

# Model for “01”

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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.: [ $A_1$ ,  $A_2$ ,  $E$ ,  $T_1$ ,  $T_2$ ]
  - 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.: [ $A_1$ ,  $A_2$ ,  $E$ ,  $T_1$ ,  $T_2$ ]
  - Spin (s): [0, 1]
- Site-cluster selection:
  - Rank: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
  - Irrep.: [ $A_1$ ,  $A_2$ ,  $E$ ,  $T_1$ ,  $T_2$ ]
- Bond-cluster selection:
  - Type: [Q, G, M, T]
  - Rank: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11]
  - Irrep.: [ $A_1$ ,  $A_2$ ,  $E$ ,  $T_1$ ,  $T_2$ ]
- Max. neighbor: 10
- Search cell range: (-2, 3), (-2, 3), (-2, 3)
- Toroidal priority: **false**

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## Group and Unit Cell

- Group: SG No. 207  $O^1$   $P432$  [cubic]
- Associated point group: PG No. 207  $O$   $432$  [cubic]
- Unit cell:
  - $a = 1.00000$ ,  $b = 1.00000$ ,  $c = 1.00000$ ,  $\alpha = 90.0$ ,  $\beta = 90.0$ ,  $\gamma = 90.0$
- Lattice vectors (conventional cell):
  - $\mathbf{a}_1 = [1.00000, 0.00000, 0.00000]$
  - $\mathbf{a}_2 = [0.00000, 1.00000, 0.00000]$
  - $\mathbf{a}_3 = [0.00000, 0.00000, 1.00000]$

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**Symmetry Operation**


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Table 1: Symmetry operation

#	SO	#	SO	#	SO	#	SO	#	SO
1	$\{1 0\}$	2	$\{2_{001} 0\}$	3	$\{2_{010} 0\}$	4	$\{2_{100} 0\}$	5	$\{3_{111}^+ 0\}$
6	$\{3_{-11-1}^+ 0\}$	7	$\{3_{1-1-1}^+ 0\}$	8	$\{3_{-1-11}^+ 0\}$	9	$\{3_{111}^- 0\}$	10	$\{3_{1-1-1}^- 0\}$
11	$\{3_{-1-11}^- 0\}$	12	$\{3_{-11-1}^- 0\}$	13	$\{2_{110} 0\}$	14	$\{2_{1-10} 0\}$	15	$\{4_{001}^- 0\}$
16	$\{4_{001}^+ 0\}$	17	$\{4_{100}^- 0\}$	18	$\{2_{011} 0\}$	19	$\{2_{01-1} 0\}$	20	$\{4_{100}^+ 0\}$
21	$\{4_{010}^+ 0\}$	22	$\{2_{101} 0\}$	23	$\{4_{010}^- 0\}$	24	$\{2_{-101} 0\}$		

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**Harmonics**


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Table 2: Harmonics

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
1	$\mathbb{G}_0(A_1)$	$A_1$	0	$G, M$	-	-	1
2	$\mathbb{Q}_0(A_1)$	$A_1$	0	$Q, T$	-	-	1
3	$\mathbb{G}_4(A_1)$	$A_1$	4	$G, M$	-	-	$\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$
4	$\mathbb{Q}_4(A_1)$	$A_1$	4	$Q, T$	-	-	$\frac{\sqrt{21}(x^4-3x^2y^2-3x^2z^2+y^4-3y^2z^2+z^4)}{6}$
5	$\mathbb{G}_3(A_2)$	$A_2$	3	$G, M$	-	-	$\sqrt{15}xyz$
6	$\mathbb{Q}_3(A_2)$	$A_2$	3	$Q, T$	-	-	$\sqrt{15}xyz$

*continued ...*

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
7	$\mathbb{G}_{2,1}(E)$	$E$	2	$G, M$	-	1	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
8	$\mathbb{G}_{2,2}(E)$					2	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
9	$\mathbb{Q}_{2,1}(E)$	$E$	2	$Q, T$	-	1	$-\frac{x^2}{2} - \frac{y^2}{2} + z^2$
10	$\mathbb{Q}_{2,2}(E)$					2	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
11	$\mathbb{G}_{4,1}(E)$	$E$	4	$G, M$	-	1	$-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$
12	$\mathbb{G}_{4,2}(E)$					2	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
13	$\mathbb{Q}_{4,1}(E)$	$E$	4	$Q, T$	-	1	$-\frac{\sqrt{15}(x^4-12x^2y^2+6x^2z^2+y^4+6y^2z^2-2z^4)}{12}$
14	$\mathbb{Q}_{4,2}(E)$					2	$\frac{\sqrt{5}(x-y)(x+y)(x^2+y^2-6z^2)}{4}$
15	$\mathbb{Q}_{5,1}(E)$	$E$	5	$Q, T$	-	1	$\frac{3\sqrt{35}xyz(x-y)(x+y)}{2}$
16	$\mathbb{Q}_{5,2}(E)$					2	$\frac{\sqrt{105}xyz(x^2+y^2-2z^2)}{2}$
17	$\mathbb{G}_{1,1}(T_1)$	$T_1$	1	$G, M$	-	1	$x$
18	$\mathbb{G}_{1,2}(T_1)$					2	$y$
19	$\mathbb{G}_{1,3}(T_1)$					3	$z$
20	$\mathbb{Q}_{1,1}(T_1)$	$T_1$	1	$Q, T$	-	1	$x$
21	$\mathbb{Q}_{1,2}(T_1)$					2	$y$
22	$\mathbb{Q}_{1,3}(T_1)$					3	$z$
23	$\mathbb{G}_{3,1}(T_1)$	$T_1$	3	$G, M$	-	1	$\frac{x(2x^2-3y^2-3z^2)}{2}$
24	$\mathbb{G}_{3,2}(T_1)$					2	$-\frac{y(3x^2-2y^2+3z^2)}{2}$
25	$\mathbb{G}_{3,3}(T_1)$					3	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
26	$\mathbb{Q}_{3,1}(T_1)$	$T_1$	3	$Q, T$	-	1	$\frac{x(2x^2-3y^2-3z^2)}{2}$
27	$\mathbb{Q}_{3,2}(T_1)$					2	$-\frac{y(3x^2-2y^2+3z^2)}{2}$

continued ...

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
28	$\mathbb{Q}_{3,3}(T_1)$					3	$-\frac{z(3x^2+3y^2-2z^2)}{2}$
29	$\mathbb{G}_{4,1}(T_1)$	$T_1$	4	$G, M$	-	1	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
30	$\mathbb{G}_{4,2}(T_1)$					2	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
31	$\mathbb{G}_{4,3}(T_1)$					3	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
32	$\mathbb{Q}_{4,1}(T_1)$	$T_1$	4	$Q, T$	-	1	$\frac{\sqrt{35}yz(y-z)(y+z)}{2}$
33	$\mathbb{Q}_{4,2}(T_1)$					2	$-\frac{\sqrt{35}xz(x-z)(x+z)}{2}$
34	$\mathbb{Q}_{4,3}(T_1)$					3	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
35	$\mathbb{Q}_{5,1}(T_1, 2)$	$T_1$	5	$Q, T$	2	1	$\frac{3\sqrt{35}x(y^2-2yz-z^2)(y^2+2yz-z^2)}{8}$
36	$\mathbb{Q}_{5,2}(T_1, 2)$					2	$\frac{3\sqrt{35}y(x^2-2xz-z^2)(x^2+2xz-z^2)}{8}$
37	$\mathbb{Q}_{5,3}(T_1, 2)$					3	$\frac{3\sqrt{35}z(x^2-2xy-y^2)(x^2+2xy-y^2)}{8}$
38	$\mathbb{G}_{2,1}(T_2)$	$T_2$	2	$G, M$	-	1	$\sqrt{3}yz$
39	$\mathbb{G}_{2,2}(T_2)$					2	$\sqrt{3}xz$
40	$\mathbb{G}_{2,3}(T_2)$					3	$\sqrt{3}xy$
41	$\mathbb{Q}_{2,1}(T_2)$	$T_2$	2	$Q, T$	-	1	$\sqrt{3}yz$
42	$\mathbb{Q}_{2,2}(T_2)$					2	$\sqrt{3}xz$
43	$\mathbb{Q}_{2,3}(T_2)$					3	$\sqrt{3}xy$
44	$\mathbb{G}_{3,1}(T_2)$	$T_2$	3	$G, M$	-	1	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
45	$\mathbb{G}_{3,2}(T_2)$					2	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$
46	$\mathbb{G}_{3,3}(T_2)$					3	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
47	$\mathbb{Q}_{3,1}(T_2)$	$T_2$	3	$Q, T$	-	1	$\frac{\sqrt{15}x(y-z)(y+z)}{2}$
48	$\mathbb{Q}_{3,2}(T_2)$					2	$-\frac{\sqrt{15}y(x-z)(x+z)}{2}$

continued ...

