_{1,1}^{(b)}(E_u)}{4}$$

$\boxed{\text{z418}}$ $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E_u,2b)=-\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{12}+\frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1}^{(b)}(A_u)}{6}-\frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{12}-\frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{4}+\frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,3)\mathbb{T}_{1,2}^{(b)}(E_u)}{4}$$

$\boxed{\text{z419}}$ $$\mathbb{Q}_{1,1}^{(1,0;c)}(E_u,a)=\frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1}^{(b)}(A_u)}{2}-\frac{\mathbb{G}_{1}^{(1,0;a)}(A_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z420}}$ $$\mathbb{Q}_{1,2}^{(1,0;c)}(E_u,a)=-\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1}^{(b)}(A_u)}{2}+\frac{\mathbb{G}_{1}^{(1,0;a)}(A_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z421}}$ $$\mathbb{Q}_{1,1}^{(1,0;c)}(E_u,b)=\frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{10}-\frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{10}-\frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{10}-\frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{10}$$

$\boxed{\text{z422}}$ $$\mathbb{Q}_{1,2}^{(1,0;c)}(E_u,b)=\frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{10}-\frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{10}-\frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{10}-\frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{10}$$

$\boxed{\text{z423}}$ $$\mathbb{Q}_{3,1}^{(1,0;c)}(E_u,1)=-\frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{30}-\frac{2\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{15}+\frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{30}+\frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{5}$$

$\boxed{\text{z424}}$ $$\mathbb{Q}_{3,2}^{(1,0;c)}(E_u,1)=\frac{2\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{15}+\frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{30}+\frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{30}+\frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{5}$$

$\boxed{\text{z425}}$ $$\mathbb{Q}_{3,1}^{(1,0;c)}(E_u,2)=\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{6}-\frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{6}-\frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2)\mathbb{T}_{1}^{(b)}(A_u)}{6}$$

$\boxed{\text{z426}}$ $$\mathbb{Q}_{3,2}^{(1,0;c)}(E_u,2)=-\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{6}+\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2)\mathbb{T}_{1}^{(b)}(A_u)}{6}-\frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{6}$$

$\boxed{\text{z427}}$ $$\mathbb{Q}_{1,1}^{(1,1;c)}(E_u,a)=\frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z428}}$ $$\mathbb{Q}_{1,2}^{(1,1;c)}(E_u,a)=\frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z429}}$ $$\mathbb{Q}_{1,1}^{(1,1;c)}(E_u,b)=\frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2}-\frac{\mathbb{M}_{1}^{(1,1;a)}(A_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z430}}$ $$\mathbb{Q}_{1,2}^{(1,1;c)}(E_u,b)=-\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2}+\frac{\mathbb{M}_{1}^{(1,1;a)}(A_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z431}}\quad \mathbb{G}_{2,1}^{(c)}(E_u,1a)=\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}+\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{6}-\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}+\frac{\mathbb{Q}_{2}^{(a)}(A_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z432}}\quad \mathbb{G}_{2,2}^{(c)}(E_u,1a)=-\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{6}-\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}-\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}+\frac{\mathbb{Q}_{2}^{(a)}(A_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z433}}\quad \mathbb{G}_{2,1}^{(c)}(E_u,1b)=\frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2}+\frac{\mathbb{M}_{1}^{(a)}(A_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z434}}\quad \mathbb{G}_{2,2}^{(c)}(E_u,1b)=-\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2}-\frac{\mathbb{M}_{1}^{(a)}(A_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z435}}\quad \mathbb{G}_{2,1}^{(c)}(E_u,2a)=-\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}+\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}-\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g,2)\mathbb{Q}_{1}^{(b)}(A_u)}{3}$$

$$\boxed{\text{z436}}\quad \mathbb{G}_{2,2}^{(c)}(E_u,2a)=\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}+\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E_g,2)\mathbb{Q}_{1}^{(b)}(A_u)}{3}+\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}$$

$$\boxed{\text{z437}}\quad \mathbb{G}_{2,1}^{(c)}(E_u,2b)=\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}-\frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z438}}\quad \mathbb{G}_{2,2}^{(c)}(E_u,2b)=-\frac{\mathbb{M}_{1,1}^{(a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}-\frac{\mathbb{M}_{1,2}^{(a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z439}}\quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u,1a)=\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}+\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{6}-\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}+\frac{\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z440}}\quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u,1a)=-\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1}^{(b)}(A_u)}{6}-\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6}-\frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}+\frac{\mathbb{Q}_{2}^{(1,-1;a)}(A_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$$