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
49	$\mathbb{Q}_{3,3}(T_2)$					3	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
50	$\mathbb{G}_{4,1}(T_2)$	$T_2$	4	$G, M$	-	1	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
51	$\mathbb{G}_{4,2}(T_2)$					2	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$
52	$\mathbb{G}_{4,3}(T_2)$					3	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
53	$\mathbb{Q}_{4,1}(T_2)$	$T_2$	4	$Q, T$	-	1	$\frac{\sqrt{5}yz(6x^2-y^2-z^2)}{2}$
54	$\mathbb{Q}_{4,2}(T_2)$					2	$-\frac{\sqrt{5}xz(x^2-6y^2+z^2)}{2}$
55	$\mathbb{Q}_{4,3}(T_2)$					3	$-\frac{\sqrt{5}xy(x^2+y^2-6z^2)}{2}$
56	$\mathbb{Q}_{5,1}(T_2)$	$T_2$	5	$Q, T$	-	1	$\frac{\sqrt{105}x(y-z)(y+z)(2x^2-y^2-z^2)}{4}$
57	$\mathbb{Q}_{5,2}(T_2)$					2	$\frac{\sqrt{105}y(x-z)(x+z)(x^2-2y^2+z^2)}{4}$
58	$\mathbb{Q}_{5,3}(T_2)$					3	$-\frac{\sqrt{105}z(x-y)(x+y)(x^2+y^2-2z^2)}{4}$

— Basis in full matrix —

Table 3: dimension = 8

#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)	#	orbital@atom(SL)
0	$ s, \uparrow\rangle @A(1)$	1	$ s, \downarrow\rangle @A(1)$	2	$ p_x, \uparrow\rangle @A(1)$	3	$ p_x, \downarrow\rangle @A(1)$	4	$ p_y, \uparrow\rangle @A(1)$
5	$ p_y, \downarrow\rangle @A(1)$	6	$ p_z, \uparrow\rangle @A(1)$	7	$ p_z, \downarrow\rangle @A(1)$				

Table 4: Atomic basis (orbital part only)

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

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**SAMB: 604 (all 604)**

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• **A** : 'A' site-cluster

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

\* ket:  $|s, \uparrow\rangle, |s, \downarrow\rangle$

\* wyckoff: **1a**

$$\boxed{\text{z1}} \quad \mathbb{Q}_0^{(c)}(A_1) = \mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_0^{(s)}(A_1)$$

• **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: **1a**

$$\boxed{\text{z2}} \quad \mathbb{G}_0^{(1,1;c)}(A_1) = \mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_0^{(s)}(A_1)$$

$$\boxed{\text{z61}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_0^{(s)}(A_1)}{2}$$

$$\boxed{\text{z62}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_0^{(s)}(A_1)}{2}$$

$$\boxed{\text{z179}} \quad \mathbb{Q}_{1,1}^{(c)}(T_1) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z180}} \quad \mathbb{Q}_{1,2}^{(c)}(T_1) = \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z181}} \quad \mathbb{Q}_{1,3}^{(c)}(T_1) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z182}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_1) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z183}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_1) = \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z184}} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_1) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z386}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z387}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z388}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

• **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: **1a**

$$\boxed{\text{z3}} \quad \mathbb{Q}_0^{(c)}(A_1) = \mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_0^{(s)}(A_1)$$

$$\boxed{\text{z4}} \quad \mathbb{Q}_0^{(1,1;c)}(A_1) = \mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_0^{(s)}(A_1)$$

$$\boxed{\text{z63}} \quad \mathbb{Q}_{2,1}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_0^{(s)}(A_1)}{2}$$

$$\boxed{\text{z64}} \quad \mathbb{Q}_{2,2}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_0^{(s)}(A_1)}{2}$$

$$\boxed{\text{z65}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_0^{(s)}(A_1)}{2}$$

$$\boxed{\text{z66}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_0^{(s)}(A_1)}{2}$$

$$\boxed{\text{z185}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_1) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z186}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_1) = \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z187}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_1) = \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z389}} \quad \mathbb{Q}_{2,1}^{(c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z390}} \quad \mathbb{Q}_{2,2}^{(c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z391}} \quad \mathbb{Q}_{2,3}^{(c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z392}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z393}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

$$\boxed{\text{z394}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(s)}(A_1)}{3}$$

- **A;A\_001\_1 : 'A'-'A' bond-cluster**

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

\* ket:  $|s, \uparrow\rangle, |s, \downarrow\rangle$

\* wyckoff: **3a@3d**

$$\boxed{\text{z5}} \quad \mathbb{Q}_0^{(c)}(A_1) = \mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_0^{(b)}(A_1)$$



$$\boxed{\text{z6}} \quad \mathbb{G}_0^{(1,-1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z67}} \quad \mathbb{Q}_{2,1}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2}$$

$$\boxed{\text{z68}} \quad \mathbb{Q}_{2,2}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z69}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E) = -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z70}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2}$$

$$\boxed{\text{z188}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_1) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z189}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_1) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z190}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_1) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z395}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z396}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z397}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

• **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: **3a@3d**

$$\boxed{\text{z7}} \quad \mathbb{Q}_0^{(c)}(A_1) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z8}} \quad \mathbb{Q}_0^{(1,0;c)}(A_1) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z9}} \quad \mathbb{G}_0^{(1,-1;c)}(A_1) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z10}} \quad \mathbb{G}_0^{(1,1;c)}(A_1) = \mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_0^{(b)}(A_1)$$

$$\boxed{\text{z39}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_2) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2}$$

$$\boxed{\text{z40}} \quad \mathbb{G}_3^{(1,-1;c)}(A_2) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z71}} \quad \mathbb{Q}_{2,1}^{(c)}(E) = -\frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z72}} \quad \mathbb{Q}_{2,2}^{(c)}(E) = \frac{\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2}$$

$$\boxed{\text{z73}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E) = -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{2}$$

$$\boxed{\text{z74}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E) = -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z75}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E) = -\frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z76}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E) = \frac{\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2}$$

$$\boxed{\text{z77}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E, a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2}$$

$$\boxed{\text{z78}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E, a) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2}$$

$$\boxed{\text{z79}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E, b) = \frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z80}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E, b) = -\frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2} - \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2}$$

$$\boxed{\text{z81}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(E) = \frac{\sqrt{2}\mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2}$$

$$\boxed{\text{z82}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(E) = \frac{\sqrt{2}\mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z191}} \quad \mathbb{Q}_{1,1}^{(c)}(T_1, a) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z192}} \quad \mathbb{Q}_{1,2}^{(c)}(T_1, a) = \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z193}} \quad \mathbb{Q}_{1,3}^{(c)}(T_1, a) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z194}} \quad \mathbb{Q}_{1,1}^{(c)}(T_1, b) = -\frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z195}} \quad \mathbb{Q}_{1,2}^{(c)}(T_1, b) = -\frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z196}} \quad \mathbb{Q}_{1,3}^{(c)}(T_1, b) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{3}$$

$$\boxed{\text{z197}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_1) = \frac{\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{2} + \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{6}$$

$$\boxed{\text{z198}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_1) = -\frac{\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{2} + \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{6}$$

$$\boxed{\text{z199}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_1) = -\frac{\sqrt{3}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{3}$$

$$\boxed{\text{z200}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_1, a) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z201}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_1, a) = \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\begin{aligned}
\text{z202} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_1, a) &= \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\text{z203} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_1, b) &= -\frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2} \\
\text{z204} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_1, b) &= -\frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2} \\
\text{z205} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_1, b) &= \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{3} \\
\text{z206} \quad \mathbb{G}_{1,1}^{(c)}(T_1) &= \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\text{z207} \quad \mathbb{G}_{1,2}^{(c)}(T_1) &= -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z208} \quad \mathbb{G}_{1,3}^{(c)}(T_1) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z209} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{30} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} \\
\text{z210} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{30} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{10} - \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} \\
\text{z211} \quad \mathbb{G}_{1,3}^{(1,-1;c)}(T_1) &= \frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} \\
\text{z212} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{15} \\
\text{z213} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{15} \\
\text{z214} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_1) &= \frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{5} - \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{15} \\
\text{z215} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_1) &= \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}
\end{aligned}$$

$$\boxed{\text{z216}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_1) = -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z217}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_1) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z218}} \quad \mathbb{G}_{1,1}^{(1,1;c)}(T_1) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z219}} \quad \mathbb{G}_{1,2}^{(1,1;c)}(T_1) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z220}} \quad \mathbb{G}_{1,3}^{(1,1;c)}(T_1) = \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z398}} \quad \mathbb{Q}_{2,1}^{(c)}(T_2) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z399}} \quad \mathbb{Q}_{2,2}^{(c)}(T_2) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z400}} \quad \mathbb{Q}_{2,3}^{(c)}(T_2) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z401}} \quad \mathbb{Q}_{3,1}^{(c)}(T_2) = -\frac{\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6}$$

$$\boxed{\text{z402}} \quad \mathbb{Q}_{3,2}^{(c)}(T_2) = \frac{\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6}$$

$$\boxed{\text{z403}} \quad \mathbb{Q}_{3,3}^{(c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{3}$$

$$\boxed{\text{z404}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z405}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_2) = -\frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z406}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_2) = -\frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z407}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_2) = -\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{6} + \frac{\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z408}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_2) = -\frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z409}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{3}$$

$$\boxed{\text{z410}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(T_2) = \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z411}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(T_2) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z412}} \quad \mathbb{Q}_{2,3}^{(1,0;c)}(T_2) = \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z413}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_2) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6}$$

$$\boxed{\text{z414}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_2) = \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6}$$

$$\boxed{\text{z415}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{3}$$

$$\boxed{\text{z416}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z417}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z418}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z419}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_2) = -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z420}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z421}} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_2) = -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3}$$

• **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: **3a@3d**

$$\boxed{\text{z11}} \quad \mathbb{Q}_0^{(c)}(A_1, a) = \mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_0^{(b)}(A_1)$$

$$\boxed{\text{z12}} \quad \mathbb{Q}_0^{(c)}(A_1, b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z13}} \quad \mathbb{Q}_0^{(1,-1;c)}(A_1) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z14}} \quad \mathbb{Q}_0^{(1,1;c)}(A_1) = \mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_0^{(b)}(A_1)$$

$$\boxed{\text{z15}} \quad \mathbb{G}_0^{(c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z16}} \quad \mathbb{G}_0^{(1,-1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z17}} \quad \mathbb{G}_4^{(1,-1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z18}} \quad \mathbb{G}_0^{(1,1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z41}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_2) = -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z42}} \quad \mathbb{Q}_3^{(1,0;c)}(A_2) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z43}} \quad \mathbb{G}_3^{(c)}(A_2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2}$$

$$\begin{aligned}
\boxed{\text{z44}} \quad \mathbb{G}_3^{(1,-1;c)}(A_2) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2} \\
\boxed{\text{z83}} \quad \mathbb{Q}_{2,1}^{(c)}(E, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2} \\
\boxed{\text{z84}} \quad \mathbb{Q}_{2,2}^{(c)}(E, a) &= \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2} \\
\boxed{\text{z85}} \quad \mathbb{Q}_{2,1}^{(c)}(E, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2} \\
\boxed{\text{z86}} \quad \mathbb{Q}_{2,2}^{(c)}(E, b) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2} \\
\boxed{\text{z87}} \quad \mathbb{Q}_{2,1}^{(c)}(E, c) &= \frac{\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2} \\
\boxed{\text{z88}} \quad \mathbb{Q}_{2,2}^{(c)}(E, c) &= -\frac{\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2} \\
\boxed{\text{z89}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E, a) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2} \\
\boxed{\text{z90}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E, a) &= \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2} \\
\boxed{\text{z91}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E, b) &= \frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2} \\
\boxed{\text{z92}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E, b) &= -\frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2} \\
\boxed{\text{z93}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2} \\
\boxed{\text{z94}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2} \\
\boxed{\text{z95}} \quad \mathbb{G}_{2,1}^{(c)}(E) &= -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}
\end{aligned}$$



$$\begin{aligned}
\boxed{\text{z96}} \quad \mathbb{G}_{2,2}^{(c)}(E) &= \frac{\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2} \\
\boxed{\text{z97}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E, a) &= -\frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} - \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} - \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} + \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} + \frac{\sqrt{42}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{14} \\
\boxed{\text{z98}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E, a) &= \frac{3\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} - \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{84} - \frac{3\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{84} + \frac{\sqrt{210}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{42} \\
\boxed{\text{z99}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E, b) &= -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\boxed{\text{z100}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E, b) &= \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2} \\
\boxed{\text{z101}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(E) &= -\frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{84} + \frac{3\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{84} - \frac{3\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} + \frac{\sqrt{210}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{42} \\
\boxed{\text{z102}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(E) &= \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} + \frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} - \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} + \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} - \frac{\sqrt{42}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{14} \\
\boxed{\text{z103}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(E) &= -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{2} \\
\boxed{\text{z104}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E) &= -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\boxed{\text{z105}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(E) &= -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\boxed{\text{z106}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(E) &= \frac{\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2} \\
\boxed{\text{z221}} \quad \mathbb{Q}_{1,1}^{(c)}(T_1) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\boxed{\text{z222}} \quad \mathbb{Q}_{1,2}^{(c)}(T_1) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z223}} \quad \mathbb{Q}_{1,3}^{(c)}(T_1) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}
\end{aligned}$$

$$\boxed{\text{z224}} \quad \mathbb{Q}_{4,1}^{(c)}(T_1) = -\frac{\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{6}$$

$$\boxed{\text{z225}} \quad \mathbb{Q}_{4,2}^{(c)}(T_1) = \frac{\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{6}$$

$$\boxed{\text{z226}} \quad \mathbb{Q}_{4,3}^{(c)}(T_1) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{3}$$

$$\boxed{\text{z227}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_1) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z228}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_1) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z229}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_1) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z230}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_1) = -\frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{12}$$

$$\boxed{\text{z231}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_1) = \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{12}$$

$$\boxed{\text{z232}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_1) = -\frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{12}$$

$$\boxed{\text{z233}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(T_1) = -\frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{6}$$

$$\boxed{\text{z234}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(T_1) = \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{6}$$

$$\boxed{\text{z235}} \quad \mathbb{Q}_{4,3}^{(1,-1;c)}(T_1) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{3}$$

$$\boxed{\text{z236}} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_1) = -\frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{30} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{10}$$

$$\boxed{\text{z237}} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_1) = -\frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{30} + \frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{10} - \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{10}$$

$$\begin{aligned}
\boxed{\text{z238}} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_1) &= \frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} + \frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} \\
\boxed{\text{z239}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_1) &= -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} + \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{15} \\
\boxed{\text{z240}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_1) &= -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{15} \\
\boxed{\text{z241}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_1) &= \frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{5} - \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{15} \\
\boxed{\text{z242}} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(T_1) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\boxed{\text{z243}} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(T_1) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z244}} \quad \mathbb{Q}_{1,3}^{(1,1;c)}(T_1) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z245}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_1) &= \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{4} \\
\boxed{\text{z246}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{4} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{4} \\
\boxed{\text{z247}} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_1) &= \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{4} \\
\boxed{\text{z248}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_1, a) &= \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\boxed{\text{z249}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_1, a) &= \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\boxed{\text{z250}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_1, a) &= \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\boxed{\text{z251}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_1, b) &= -\frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} + \frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2}
\end{aligned}$$

$$\boxed{\text{z252}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_1, b) = -\frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z253}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_1, b) = \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{3}$$

$$\boxed{\text{z422}} \quad \mathbb{Q}_{2,1}^{(c)}(T_2, a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z423}} \quad \mathbb{Q}_{2,2}^{(c)}(T_2, a) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z424}} \quad \mathbb{Q}_{2,3}^{(c)}(T_2, a) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z425}} \quad \mathbb{Q}_{2,1}^{(c)}(T_2, b) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z426}} \quad \mathbb{Q}_{2,2}^{(c)}(T_2, b) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z427}} \quad \mathbb{Q}_{2,3}^{(c)}(T_2, b) = -\frac{\sqrt{3}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{3}$$

$$\boxed{\text{z428}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_2, a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z429}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_2, a) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z430}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_2, a) = \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z431}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_2, b) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z432}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_2, b) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z433}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_2, b) = -\frac{\sqrt{3}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{3}$$

$$\begin{aligned}
\text{z434} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_2) &= \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} \\
\text{z435} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_2) &= \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} \\
\text{z436} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_2) &= \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\text{z437} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(T_2) &= -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} \\
\text{z438} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(T_2) &= \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2} - \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} \\
\text{z439} \quad \mathbb{Q}_{2,3}^{(1,0;c)}(T_2) &= \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{3} \\
\text{z440} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_2) &= -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} \\
\text{z441} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_2) &= \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} \\
\text{z442} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_2) &= -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} \\
\text{z443} \quad \mathbb{G}_{2,1}^{(c)}(T_2) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\text{z444} \quad \mathbb{G}_{2,2}^{(c)}(T_2) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z445} \quad \mathbb{G}_{2,3}^{(c)}(T_2) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z446} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_2, a) &= -\frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{21} - \frac{\sqrt{21}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{21} - \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{21} \\
\text{z447} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_2, a) &= -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{21} - \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{21} - \frac{\sqrt{21}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{21}
\end{aligned}$$

$$\begin{aligned}
\text{z448} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_2, a) &= -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{21} - \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{21} - \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{21} \\
\text{z449} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\text{z450} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z451} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z452} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{84} - \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{28} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{84} + \frac{3\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} + \frac{\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{7} \\
\text{z453} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{84} + \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{28} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{84} - \frac{3\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} + \frac{\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{7} \\
\text{z454} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{84} - \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{84} + \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} + \frac{\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{7} \\
\text{z455} \quad \mathbb{G}_{2,1}^{(1,0;c)}(T_2) &= \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\text{z456} \quad \mathbb{G}_{2,2}^{(1,0;c)}(T_2) &= -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z457} \quad \mathbb{G}_{2,3}^{(1,0;c)}(T_2) &= -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z458} \quad \mathbb{G}_{2,1}^{(1,1;c)}(T_2) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\text{z459} \quad \mathbb{G}_{2,2}^{(1,1;c)}(T_2) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z460} \quad \mathbb{G}_{2,3}^{(1,1;c)}(T_2) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}
\end{aligned}$$

• A;A\_002\_1 : 'A'-'A' bond-cluster

\* bra:  $\langle s, \uparrow |, \langle s, \downarrow |$   
 \* ket:  $|s, \uparrow\rangle, |s, \downarrow\rangle$   
 \* wyckoff: **6b03c**

$$\boxed{\text{z19}} \quad \mathbb{Q}_0^{(c)}(A_1) = \mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_0^{(b)}(A_1)$$

$$\boxed{\text{z20}} \quad \mathbb{G}_0^{(1,-1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z45}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_2) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z107}} \quad \mathbb{Q}_{2,1}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2}$$

$$\boxed{\text{z108}} \quad \mathbb{Q}_{2,2}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z109}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E, a) = -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z110}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E, a) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2}$$

$$\boxed{\text{z111}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E, b) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{2}$$

$$\boxed{\text{z112}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E, b) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z254}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_1, a) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z255}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_1, a) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z256}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_1, a) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z257}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_1, b) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z258}} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_1, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z259}} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_1, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z461}} \quad \mathbb{Q}_{2,1}^{(c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z462}} \quad \mathbb{Q}_{2,2}^{(c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z463}} \quad \mathbb{Q}_{2,3}^{(c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z464}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z465}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_2) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z466}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z467}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z468}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z469}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