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

$$\boxed{\text{z442}}\quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u,1b)=-\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2}-\frac{\mathbb{M}_{1}^{(1,-1;a)}(A_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$$\boxed{\text{z443}}\quad \mathbb{G}_{2,1}^{(1,-1;c)}(E_u,1c)=\frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{42}+\frac{2\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{21}-\frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{42}-\frac{\sqrt{14}\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14}$$

$$\boxed{\text{z444}}\quad \mathbb{G}_{2,2}^{(1,-1;c)}(E_u,1c)=-\frac{2\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{21}-\frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{42}-\frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{42}+\frac{\sqrt{14}\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14}$$

$\boxed{\text{z445}}$ $$\mathbb{G}_{2,1}^{(1,-1;c)}(E_u,2a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1}^{(b)}(A_u)}{3}$$

$\boxed{\text{z446}}$ $$\mathbb{G}_{2,2}^{(1,-1;c)}(E_u,2a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2)\mathbb{Q}_{1}^{(b)}(A_u)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1)\mathbb{Q}_{1,1}^{(b)}(E_u)}{6}$$

$\boxed{\text{z447}}$ $$\mathbb{G}_{2,1}^{(1,-1;c)}(E_u,2b) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z448}}$ $$\mathbb{G}_{2,2}^{(1,-1;c)}(E_u,2b) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z449}}$ $$\mathbb{G}_{2,1}^{(1,-1;c)}(E_u,2c) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{42} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{42} + \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1}^{(b)}(A_u)}{42} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{14} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_g,3)\mathbb{T}_{1,1}^{(b)}(E_u)}{14}$$

$\boxed{\text{z450}}$ $$\mathbb{G}_{2,2}^{(1,-1;c)}(E_u,2c) = \frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{42} - \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1}^{(b)}(A_u)}{42} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{42} - \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{14} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_g,3)\mathbb{T}_{1,2}^{(b)}(E_u)}{14}$$

$\boxed{\text{z451}}$ $$\mathbb{G}_{4,1}^{(1,-1;c)}(E_u,1) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{28} + \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{28} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{28} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{14}$$

$\boxed{\text{z452}}$ $$\mathbb{G}_{4,2}^{(1,-1;c)}(E_u,1) = -\frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1}^{(b)}(A_u)}{28} + \frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{28} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{28} - \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{14}$$

$\boxed{\text{z453}}$ $$\mathbb{G}_{4,1}^{(1,-1;c)}(E_u,2) = -\frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,3)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$$

$\boxed{\text{z454}}$ $$\mathbb{G}_{4,2}^{(1,-1;c)}(E_u,2) = \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_g,3)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$$

$\boxed{\text{z455}}$ $$\mathbb{G}_{4,1}^{(1,-1;c)}(E_u,3) = \frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{28} - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{28} + \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1}^{(b)}(A_u)}{14} - \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_g,2)\mathbb{T}_{1,2}^{(b)}(E_u)}{28} - \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_g,3)\mathbb{T}_{1,1}^{(b)}(E_u)}{28}$$

$\boxed{\text{z456}}$ $$\mathbb{G}_{4,2}^{(1,-1;c)}(E_u,3) = -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,2}^{(b)}(E_u)}{28} - \frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2)\mathbb{T}_{1}^{(b)}(A_u)}{14} - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1)\mathbb{T}_{1,1}^{(b)}(E_u)}{28} + \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_g,2)\mathbb{T}_{1,1}^{(b)}(E_u)}{28} - \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_g,3)\mathbb{T}_{1,2}^{(b)}(E_u)}{28}$$

$\boxed{\text{z457}}$ $\mathbb{G}_{2,1}^{(1,0;c)}(E_u, 1a) = \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1}^{(b)}(A_u)}{2} + \frac{\mathbb{G}_{1}^{(1,0;a)}(A_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z458}}$ $\mathbb{G}_{2,2}^{(1,0;c)}(E_u, 1a) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1}^{(b)}(A_u)}{2} - \frac{\mathbb{G}_{1}^{(1,0;a)}(A_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z459}}$ $\mathbb{G}_{2,1}^{(1,0;c)}(E_u, 1b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 1)\mathbb{T}_{1}^{(b)}(A_u)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\mathbb{T}_{2}^{(1,0;a)}(A_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z460}}$ $\mathbb{G}_{2,2}^{(1,0;c)}(E_u, 1b) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 1)\mathbb{T}_{1}^{(b)}(A_u)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 2)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\mathbb{T}_{2}^{(1,0;a)}(A_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z461}}$ $\mathbb{G}_{2,1}^{(1,0;c)}(E_u, 2a) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z462}}$ $\mathbb{G}_{2,2}^{(1,0;c)}(E_u, 2a) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E_g)\mathbb{Q}_{1,2}^{(b)}(E_u)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E_g)\mathbb{Q}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z463}}$ $\mathbb{G}_{2,1}^{(1,0;c)}(E_u, 2b) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 2)\mathbb{T}_{1}^{(b)}(A_u)}{3}$