• **A;A\_002\_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: **6b@3c**

$$\boxed{\text{z21}} \quad \mathbb{Q}_0^{(c)}(A_1) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$



$$\boxed{\text{z22}} \quad \mathbb{Q}_0^{(1,-1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z23}} \quad \mathbb{Q}_0^{(1,0;c)}(A_1) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z24}} \quad \mathbb{G}_0^{(1,-1;c)}(A_1) = \frac{\sqrt{5}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{5} + \frac{\sqrt{5}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{5} + \frac{\sqrt{5}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{5}$$

$$\boxed{\text{z25}} \quad \mathbb{G}_4^{(1,-1;c)}(A_1) = \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15} - \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15}$$

$$\boxed{\text{z26}} \quad \mathbb{G}_0^{(1,1;c)}(A_1) = \mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_0^{(b)}(A_1)$$

$$\boxed{\text{z46}} \quad \mathbb{Q}_3^{(c)}(A_2) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z47}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_2) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2}$$

$$\boxed{\text{z48}} \quad \mathbb{Q}_3^{(1,0;c)}(A_2) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z49}} \quad \mathbb{G}_3^{(c)}(A_2) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z50}} \quad \mathbb{G}_3^{(1,-1;c)}(A_2) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z51}} \quad \mathbb{G}_3^{(1,0;c)}(A_2) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z113}} \quad \mathbb{Q}_{2,1}^{(c)}(E, a) = -\frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z114}} \quad \mathbb{Q}_{2,2}^{(c)}(E, a) = \frac{\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2}$$

$$\boxed{\text{z115}} \quad \mathbb{Q}_{2,1}^{(c)}(E, b) = \frac{\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{2}$$

$$\begin{aligned}
\text{z116} \quad \mathbb{Q}_{2,2}^{(c)}(E, b) &= \frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{3}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} \\
\text{z117} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E, a) &= -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{2} \\
\text{z118} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E, a) &= -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\text{z119} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E, b) &= \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{3}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} \\
\text{z120} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E, b) &= -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{2} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{2} \\
\text{z121} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E, a) &= -\frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\text{z122} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E, a) &= \frac{\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2} \\
\text{z123} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E, b) &= \frac{\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{2} \\
\text{z124} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E, b) &= \frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{3}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} \\
\text{z125} \quad \mathbb{G}_{2,1}^{(c)}(E) &= \frac{\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{2} \\
\text{z126} \quad \mathbb{G}_{2,2}^{(c)}(E) &= \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3} \\
\text{z127} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E, a) &= \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2} \\
\text{z128} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E, a) &= \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2} \\
\text{z129} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E, b) &= \frac{\sqrt{7}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{7} + \frac{\sqrt{7}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} - \frac{\sqrt{7}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{7} + \frac{\sqrt{7}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} - \frac{\sqrt{7}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{7}
\end{aligned}$$

$$\begin{aligned}
\boxed{\text{z130}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E, b) &= -\frac{\sqrt{7}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{7} - \frac{\sqrt{21}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} - \frac{\sqrt{7}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{7} + \frac{\sqrt{21}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} \\
\boxed{\text{z131}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(E) &= \frac{\sqrt{21}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{14} - \frac{\sqrt{21}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{21} - \frac{\sqrt{21}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{14} - \frac{\sqrt{21}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{21} + \frac{2\sqrt{21}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21} \\
\boxed{\text{z132}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(E) &= -\frac{\sqrt{21}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{14} + \frac{\sqrt{7}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{7} - \frac{\sqrt{21}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{14} - \frac{\sqrt{7}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{7} \\
\boxed{\text{z133}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(E) &= \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{2} \\
\boxed{\text{z134}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E) &= \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3} \\
\boxed{\text{z135}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(E) &= \frac{\sqrt{2}\mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2} \\
\boxed{\text{z136}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(E) &= \frac{\sqrt{2}\mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2} \\
\boxed{\text{z260}} \quad \mathbb{Q}_{1,1}^{(c)}(T_1, a) &= \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\boxed{\text{z261}} \quad \mathbb{Q}_{1,2}^{(c)}(T_1, a) &= \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\boxed{\text{z262}} \quad \mathbb{Q}_{1,3}^{(c)}(T_1, a) &= \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\boxed{\text{z263}} \quad \mathbb{Q}_{1,1}^{(c)}(T_1, b) &= -\frac{\sqrt{30}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{30} + \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{10} \\
\boxed{\text{z264}} \quad \mathbb{Q}_{1,2}^{(c)}(T_1, b) &= \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{10} - \frac{\sqrt{30}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{30} - \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{10} \\
\boxed{\text{z265}} \quad \mathbb{Q}_{1,3}^{(c)}(T_1, b) &= \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{10} + \frac{\sqrt{30}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{15} \\
\boxed{\text{z266}} \quad \mathbb{Q}_{3,1}^{(c)}(T_1) &= -\frac{\sqrt{5}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{10} + \frac{\sqrt{15}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} - \frac{\sqrt{15}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15}
\end{aligned}$$

$$\begin{aligned}
\boxed{z267} \quad \mathbb{Q}_{3,2}^{(c)}(T_1) &= -\frac{\sqrt{15}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} - \frac{\sqrt{5}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} \\
\boxed{z268} \quad \mathbb{Q}_{3,3}^{(c)}(T_1) &= -\frac{\sqrt{15}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} + \frac{\sqrt{5}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{5} \\
\boxed{z269} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{10} + \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{30} \\
&\quad - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{30} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{30} + \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{30} \\
\boxed{z270} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_1) &= \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{10} + \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{30} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{30} \\
&\quad - \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{10} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{30} - \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{30} \\
\boxed{z271} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{30} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{30} - \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{15} \\
\boxed{z272} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_1) &= \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{20} - \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{20} - \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{60} \\
&\quad + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{60} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15} \\
\boxed{z273} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{20} + \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{60} \\
&\quad + \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{20} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{60} - \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} \\
\boxed{z274} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{30} + \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{30} \\
\boxed{z275} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(T_1) &= -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{2} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{z276} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(T_1) &= \frac{\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{2} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\boxed{z277} \quad \mathbb{Q}_{4,3}^{(1,-1;c)}(T_1) &= \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{M}_{2,3}^{(b)}(T_2)}{3}
\end{aligned}$$

$$\begin{aligned}
\text{z278} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_1, a) &= \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\text{z279} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_1, a) &= \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\text{z280} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_1, a) &= \frac{\sqrt{3}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\text{z281} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_1, b) &= -\frac{\sqrt{30}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{30} + \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{10} \\
\text{z282} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_1, b) &= \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{10} - \frac{\sqrt{30}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{30} - \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{10} \\
\text{z283} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_1, b) &= \frac{\sqrt{10}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{10} + \frac{\sqrt{30}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{15} \\
\text{z284} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_1) &= -\frac{\sqrt{5}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{10} + \frac{\sqrt{15}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} - \frac{\sqrt{15}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15} \\
\text{z285} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_1) &= -\frac{\sqrt{15}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} - \frac{\sqrt{5}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} \\
\text{z286} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_1) &= -\frac{\sqrt{15}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15} - \frac{\sqrt{15}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} + \frac{\sqrt{5}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{5} \\
\text{z287} \quad \mathbb{G}_{1,1}^{(c)}(T_1, a) &= \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\text{z288} \quad \mathbb{G}_{1,2}^{(c)}(T_1, a) &= -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z289} \quad \mathbb{G}_{1,3}^{(c)}(T_1, a) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z290} \quad \mathbb{G}_{1,1}^{(c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\text{z291} \quad \mathbb{G}_{1,2}^{(c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6}
\end{aligned}$$

$$\begin{aligned}
\text{z292} \quad \mathbb{G}_{1,3}^{(c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\text{z293} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(T_1, a) &= -\frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{30} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} \\
\text{z294} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(T_1, a) &= -\frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{30} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{10} - \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} \\
\text{z295} \quad \mathbb{G}_{1,3}^{(1,-1;c)}(T_1, a) &= \frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} \\
\text{z296} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(T_1, b) &= -\frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\text{z297} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} - \frac{\sqrt{6}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\text{z298} \quad \mathbb{G}_{1,3}^{(1,-1;c)}(T_1, b) &= -\frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\text{z299} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{15} \\
\text{z300} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{15} \\
\text{z301} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_1) &= \frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{5} - \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{15} \\
\text{z302} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{4} - \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{4} - \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{12} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{12} \\
\text{z303} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(T_1) &= \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{4} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{12} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{4} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{12} \\
\text{z304} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_1) &= \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{6} \\
\text{z305} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_1, a) &= \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}
\end{aligned}$$

$$\begin{aligned}
\boxed{\text{z306}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_1, a) &= -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z307}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_1, a) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z308}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\boxed{\text{z309}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{\text{z310}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{\text{z311}} \quad \mathbb{G}_{1,1}^{(1,1;c)}(T_1) &= \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} \\
\boxed{\text{z312}} \quad \mathbb{G}_{1,2}^{(1,1;c)}(T_1) &= \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} \\
\boxed{\text{z313}} \quad \mathbb{G}_{1,3}^{(1,1;c)}(T_1) &= \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\boxed{\text{z470}} \quad \mathbb{Q}_{2,1}^{(c)}(T_2, a) &= \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\boxed{\text{z471}} \quad \mathbb{Q}_{2,2}^{(c)}(T_2, a) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z472}} \quad \mathbb{Q}_{2,3}^{(c)}(T_2, a) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z473}} \quad \mathbb{Q}_{2,1}^{(c)}(T_2, b) &= -\frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\boxed{\text{z474}} \quad \mathbb{Q}_{2,2}^{(c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{\text{z475}} \quad \mathbb{Q}_{2,3}^{(c)}(T_2, b) &= -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6}
\end{aligned}$$

$$\begin{aligned}
\text{z476} \quad \mathbb{Q}_{3,1}^{(c)}(T_2) &= -\frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3} - \frac{\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3} \\
\text{z477} \quad \mathbb{Q}_{3,2}^{(c)}(T_2) &= -\frac{\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3} \\
\text{z478} \quad \mathbb{Q}_{3,3}^{(c)}(T_2) &= \frac{\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3} - \frac{\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3} + \frac{\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{3} \\
\text{z479} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_2, a) &= \frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\text{z480} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_2, a) &= -\frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z481} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_2, a) &= -\frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z482} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{30} - \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{10} \\
\text{z483} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{30} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{10} \\
\text{z484} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_2, b) &= -\frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{M}_{2,3}^{(b)}(T_2)}{15} + \frac{\sqrt{10}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{10} \\
\text{z485} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_2) &= \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{12} - \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{12} + \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{4} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{4} \\
\text{z486} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_2) &= \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{12} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{4} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{12} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{4} \\
\text{z487} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{6} \\
\text{z488} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{10} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{10} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{15} + \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{15} \\
\text{z489} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{10} + \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{15} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{10} + \frac{\sqrt{15}\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{15}
\end{aligned}$$



$$\begin{aligned}
\boxed{\text{z490}} \quad \mathbb{Q}_{4,3}^{(1,-1;c)}(T_2) &= \frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{M}_{2,3}^{(b)}(T_2)}{5} + \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{15} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{15} \\
\boxed{\text{z491}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(T_2, a) &= \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\boxed{\text{z492}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(T_2, a) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z493}} \quad \mathbb{Q}_{2,3}^{(1,0;c)}(T_2, a) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z494}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(T_2, b) &= -\frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\boxed{\text{z495}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,3}^{(1,0;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{\text{z496}} \quad \mathbb{Q}_{2,3}^{(1,0;c)}(T_2, b) &= -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{\text{z497}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_2) &= -\frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3} - \frac{\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3} \\
\boxed{\text{z498}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_2) &= -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3} \\
\boxed{\text{z499}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_2) &= \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3} + \frac{\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{3} \\
\boxed{\text{z500}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(T_2) &= \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} \\
\boxed{\text{z501}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(T_2) &= \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} \\
\boxed{\text{z502}} \quad \mathbb{Q}_{2,3}^{(1,1;c)}(T_2) &= \frac{\sqrt{3}\mathbb{M}_0^{(1,1;a)}(A_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} \\
\boxed{\text{z503}} \quad \mathbb{G}_{2,1}^{(c)}(T_2) &= -\frac{\sqrt{6}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{6}
\end{aligned}$$

$$\boxed{\text{z504}} \quad \mathbb{G}_{2,2}^{(c)}(T_2) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z505}} \quad \mathbb{G}_{2,3}^{(c)}(T_2) = -\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{3}$$

$$\boxed{\text{z506}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_2, a) = \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z507}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_2, a) = \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z508}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_2, a) = \frac{\sqrt{3}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z509}} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_2, b) = \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{42} + \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{42} - \frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{14} \\ - \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14}$$

$$\boxed{\text{z510}} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_2, b) = \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{42} + \frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} \\ + \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{42} + \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{14} + \frac{\sqrt{14}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14}$$

$$\boxed{\text{z511}} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_2, b) = -\frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21} + \frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} - \frac{\sqrt{42}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{21}$$

$$\boxed{\text{z512}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_2) = -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z513}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_2) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\mathbb{M}_{2,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z514}} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_2) = -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z515}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_2) = -\frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{28} - \frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{28} + \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{28} \\ + \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{28} + \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21} + \frac{\sqrt{42}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{21}$$

$$\begin{aligned}
\text{z516} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{28} + \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21} - \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{28} \\
&\quad - \frac{\sqrt{14}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{28} - \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{28} + \frac{\sqrt{42}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{21} \\
\text{z517} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_2) &= \frac{\sqrt{14}\mathbb{G}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{14} + \frac{\sqrt{42}\mathbb{G}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{21} + \frac{\sqrt{42}\mathbb{G}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{21} + \frac{\sqrt{14}\mathbb{G}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{14} \\
\text{z518} \quad \mathbb{G}_{2,1}^{(1,0;c)}(T_2) &= -\frac{\sqrt{6}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{6} \\
\text{z519} \quad \mathbb{G}_{2,2}^{(1,0;c)}(T_2) &= \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{6} \\
\text{z520} \quad \mathbb{G}_{2,3}^{(1,0;c)}(T_2) &= -\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{Q}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{3} \\
\text{z521} \quad \mathbb{G}_{2,1}^{(1,1;c)}(T_2) &= \frac{\sqrt{3}\mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3} \\
\text{z522} \quad \mathbb{G}_{2,2}^{(1,1;c)}(T_2) &= \frac{\sqrt{3}\mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3} \\
\text{z523} \quad \mathbb{G}_{2,3}^{(1,1;c)}(T_2) &= \frac{\sqrt{3}\mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3}
\end{aligned}$$

• **A;A\_002\_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: **6b03c**

$$\begin{aligned}
\text{z27} \quad \mathbb{Q}_0^{(c)}(A_1, a) &= \mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_0^{(b)}(A_1) \\
\text{z28} \quad \mathbb{Q}_0^{(c)}(A_1, b) &= \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{5} \\
\text{z29} \quad \mathbb{Q}_4^{(c)}(A_1) &= \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15}
\end{aligned}$$

$$\begin{aligned}
\boxed{\text{z30}} \quad \mathbb{Q}_0^{(1,-1;c)}(A_1) &= \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{5} \\
\boxed{\text{z31}} \quad \mathbb{Q}_4^{(1,-1;c)}(A_1) &= \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} \\
\boxed{\text{z32}} \quad \mathbb{Q}_0^{(1,1;c)}(A_1) &= \mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_0^{(b)}(A_1) \\
\boxed{\text{z33}} \quad \mathbb{G}_0^{(c)}(A_1) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\boxed{\text{z34}} \quad \mathbb{G}_0^{(1,-1;c)}(A_1) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\boxed{\text{z35}} \quad \mathbb{G}_4^{(1,-1;c)}(A_1, a) &= \frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\boxed{\text{z36}} \quad \mathbb{G}_4^{(1,-1;c)}(A_1, b) &= -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} \\
\boxed{\text{z37}} \quad \mathbb{G}_0^{(1,0;c)}(A_1) &= \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} \\
\boxed{\text{z38}} \quad \mathbb{G}_0^{(1,1;c)}(A_1) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\boxed{\text{z52}} \quad \mathbb{Q}_3^{(c)}(A_2) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} \\
\boxed{\text{z53}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_2, a) &= -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\boxed{\text{z54}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_2, b) &= -\frac{\sqrt{3}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} - \frac{\sqrt{3}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} \\
\boxed{\text{z55}} \quad \mathbb{Q}_3^{(1,-1;c)}(A_2, c) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} \\
\boxed{\text{z56}} \quad \mathbb{Q}_3^{(1,0;c)}(A_2) &= \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}
\end{aligned}$$

$$\boxed{\text{z57}} \quad \mathbb{Q}_3^{(1,1;c)}(A_2) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z58}} \quad \mathbb{G}_3^{(c)}(A_2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2}$$

$$\boxed{\text{z59}} \quad \mathbb{G}_3^{(1,-1;c)}(A_2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{2}$$

$$\boxed{\text{z60}} \quad \mathbb{G}_3^{(1,0;c)}(A_2) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z137}} \quad \mathbb{Q}_{2,1}^{(c)}(E, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2}$$

$$\boxed{\text{z138}} \quad \mathbb{Q}_{2,2}^{(c)}(E, a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2}$$

$$\boxed{\text{z139}} \quad \mathbb{Q}_{2,1}^{(c)}(E, b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2}$$

$$\boxed{\text{z140}} \quad \mathbb{Q}_{2,2}^{(c)}(E, b) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2}$$

$$\boxed{\text{z141}} \quad \mathbb{Q}_{2,1}^{(c)}(E, c) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{7} + \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{7} + \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{7}$$

$$\boxed{\text{z142}} \quad \mathbb{Q}_{2,2}^{(c)}(E, c) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{7} - \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{7} + \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14}$$

$$\boxed{\text{z143}} \quad \mathbb{Q}_{4,1}^{(c)}(E) = \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{14} - \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{21} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{14} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{21} + \frac{2\sqrt{21}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21}$$

$$\boxed{\text{z144}} \quad \mathbb{Q}_{4,2}^{(c)}(E) = -\frac{\sqrt{21}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{14} + \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{7} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{7}$$

$$\boxed{\text{z145}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E, a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2}$$

$$\boxed{\text{z146}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E, a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_0^{(b)}(A_1)}{2}$$

$$\begin{aligned}
\text{z147} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(E,b) &= \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{7} + \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{7} + \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{7} \\
\text{z148} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(E,b) &= -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{7} - \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{7} + \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} \\
\text{z149} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(E) &= \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{14} - \frac{\sqrt{21}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{21} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{14} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{21} + \frac{2\sqrt{21}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21} \\
\text{z150} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(E) &= -\frac{\sqrt{21}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E)}{14} + \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{7} - \frac{\sqrt{21}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{7} \\
\text{z151} \quad \mathbb{Q}_{5,1}^{(1,-1;c)}(E) &= \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{28} - \frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{28} - \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{28} - \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{28} + \frac{\sqrt{42}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{14} \\
\text{z152} \quad \mathbb{Q}_{5,2}^{(1,-1;c)}(E) &= \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{84} + \frac{3\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{28} + \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{84} - \frac{3\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{28} - \frac{\sqrt{210}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{42} \\
\text{z153} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(E) &= \frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{2} \\
\text{z154} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(E) &= \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3} \\
\text{z155} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(E) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E)}{2} \\
\text{z156} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(E) &= \frac{\sqrt{2}\mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E)}{2} \\
\text{z157} \quad \mathbb{G}_{2,1}^{(c)}(E,a) &= -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\text{z158} \quad \mathbb{G}_{2,2}^{(c)}(E,a) &= \frac{\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2} \\
\text{z159} \quad \mathbb{G}_{2,1}^{(c)}(E,b) &= \frac{\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{2} \\
\text{z160} \quad \mathbb{G}_{2,2}^{(c)}(E,b) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3}
\end{aligned}$$

$$\begin{aligned}
\text{z161} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E,a) &= -\frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} - \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} - \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} + \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} + \frac{\sqrt{42}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{14} \\
\text{z162} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E,a) &= \frac{3\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} - \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{84} - \frac{3\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{84} + \frac{\sqrt{210}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{42} \\
\text{z163} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E,b) &= -\frac{3\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{28} - \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{84} + \frac{3\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{28} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{84} + \frac{\sqrt{210}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{42} \\
\text{z164} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E,b) &= -\frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{28} + \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{28} - \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{28} - \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{28} + \frac{\sqrt{42}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{14} \\
\text{z165} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E,c) &= -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\text{z166} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E,c) &= \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2} \\
\text{z167} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(E,d) &= \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{2} \\
\text{z168} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(E,d) &= \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} \\
\text{z169} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(E) &= -\frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{84} + \frac{3\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{84} - \frac{3\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} + \frac{\sqrt{210}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{42} \\
\text{z170} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(E) &= \frac{\sqrt{70}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} + \frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} - \frac{\sqrt{70}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} + \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} - \frac{\sqrt{42}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{14} \\
\text{z171} \quad \mathbb{G}_{2,1}^{(1,0;c)}(E,a) &= -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{2} \\
\text{z172} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E,a) &= -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\text{z173} \quad \mathbb{G}_{2,1}^{(1,0;c)}(E,b) &= \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} \\
\text{z174} \quad \mathbb{G}_{2,2}^{(1,0;c)}(E,b) &= -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{2} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{2}
\end{aligned}$$