$\boxed{\text{z464}}$ $\mathbb{G}_{2,2}^{(1,0;c)}(E_u, 2b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 1)\mathbb{T}_{1,2}^{(b)}(E_u)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 2)\mathbb{T}_{1}^{(b)}(A_u)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E_g, 1)\mathbb{T}_{1,1}^{(b)}(E_u)}{6}$

$\boxed{\text{z465}}$ $\mathbb{G}_{2,1}^{(1,1;c)}(E_u, 1) = \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2} + \frac{\mathbb{M}_{1}^{(1,1;a)}(A_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z466}}$ $\mathbb{G}_{2,2}^{(1,1;c)}(E_u, 1) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1}^{(b)}(A_u)}{2} - \frac{\mathbb{M}_{1}^{(1,1;a)}(A_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

$\boxed{\text{z467}}$ $\mathbb{G}_{2,1}^{(1,1;c)}(E_u, 2) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2}$

$\boxed{\text{z468}}$ $\mathbb{G}_{2,2}^{(1,1;c)}(E_u, 2) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E_g)\mathbb{T}_{1,2}^{(b)}(E_u)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E_g)\mathbb{T}_{1,1}^{(b)}(E_u)}{2}$

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

$\boxed{\text{x1}}$ $$\mathbb{Q}_0^{(a)}(A_g)=\begin{bmatrix}\frac{\sqrt{2}}{2} & 0\\ 0 & \frac{\sqrt{2}}{2}\end{bmatrix}$$

$\boxed{\text{x2}}$ $$\mathbb{M}_1^{(1,-1;a)}(A_g)=\begin{bmatrix}\frac{\sqrt{2}}{2} & 0\\ 0 & -\frac{\sqrt{2}}{2}\end{bmatrix}$$

$\boxed{\text{x3}}$ $$\mathbb{M}_{1,1}^{(1,-1;a)}(E_g)=\begin{bmatrix}0 & \frac{\sqrt{2}}{2}\\ \frac{\sqrt{2}}{2} & 0\end{bmatrix}$$

$\boxed{\text{x4}}$ $$\mathbb{M}_{1,2}^{(1,-1;a)}(E_g)=\begin{bmatrix}0 & -\frac{\sqrt{2}i}{2}\\ \frac{\sqrt{2}i}{2} & 0\end{bmatrix}$$

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

$\boxed{\text{x5}}$ $$\mathbb{Q}_1^{(a)}(A_u)=\begin{bmatrix}0 & 0 & 0 & 0 & \frac{1}{2} & 0\\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2}\end{bmatrix}$$

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

$\boxed{\text{x7}}$ $$\mathbb{Q}_{1,2}^{(a)}(E_u)=\begin{bmatrix}0 & 0 & \frac{1}{2} & 0 & 0 & 0\\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0\end{bmatrix}$$

$\boxed{\text{x8}}$ $$\mathbb{Q}_1^{(1,0;a)}(A_u)=\begin{bmatrix}0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0\\ \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0\end{bmatrix}$$

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

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

$\boxed{\text{x11}}$ $\mathbb{G}_{2}^{(1,-1;a)}(A_u) = \begin{bmatrix} 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \end{bmatrix}$

$\boxed{\text{x12}}$ $\mathbb{G}_{2,1}^{(1,-1;a)}(E_u,1) = \begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$

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

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

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

$\boxed{\text{x16}}$ $\mathbb{G}_{0}^{(1,1;a)}(A_u) = \begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$

$\boxed{\text{x17}}$ $\mathbb{M}_{2}^{(1,-1;a)}(A_u) = \begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{6} & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$

$\boxed{\text{x18}}$ $\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,1) = \begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$

$\boxed{\text{x19}}$ $\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,1) = \begin{bmatrix} -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$

$\boxed{\text{x20}}$ $\mathbb{M}_{2,1}^{(1,-1;a)}(E_u,2) = \begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$

$\boxed{\text{x21}}$ $\mathbb{M}_{2,2}^{(1,-1;a)}(E_u,2) = \begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$

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

$\boxed{\text{x23}}$ $\mathbb{T}_{1}^{(a)}(A_u) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$

$\boxed{\text{x24}}$ $\mathbb{T}_{1,1}^{(a)}(E_u) = \begin{bmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$

$\boxed{\text{x25}}$ $\mathbb{T}_{1,2}^{(a)}(E_u) = \begin{bmatrix} 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$

$\boxed{\text{x26}}$ $\mathbb{T}_{1}^{(1,0;a)}(A_u) = \begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$

$\boxed{\text{x27}}$ $\mathbb{T}_{1,1}^{(1,0;a)}(E_u) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$

$\boxed{\text{x28}}$ $\mathbb{T}_{1,2}^{(1,0;a)}(E_u) = \begin{bmatrix} \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$

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

$\boxed{\text{x29}}$ $\mathbb{Q}_{0}^{(a)}(A_g) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{bmatrix}$

$\boxed{\text{x30}}$ $\mathbb{Q}_2^{(a)}(A_g) = \begin{bmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} \end{bmatrix}$

$\boxed{\text{x31}}$ $\mathbb{Q}_{2,1}^{(a)}(E_g, 1) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$

$\boxed{\text{x32}}$ $\mathbb{Q}_{2,2}^{(a)}(E_g, 1) = \begin{bmatrix} 0 & 0 & 0 & 0 & -\frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$

$\boxed{\text{x33}}$ $\mathbb{Q}_{2,1}^{(a)}(E_g, 2) = \begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

$$\boxed{\text{x34}} \quad \mathbb{Q}_{2,2}^{(a)}(E_g,2) = \begin{bmatrix} 0 & 0 & -\frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{1}{2} & 0 & 0 \\ -\frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

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

$$\boxed{\text{x36}} \quad \mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,1) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x37}} \quad \mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,1) = \begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$$

$\boxed{\text{x38}}$ $$\mathbb{Q}_{2,1}^{(1,-1;a)}(E_g,2) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$$

$\boxed{\text{x39}}$ $$\mathbb{Q}_{2,2}^{(1,-1;a)}(E_g,2) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$\boxed{\text{x40}}$ $$\mathbb{Q}_{0}^{(1,1;a)}(A_g) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$$

$\boxed{\text{x41}}$ $$\mathbb{G}_{1}^{(1,0;a)}(A_g) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$\boxed{\text{x42}}$ $$\mathbb{G}_{1,1}^{(1,0;a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$\boxed{\text{x43}}$ $$\mathbb{G}_{1,2}^{(1,0;a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$$

$\boxed{\text{x44}}$ $$\mathbb{M}_{1}^{(a)}(A_g) = \begin{bmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$\boxed{\text{x45}}$ $$\mathbb{M}_{1,1}^{(a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x46}} \quad \mathbb{M}_{1,2}^{(a)}(E_g) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x47}} \quad \mathbb{M}_{1}^{(1,-1;a)}(A_g) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$$

$$\boxed{\text{x48}} \quad \mathbb{M}_{3}^{(1,-1;a)}(A_g,1) = \begin{bmatrix} -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{5} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{5} \end{bmatrix}$$

$$\boxed{\text{x49}} \quad \mathbb{M}_{3}^{(1,-1;a)}(A_g,2) = \begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x50}}\quad \mathbb{M}_{3}^{(1,-1;a)}(A_g,3)=\begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x51}}\quad \mathbb{M}_{1,1}^{(1,-1;a)}(E_g)=\begin{bmatrix} 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x52}}\quad \mathbb{M}_{1,2}^{(1,-1;a)}(E_g)=\begin{bmatrix} 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x53}}\quad \mathbb{M}_{3,1}^{(1,-1;a)}(E_g,1)=\begin{bmatrix} 0 & -\frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{60} & \frac{\sqrt{30}}{15} & 0 \\ -\frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{60} & 0 & 0 & -\frac{\sqrt{30}}{15} \\ 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{15} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{15} \\ 0 & -\frac{\sqrt{30}}{15} & 0 & 0 & \frac{\sqrt{30}}{15} & 0 \end{bmatrix}$$

$\boxed{\text{x54}}$ $$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,1) = \begin{bmatrix} 0 & \frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 \\ -\frac{\sqrt{30}i}{60} & 0 & -\frac{\sqrt{30}}{60} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{30}}{60} & 0 & \frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ -\frac{\sqrt{30}}{60} & 0 & -\frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \\ 0 & 0 & \frac{\sqrt{30}}{15} & 0 & 0 & -\frac{\sqrt{30}i}{15} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{15} & \frac{\sqrt{30}i}{15} & 0 \end{bmatrix}$$