$$\boxed{\text{z175}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(E, a) = -\frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{3}$$

$$\boxed{\text{z176}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(E, a) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{2}$$

$$\boxed{\text{z177}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(E, b) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{2}$$

$$\boxed{\text{z178}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(E, b) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{3}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z314}} \quad \mathbb{Q}_{1,1}^{(c)}(T_1, a) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z315}} \quad \mathbb{Q}_{1,2}^{(c)}(T_1, a) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z316}} \quad \mathbb{Q}_{1,3}^{(c)}(T_1, a) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z317}} \quad \mathbb{Q}_{1,1}^{(c)}(T_1, b) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z318}} \quad \mathbb{Q}_{1,2}^{(c)}(T_1, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z319}} \quad \mathbb{Q}_{1,3}^{(c)}(T_1, b) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z320}} \quad \mathbb{Q}_{4,1}^{(c)}(T_1) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{4} - \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{12} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{12}$$

$$\boxed{\text{z321}} \quad \mathbb{Q}_{4,2}^{(c)}(T_1) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{12}$$

$$\boxed{\text{z322}} \quad \mathbb{Q}_{4,3}^{(c)}(T_1) = \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{6}$$

$$\boxed{\text{z323}} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_1, a) = -\frac{\sqrt{2}\mathbb{I}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{21} - \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{21} - \frac{\sqrt{2}\mathbb{I}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{21} + \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{21}$$



$$\begin{aligned}
\text{z324} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_1, a) &= -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{21} + \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{21} - \frac{\sqrt{21}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{21} - \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{21} \\
\text{z325} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_1, a) &= -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{21} - \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{21} - \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{21} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{21} \\
\text{z326} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\text{z327} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_1, b) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z328} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z329} \quad \mathbb{Q}_{1,1}^{(1,-1;c)}(T_1, c) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\text{z330} \quad \mathbb{Q}_{1,2}^{(1,-1;c)}(T_1, c) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\text{z331} \quad \mathbb{Q}_{1,3}^{(1,-1;c)}(T_1, c) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\text{z332} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_1, a) &= -\frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} \\
\text{z333} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_1, a) &= \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} \\
\text{z334} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_1, a) &= -\frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} \\
\text{z335} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_1, b) &= -\frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{84} - \frac{5\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{84} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{84} + \frac{5\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{84} - \frac{4\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{21} \\
\text{z336} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_1, b) &= -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{84} + \frac{5\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{84} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{84} - \frac{5\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{84} - \frac{4\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{21} \\
\text{z337} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_1, b) &= -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{84} - \frac{5\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{84} - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{84} + \frac{5\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{84} - \frac{4\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{21}
\end{aligned}$$

$$\begin{aligned}
\text{z338} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(T_1) &= -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{4} - \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{12} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{12} \\
\text{z339} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(T_1) &= \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{12} \\
\text{z340} \quad \mathbb{Q}_{4,3}^{(1,-1;c)}(T_1) &= \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{6} \\
\text{z341} \quad \mathbb{Q}_{5,1}^{(1,-1;c)}(T_1, 2) &= \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{4} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{12} + \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{4} \\
\text{z342} \quad \mathbb{Q}_{5,2}^{(1,-1;c)}(T_1, 2) &= \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{12} + \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{4} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{4} \\
\text{z343} \quad \mathbb{Q}_{5,3}^{(1,-1;c)}(T_1, 2) &= \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{4} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{12} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{4} \\
\text{z344} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_1, a) &= -\frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{30} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} \\
\text{z345} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_1, a) &= -\frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{30} + \frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{10} - \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} \\
\text{z346} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_1, a) &= \frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} + \frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} + \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} \\
\text{z347} \quad \mathbb{Q}_{1,1}^{(1,0;c)}(T_1, b) &= -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\text{z348} \quad \mathbb{Q}_{1,2}^{(1,0;c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{2}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\text{z349} \quad \mathbb{Q}_{1,3}^{(1,0;c)}(T_1, b) &= -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\text{z350} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_1, a) &= -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} + \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{15} \\
\text{z351} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_1, a) &= -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{15}
\end{aligned}$$

$$\begin{aligned}
\text{z352} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_1, a) &= \frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{5} - \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{15} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{15} \\
\text{z353} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_1, b) &= \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} + \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} \\
\text{z354} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_1, b) &= -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} \\
\text{z355} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_1, b) &= -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{3} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{M}_{2,3}^{(b)}(T_2)}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{3} \\
\text{z356} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(T_1, a) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\text{z357} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(T_1, a) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z358} \quad \mathbb{Q}_{1,3}^{(1,1;c)}(T_1, a) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z359} \quad \mathbb{Q}_{1,1}^{(1,1;c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\text{z360} \quad \mathbb{Q}_{1,2}^{(1,1;c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\text{z361} \quad \mathbb{Q}_{1,3}^{(1,1;c)}(T_1, b) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\text{z362} \quad \mathbb{G}_{1,1}^{(c)}(T_1) &= -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{30} + \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{30} \\
\text{z363} \quad \mathbb{G}_{1,2}^{(c)}(T_1) &= \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{30} - \frac{\sqrt{10}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{30} \\
\text{z364} \quad \mathbb{G}_{1,3}^{(c)}(T_1) &= -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{30} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{15} \\
\text{z365} \quad \mathbb{G}_{3,1}^{(c)}(T_1) &= \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{20} - \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{20} - \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{60} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{60} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15}
\end{aligned}$$

$$\boxed{\text{z366}} \quad \mathbb{G}_{3,2}^{(c)}(T_1) = -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{20} + \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{60} + \frac{\sqrt{10}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{20} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{60} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15}$$

$$\boxed{\text{z367}} \quad \mathbb{G}_{3,3}^{(c)}(T_1) = -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{30} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{30}$$

$$\boxed{\text{z368}} \quad \mathbb{G}_{1,1}^{(1,-1;c)}(T_1) = -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{30} \\ - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{30} + \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{30}$$

$$\boxed{\text{z369}} \quad \mathbb{G}_{1,2}^{(1,-1;c)}(T_1) = \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{30} \\ - \frac{\sqrt{10}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{10} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{30}$$

$$\boxed{\text{z370}} \quad \mathbb{G}_{1,3}^{(1,-1;c)}(T_1) = -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{30} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{30} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{15}$$

$$\boxed{\text{z371}} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_1) = \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{20} - \frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{20} - \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{60} \\ + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{60} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15}$$

$$\boxed{\text{z372}} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_1) = -\frac{\sqrt{10}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{20} + \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{60} \\ + \frac{\sqrt{10}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{20} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{60} - \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15}$$

$$\boxed{\text{z373}} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_1) = -\frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{30} + \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} + \frac{\sqrt{30}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{30}$$

$$\boxed{\text{z374}} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_1) = \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{4}$$

$$\boxed{\text{z375}} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(T_1) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{4} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{4}$$

$$\boxed{\text{z376}} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_1) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{4} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{4}$$

$$\boxed{\text{z377}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_1, a) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z378}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_1, a) = \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z379}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_1, a) = \frac{\sqrt{3}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z380}} \quad \mathbb{G}_{1,1}^{(1,0;c)}(T_1, b) = -\frac{\sqrt{30}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{30} + \frac{\sqrt{10}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{10}$$

$$\boxed{\text{z381}} \quad \mathbb{G}_{1,2}^{(1,0;c)}(T_1, b) = \frac{\sqrt{10}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{10} - \frac{\sqrt{30}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{30} - \frac{\sqrt{10}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{10}$$

$$\boxed{\text{z382}} \quad \mathbb{G}_{1,3}^{(1,0;c)}(T_1, b) = \frac{\sqrt{10}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{10} + \frac{\sqrt{10}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{10} + \frac{\sqrt{30}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{15}$$

$$\boxed{\text{z383}} \quad \mathbb{G}_{3,1}^{(1,0;c)}(T_1) = -\frac{\sqrt{5}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{10} + \frac{\sqrt{15}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} - \frac{\sqrt{15}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15}$$

$$\boxed{\text{z384}} \quad \mathbb{G}_{3,2}^{(1,0;c)}(T_1) = -\frac{\sqrt{15}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{15} - \frac{\sqrt{5}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15}$$

$$\boxed{\text{z385}} \quad \mathbb{G}_{3,3}^{(1,0;c)}(T_1) = -\frac{\sqrt{15}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{15} - \frac{\sqrt{15}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{15} + \frac{\sqrt{5}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{5}$$

$$\boxed{\text{z524}} \quad \mathbb{Q}_{2,1}^{(c)}(T_2, a) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z525}} \quad \mathbb{Q}_{2,2}^{(c)}(T_2, a) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z526}} \quad \mathbb{Q}_{2,3}^{(c)}(T_2, a) = \frac{\sqrt{3}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z527}} \quad \mathbb{Q}_{2,1}^{(c)}(T_2, b) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\boxed{\text{z528}} \quad \mathbb{Q}_{2,2}^{(c)}(T_2, b) = \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}$$