$\boxed{\text{x55}}$ $$\mathbb{M}_{3,1}^{(1,-1;a)}(E_g,2) = \begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$$

$\boxed{\text{x56}}$ $$\mathbb{M}_{3,2}^{(1,-1;a)}(E_g,2) = \begin{bmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$$

$\boxed{\text{x57}}$ $$\mathbb{M}_{1}^{(1,1;a)}(A_g) = \begin{bmatrix} -\frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{30} & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \end{bmatrix}$$

$\boxed{\text{x58}}$ $$\mathbb{M}_{1,1}^{(1,1;a)}(E_g) = \begin{bmatrix} 0 & \frac{\sqrt{30}}{15} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{15} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 \end{bmatrix}$$

$\boxed{\text{x59}}$ $$\mathbb{M}_{1,2}^{(1,1;a)}(E_g) = \begin{bmatrix} 0 & \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{15} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{30}i}{30} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & -\frac{\sqrt{30}i}{30} & 0 \end{bmatrix}$$

$\boxed{\text{x60}}$ $$\mathbb{T}_{2}^{(1,0;a)}(A_g) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$\boxed{\text{x61}}$ $$\mathbb{T}_{2,1}^{(1,0;a)}(E_g, 1) = \begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \end{bmatrix}$$

x62 $\mathbb{T}_{2,2}^{(1,0;a)}(E_g,1) = \begin{bmatrix} 0 & -\frac{\sqrt{6}i}{6} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}i}{6} & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ -\frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & \frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{12} & -\frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$

x63 $\mathbb{T}_{2,1}^{(1,0;a)}(E_g,2) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \end{bmatrix}$

x64 $\mathbb{T}_{2,2}^{(1,0;a)}(E_g,2) = \begin{bmatrix} -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & -\frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$

— Cluster SAMB

- Site cluster

** Wyckoff: `3e`

y1 $\mathbb{Q}_0^{(s)}(A_g) = \left[\frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3}\right]$

y2 $\mathbb{Q}_{2,1}^{(s)}(E_g,1) = \left[\frac{\sqrt{14}}{14}, \frac{\sqrt{14}}{7}, -\frac{3\sqrt{14}}{14}\right]$

$\boxed{\text{y3}}$ $\mathbb{Q}_{2,2}^{(s)}(E_g,1) = \left[-\frac{5\sqrt{42}}{42}, \frac{2\sqrt{42}}{21}, \frac{\sqrt{42}}{42}\right]$

- Bond cluster

** Wyckoff: `6a@6g`

$\boxed{\text{y4}}$ $\mathbb{Q}_{0}^{(s)}(A_g) = \left[\frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}\right]$

$\boxed{\text{y5}}$ $\mathbb{T}_{0}^{(s)}(A_g) = \left[\frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}\right]$

$\boxed{\text{y6}}$ $\mathbb{Q}_{1}^{(s)}(A_u) = \left[\frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}\right]$

$\boxed{\text{y7}}$ $\mathbb{T}_{1}^{(s)}(A_u) = \left[\frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, -\frac{\sqrt{6}i}{6}, -\frac{\sqrt{6}i}{6}, -\frac{\sqrt{6}i}{6}\right]$

$\boxed{\text{y8}}$ $\mathbb{M}_{1,1}^{(s)}(E_g) = \left[\frac{\sqrt{7}i}{14}, \frac{\sqrt{7}i}{7}, -\frac{3\sqrt{7}i}{14}, \frac{\sqrt{7}i}{14}, \frac{\sqrt{7}i}{7}, -\frac{3\sqrt{7}i}{14}\right]$

$\boxed{\text{y9}}$ $\mathbb{M}_{1,2}^{(s)}(E_g) = \left[-\frac{5\sqrt{21}i}{42}, \frac{2\sqrt{21}i}{21}, \frac{\sqrt{21}i}{42}, -\frac{5\sqrt{21}i}{42}, \frac{2\sqrt{21}i}{21}, \frac{\sqrt{21}i}{42}\right]$

$\boxed{\text{y10}}$ $\mathbb{Q}_{2,1}^{(s)}(E_g,1) = \left[\frac{\sqrt{7}}{14}, \frac{\sqrt{7}}{7}, -\frac{3\sqrt{7}}{14}, \frac{\sqrt{7}}{14}, \frac{\sqrt{7}}{7}, -\frac{3\sqrt{7}}{14}\right]$

$\boxed{\text{y11}}$ $\mathbb{Q}_{2,2}^{(s)}(E_g,1) = \left[-\frac{5\sqrt{21}}{42}, \frac{2\sqrt{21}}{21}, \frac{\sqrt{21}}{42}, -\frac{5\sqrt{21}}{42}, \frac{2\sqrt{21}}{21}, \frac{\sqrt{21}}{42}\right]$

$\boxed{\text{y12}}$ $\mathbb{Q}_{1,1}^{(s)}(E_u) = \left[\frac{5\sqrt{21}}{42}, -\frac{2\sqrt{21}}{21}, -\frac{\sqrt{21}}{42}, -\frac{5\sqrt{21}}{42}, \frac{2\sqrt{21}}{21}, \frac{\sqrt{21}}{42}\right]$

$\boxed{\text{y13}}$ $\mathbb{Q}_{1,2}^{(s)}(E_u) = \left[\frac{\sqrt{7}}{14}, \frac{\sqrt{7}}{7}, -\frac{3\sqrt{7}}{14}, -\frac{\sqrt{7}}{14}, -\frac{\sqrt{7}}{7}, \frac{3\sqrt{7}}{14}\right]$

$\boxed{\text{y14}}$ $\mathbb{T}^{(s)}_{1,1}(E_u) = \left[\frac{5\sqrt{21}i}{42}, -\frac{2\sqrt{21}i}{21}, -\frac{\sqrt{21}i}{42}, -\frac{5\sqrt{21}i}{42}, \frac{2\sqrt{21}i}{21}, \frac{\sqrt{21}i}{42}\right]$

$\boxed{\text{y15}}$ $\mathbb{T}^{(s)}_{1,2}(E_u) = \left[\frac{\sqrt{7}i}{14}, \frac{\sqrt{7}i}{7}, -\frac{3\sqrt{7}i}{14}, -\frac{\sqrt{7}i}{14}, -\frac{\sqrt{7}i}{7}, \frac{3\sqrt{7}i}{14}\right]$

Site and Bond

Table 5: Orbital of each site

#	site	orbital
1	`A`	$\lvert s,\uparrow\rangle$, $\lvert s,\downarrow\rangle$, $\lvert p_x,\uparrow\rangle$, $\lvert p_x,\downarrow\rangle$, $\lvert p_y,\uparrow\rangle$, $\lvert p_y,\downarrow\rangle$, $\lvert p_z,\uparrow\rangle$, $\lvert p_z,\downarrow\rangle$

Table 6: Neighbor and bra-ket of each bond

#	head	tail	neighbor	head (bra)	tail (ket)
1	`A`	`A`	`[1]`	`[s,p]`	`[s,p]`

Site in Unit Cell

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

Table 7: 'A' (#1) site cluster (3e), -1

SL	position ($\boldsymbol{s}$)	mapping
1	[0.50000, 0.00000, 0.00000]	[1,4]
2	[0.00000, 0.50000, 0.00000]	[2,5]
3	[0.50000, 0.50000, 0.00000]	[3,6]

Bond in Unit Cell

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

Table 8: 1-th 'A'-'A' [1] (#1) bond cluster (6a@6g), D, $|\boldsymbol{v}|$= 0.5 (cartesian)

SL	vector ($\boldsymbol{v}$)	center ($\boldsymbol{c}$)	mapping	head	tail	$\boldsymbol{R}$ (primitive)
1	[-0.50000,-0.50000, 0.00000]	[0.25000, 0.75000, 0.00000]	[1]	(2,1)	(1,1)	[0,1,0]
2	[0.50000, 0.00000, 0.00000]	[0.25000, 0.50000, 0.00000]	[2]	(3,1)	(2,1)	[0,0,0]
3	[0.00000, 0.50000, 0.00000]	[0.50000, 0.75000, 0.00000]	[3]	(1,1)	(3,1)	[0,-1,0]
4	[0.50000, 0.50000, 0.00000]	[0.75000, 0.25000, 0.00000]	[4]	(2,1)	(1,1)	[-1,0,0]
5	[-0.50000, 0.00000, 0.00000]	[0.75000, 0.50000, 0.00000]	[5]	(3,1)	(2,1)	[1,0,0]
6	[0.00000,-0.50000, 0.00000]	[0.50000, 0.25000, 0.00000]	[6]	(1,1)	(3,1)	[0,0,0]