$$\begin{aligned}
\boxed{\text{z529}} \quad \mathbb{Q}_{2,3}^{(c)}(T_2, b) &= \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\boxed{\text{z530}} \quad \mathbb{Q}_{2,1}^{(c)}(T_2, c) &= \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{42} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{42} - \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{14} - \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} \\
\boxed{\text{z531}} \quad \mathbb{Q}_{2,2}^{(c)}(T_2, c) &= \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{42} + \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{42} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} \\
\boxed{\text{z532}} \quad \mathbb{Q}_{2,3}^{(c)}(T_2, c) &= -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21} + \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} - \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{21} \\
\boxed{\text{z533}} \quad \mathbb{Q}_{3,1}^{(c)}(T_2) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\boxed{\text{z534}} \quad \mathbb{Q}_{3,2}^{(c)}(T_2) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{\text{z535}} \quad \mathbb{Q}_{3,3}^{(c)}(T_2) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{\text{z536}} \quad \mathbb{Q}_{4,1}^{(c)}(T_2) &= -\frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{28} - \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21} + \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{21} \\
\boxed{\text{z537}} \quad \mathbb{Q}_{4,2}^{(c)}(T_2) &= -\frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{28} - \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{28} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{21} \\
\boxed{\text{z538}} \quad \mathbb{Q}_{4,3}^{(c)}(T_2) &= \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{21} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{21} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{14} \\
\boxed{\text{z539}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_2, a) &= \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\boxed{\text{z540}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_2, a) &= \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3} \\
\boxed{\text{z541}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_2, a) &= \frac{\sqrt{3}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_0^{(b)}(A_1)}{3}
\end{aligned}$$

$$\begin{aligned}
\boxed{\text{z542}} \quad \mathbb{Q}_{2,1}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{42} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{42} - \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{14} \\
&\quad - \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} \\
\boxed{\text{z543}} \quad \mathbb{Q}_{2,2}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{42} + \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{14} \\
&\quad + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{42} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} \\
\boxed{\text{z544}} \quad \mathbb{Q}_{2,3}^{(1,-1;c)}(T_2, b) &= -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21} + \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{14} - \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{21} \\
\boxed{\text{z545}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_2, a) &= \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} \\
\boxed{\text{z546}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_2, a) &= \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} \\
\boxed{\text{z547}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_2, a) &= \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} - \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{12} + \frac{\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} \\
\boxed{\text{z548}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{24} - \frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{8} - \frac{\sqrt{6}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{24} - \frac{\sqrt{10}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{8} \\
\boxed{\text{z549}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_2, b) &= -\frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{24} - \frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{8} + \frac{\sqrt{6}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{24} - \frac{\sqrt{10}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{8} \\
\boxed{\text{z550}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{24} - \frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{8} - \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{24} - \frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{8} \\
\boxed{\text{z551}} \quad \mathbb{Q}_{3,1}^{(1,-1;c)}(T_2, c) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\boxed{\text{z552}} \quad \mathbb{Q}_{3,2}^{(1,-1;c)}(T_2, c) &= -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{\text{z553}} \quad \mathbb{Q}_{3,3}^{(1,-1;c)}(T_2, c) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6}
\end{aligned}$$

$$\begin{aligned}
\boxed{\text{z554}} \quad \mathbb{Q}_{4,1}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{28} - \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{28} \\
&\quad + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21} + \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{21} \\
\boxed{\text{z555}} \quad \mathbb{Q}_{4,2}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,3}^{(b)}(T_2)}{21} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{28} \\
&\quad - \frac{\sqrt{14}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{28} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{28} + \frac{\sqrt{42}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{21} \\
\boxed{\text{z556}} \quad \mathbb{Q}_{4,3}^{(1,-1;c)}(T_2) &= \frac{\sqrt{14}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(T_2)}{21} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(T_2)}{21} + \frac{\sqrt{14}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{14} \\
\boxed{\text{z557}} \quad \mathbb{Q}_{5,1}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{8} - \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{24} + \frac{\sqrt{10}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{8} - \frac{\sqrt{6}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{24} \\
\boxed{\text{z558}} \quad \mathbb{Q}_{5,2}^{(1,-1;c)}(T_2) &= \frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{8} - \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{24} - \frac{\sqrt{10}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{8} - \frac{\sqrt{6}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{24} \\
\boxed{\text{z559}} \quad \mathbb{Q}_{5,3}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{10}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{8} - \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{24} + \frac{\sqrt{10}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{8} - \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{24} \\
\boxed{\text{z560}} \quad \mathbb{Q}_{2,1}^{(1,0;c)}(T_2) &= -\frac{\sqrt{6}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{6} \\
\boxed{\text{z561}} \quad \mathbb{Q}_{2,2}^{(1,0;c)}(T_2) &= \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} - \frac{\sqrt{2}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{\text{z562}} \quad \mathbb{Q}_{2,3}^{(1,0;c)}(T_2) &= -\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{6} + \frac{\sqrt{2}\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{3} \\
\boxed{\text{z563}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_2, a) &= -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} \\
\boxed{\text{z564}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_2, a) &= \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3} \\
\boxed{\text{z565}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_2, a) &= -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{3}
\end{aligned}$$



$$\boxed{\text{z566}} \quad \mathbb{Q}_{3,1}^{(1,0;c)}(T_2, b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} - \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{M}_{2,1}^{(b)}(T_2)}{2}$$

$$\boxed{\text{z567}} \quad \mathbb{Q}_{3,2}^{(1,0;c)}(T_2, b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{M}_{2,2}^{(b)}(T_2)}{2}$$

$$\boxed{\text{z568}} \quad \mathbb{Q}_{3,3}^{(1,0;c)}(T_2, b) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{M}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z569}} \quad \mathbb{Q}_{2,1}^{(1,1;c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z570}} \quad \mathbb{Q}_{2,2}^{(1,1;c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z571}} \quad \mathbb{Q}_{2,3}^{(1,1;c)}(T_2) = \frac{\sqrt{3}\mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3}$$

$$\boxed{\text{z572}} \quad \mathbb{Q}_{3,1}^{(1,1;c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z573}} \quad \mathbb{Q}_{3,2}^{(1,1;c)}(T_2) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z574}} \quad \mathbb{Q}_{3,3}^{(1,1;c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{M}_{2,1}^{(b)}(T_2)}{6}$$

$$\boxed{\text{z575}} \quad \mathbb{G}_{2,1}^{(c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z576}} \quad \mathbb{G}_{2,2}^{(c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z577}} \quad \mathbb{G}_{2,3}^{(c)}(T_2) = \frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}$$

$$\boxed{\text{z578}} \quad \mathbb{G}_{3,1}^{(c)}(T_2) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{12} - \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{4} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{4}$$

$$\boxed{\text{z579}} \quad \mathbb{G}_{3,2}^{(c)}(T_2) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{12} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{4}$$

$$\begin{aligned}
\text{z580} \quad \mathbb{G}_{3,3}^{(c)}(T_2) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,3}^{(a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{6} \\
\text{z581} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_2, a) &= -\frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{21} - \frac{\sqrt{21}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{21} - \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{21} \\
\text{z582} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_2, a) &= -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{21} - \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{21} - \frac{\sqrt{21}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{21} \\
\text{z583} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_2, a) &= -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{21} - \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{21} - \frac{\sqrt{35}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{21} + \frac{\sqrt{35}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{21} \\
\text{z584} \quad \mathbb{G}_{2,1}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\text{z585} \quad \mathbb{G}_{2,2}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z586} \quad \mathbb{G}_{2,3}^{(1,-1;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\text{z587} \quad \mathbb{G}_{3,1}^{(1,-1;c)}(T_2) &= \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{12} - \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{4} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,1}^{(b)}(T_2)}{4} \\
\text{z588} \quad \mathbb{G}_{3,2}^{(1,-1;c)}(T_2) &= \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{12} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E)\mathbb{Q}_{2,2}^{(b)}(T_2)}{4} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{12} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,2}^{(b)}(E)}{4} \\
\text{z589} \quad \mathbb{G}_{3,3}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E)\mathbb{Q}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,3}^{(1,-1;a)}(T_2)\mathbb{Q}_{2,1}^{(b)}(E)}{6} \\
\text{z590} \quad \mathbb{G}_{4,1}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{84} - \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{28} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{84} + \frac{3\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} + \frac{\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{7} \\
\text{z591} \quad \mathbb{G}_{4,2}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{84} + \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{28} - \frac{\sqrt{105}\mathbb{M}_{3,3}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{84} - \frac{3\sqrt{7}\mathbb{M}_{3,3}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} + \frac{\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{7} \\
\text{z592} \quad \mathbb{G}_{4,3}^{(1,-1;c)}(T_2) &= -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{84} - \frac{3\sqrt{7}\mathbb{M}_{3,1}^{(1,-1;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{28} - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{84} + \frac{3\sqrt{7}\mathbb{M}_{3,2}^{(1,-1;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{28} + \frac{\sqrt{7}\mathbb{M}_3^{(1,-1;a)}(A_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{7} \\
\text{z593} \quad \mathbb{G}_{2,1}^{(1,0;c)}(T_2, a) &= \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6}
\end{aligned}$$

$$\begin{aligned}
\boxed{\text{z594}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(T_2, a) &= -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z595}} \quad \mathbb{G}_{2,3}^{(1,0;c)}(T_2, a) &= -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E)\mathbb{T}_{1,3}^{(b)}(T_1)}{3} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z596}} \quad \mathbb{G}_{2,1}^{(1,0;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} \\
\boxed{\text{z597}} \quad \mathbb{G}_{2,2}^{(1,0;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{M}_{2,3}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{2,3}^{(1,0;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{\text{z598}} \quad \mathbb{G}_{2,3}^{(1,0;c)}(T_2, b) &= \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(T_2)\mathbb{M}_{2,2}^{(b)}(T_2)}{6} + \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(T_2)\mathbb{M}_{2,1}^{(b)}(T_2)}{6} \\
\boxed{\text{z599}} \quad \mathbb{G}_{3,1}^{(1,0;c)}(T_2) &= -\frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} + \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3} - \frac{\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3} \\
\boxed{\text{z600}} \quad \mathbb{G}_{3,2}^{(1,0;c)}(T_2) &= -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,3}^{(b)}(T_2)}{3} + \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(E)}{6} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{6} + \frac{\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3} \\
\boxed{\text{z601}} \quad \mathbb{G}_{3,3}^{(1,0;c)}(T_2) &= \frac{\mathbb{G}_{1,1}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(T_2)}{3} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(T_1)\mathbb{Q}_{2,1}^{(b)}(T_2)}{3} + \frac{\mathbb{G}_{1,3}^{(1,0;a)}(T_1)\mathbb{Q}_{2,2}^{(b)}(E)}{3} \\
\boxed{\text{z602}} \quad \mathbb{G}_{2,1}^{(1,1;c)}(T_2) &= \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} \\
\boxed{\text{z603}} \quad \mathbb{G}_{2,2}^{(1,1;c)}(T_2) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,3}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,3}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6} \\
\boxed{\text{z604}} \quad \mathbb{G}_{2,3}^{(1,1;c)}(T_2) &= \frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(T_1)\mathbb{T}_{1,2}^{(b)}(T_1)}{6} + \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(T_1)\mathbb{T}_{1,1}^{(b)}(T_1)}{6}
\end{aligned}$$

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Atomic SAMB

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

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

$$\boxed{\text{x1}} \quad \mathbb{Q}_0^{(a)}(A_1) = \begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \end{bmatrix}$$

$$\boxed{\text{x2}} \quad \mathbb{M}_{1,1}^{(1,-1;a)}(T_1) = \begin{bmatrix} 0 & \frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} & 0 \end{bmatrix}$$

$$\boxed{\text{x3}} \quad \mathbb{M}_{1,2}^{(1,-1;a)}(T_1) = \begin{bmatrix} 0 & -\frac{\sqrt{2}i}{2} \\ \frac{\sqrt{2}i}{2} & 0 \end{bmatrix}$$

$$\boxed{\text{x4}} \quad \mathbb{M}_{1,3}^{(1,-1;a)}(T_1) = \begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & -\frac{\sqrt{2}}{2} \end{bmatrix}$$

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

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

$$\boxed{\text{x5}} \quad \mathbb{Q}_{1,1}^{(a)}(T_1) = \begin{bmatrix} \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x6}} \quad \mathbb{Q}_{1,2}^{(a)}(T_1) = \begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x7}} \quad \mathbb{Q}_{1,3}^{(a)}(T_1) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \end{bmatrix}$$

$$\boxed{\text{x8}} \quad \mathbb{Q}_{1,1}^{(1,0;a)}(T_1) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$$

$$\boxed{\text{x9}} \quad \mathbb{Q}_{1,2}^{(1,0;a)}(T_1) = \begin{bmatrix} \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$$

$$\boxed{\text{x10}} \quad \mathbb{Q}_{1,3}^{(1,0;a)}(T_1) = \begin{bmatrix} 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$$

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

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

$$\boxed{\text{x13}} \quad \mathbb{G}_{2,1}^{(1,-1;a)}(T_2) = \begin{bmatrix} 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$$

$$\boxed{\text{x14}} \quad \mathbb{G}_{2,2}^{(1,-1;a)}(T_2) = \begin{bmatrix} \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$$

$$\boxed{\text{x15}} \quad \mathbb{G}_{2,3}^{(1,-1;a)}(T_2) = \begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x16}} \quad \mathbb{G}_0^{(1,1;a)}(A_1) = \begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \end{bmatrix}$$

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

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

$$\boxed{\text{x19}} \quad \mathbb{M}_{2,1}^{(1,-1;a)}(T_2) = \begin{bmatrix} 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$$

$$\boxed{\text{x20}} \quad \mathbb{M}_{2,2}^{(1,-1;a)}(T_2) = \begin{bmatrix} \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \end{bmatrix}$$

$$\boxed{\text{x21}} \quad \mathbb{M}_{2,3}^{(1,-1;a)}(T_2) = \begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x22}} \quad \mathbb{M}_0^{(1,1;a)}(A_1) = \begin{bmatrix} 0 & \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & \frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} \end{bmatrix}$$

$$\boxed{\text{x23}} \quad \mathbb{T}_{1,1}^{(a)}(T_1) = \begin{bmatrix} \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x24}} \quad \mathbb{T}_{1,2}^{(a)}(T_1) = \begin{bmatrix} 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x25}} \quad \mathbb{T}_{1,3}^{(a)}(T_1) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$$

$$\boxed{\text{x26}} \quad \mathbb{T}_{1,1}^{(1,0;a)}(T_1) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & \frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \end{bmatrix}$$

$$\boxed{\text{x27}} \quad \mathbb{T}_{1,2}^{(1,0;a)}(T_1) = \begin{bmatrix} \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \end{bmatrix}$$

$$\boxed{\text{x28}} \quad \mathbb{T}_{1,3}^{(1,0;a)}(T_1) = \begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

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

$$\boxed{\text{x29}} \quad \mathbb{Q}_0^{(a)}(A_1) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \end{bmatrix}$$

$$\boxed{\text{x30}} \quad \mathbb{Q}_{2,1}^{(a)}(E) = \begin{bmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} \end{bmatrix}$$

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

$$\boxed{\text{x32}} \quad \mathbb{Q}_{2,1}^{(a)}(T_2) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x33}} \quad \mathbb{Q}_{2,2}^{(a)}(T_2) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x34}} \quad \mathbb{Q}_{2,3}^{(a)}(T_2) = \begin{bmatrix} 0 & 0 & \frac{1}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 & 0 \\ \frac{1}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{1}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

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

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

$$\boxed{\text{x37}} \quad \mathbb{Q}_{2,1}^{(1,-1;a)}(T_2) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$$



$$\boxed{\text{x38}} \quad \mathbb{Q}_{2,2}^{(1,-1;a)}(T_2) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x39}} \quad \mathbb{Q}_{2,3}^{(1,-1;a)}(T_2) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x40}} \quad \mathbb{Q}_0^{(1,1;a)}(A_1) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ \frac{\sqrt{3}i}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x41}} \quad \mathbb{G}_{1,1}^{(1,0;a)}(T_1) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 \\ -\frac{\sqrt{2}}{4} & 0 & 0 & 0 & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x42}} \quad \mathbb{G}_{1,2}^{(1,0;a)}(T_1) = \begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x43}} \quad \mathbb{G}_{1,3}^{(1,0;a)}(T_1) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x44}} \quad \mathbb{M}_{1,1}^{(a)}(T_1) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -\frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{i}{2} \\ 0 & 0 & \frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{i}{2} & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x45}} \quad \mathbb{M}_{1,2}^{(a)}(T_1) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ -\frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{i}{2} & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x46}} \quad \mathbb{M}_{1,3}^{(a)}(T_1) = \begin{bmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x47}} \quad \mathbb{M}_3^{(1,-1;a)}(A_2) = \begin{bmatrix} 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \\ \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x48}} \quad \mathbb{M}_{1,1}^{(1,-1;a)}(T_1) = \begin{bmatrix} 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x49}} \quad \mathbb{M}_{1,2}^{(1,-1;a)}(T_1) = \begin{bmatrix} 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}i}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x50}} \quad \mathbb{M}_{1,3}^{(1,-1;a)}(T_1) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$$

$$\boxed{\text{x51}} \quad \mathbb{M}_{3,1}^{(1,-1;a)}(T_1) = \begin{bmatrix} 0 & \frac{\sqrt{5}}{5} & 0 & \frac{\sqrt{5}i}{10} & -\frac{\sqrt{5}}{10} & 0 \\ \frac{\sqrt{5}}{5} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \end{bmatrix}$$

$$\boxed{\text{x52}} \quad \mathbb{M}_{3,2}^{(1,-1;a)}(T_1) = \begin{bmatrix} 0 & \frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 \\ -\frac{\sqrt{5}i}{10} & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{5} & -\frac{\sqrt{5}}{10} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{5} & 0 & 0 & \frac{\sqrt{5}}{10} \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \end{bmatrix}$$

$$\boxed{\text{x53}} \quad \mathbb{M}_{3,3}^{(1,-1;a)}(T_1) = \begin{bmatrix} -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{5} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{5} \end{bmatrix}$$

$$\boxed{\text{x54}} \quad \mathbb{M}_{3,1}^{(1,-1;a)}(T_2) = \begin{bmatrix} 0 & 0 & 0 & -\frac{\sqrt{3}i}{6} & -\frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 \\ \frac{\sqrt{3}i}{6} & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x55}} \quad \mathbb{M}_{3,2}^{(1,-1;a)}(T_2) = \begin{bmatrix} 0 & \frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ -\frac{\sqrt{3}i}{6} & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{3}}{6} \\ 0 & 0 & \frac{\sqrt{3}}{6} & 0 & 0 & -\frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & \frac{\sqrt{3}i}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x56}} \quad \mathbb{M}_{3,3}^{(1,-1;a)}(T_2) = \begin{bmatrix} \frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{6} \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}}{6} & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & \frac{\sqrt{3}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{3}}{6} & -\frac{\sqrt{3}i}{6} & 0 \\ 0 & \frac{\sqrt{3}}{6} & 0 & \frac{\sqrt{3}i}{6} & 0 & 0 \\ \frac{\sqrt{3}}{6} & 0 & -\frac{\sqrt{3}i}{6} & 0 & 0 & 0 \end{bmatrix}$$

$$\boxed{\text{x57}} \quad \mathbb{M}_{1,1}^{(1,1;a)}(T_1) = \begin{bmatrix} 0 & \frac{\sqrt{30}}{15} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{15} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & -\frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 \\ \frac{\sqrt{30}i}{20} & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & 0 \\ \frac{\sqrt{30}}{20} & 0 & 0 & 0 & 0 & -\frac{\sqrt{30}}{30} \\ 0 & -\frac{\sqrt{30}}{20} & 0 & 0 & -\frac{\sqrt{30}}{30} & 0 \end{bmatrix}$$

$$\boxed{\text{x58}} \quad \mathbb{M}_{1,2}^{(1,1;a)}(T_1) = \begin{bmatrix} 0 & \frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 \\ -\frac{\sqrt{30}i}{30} & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{15} & \frac{\sqrt{30}}{20} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{15} & 0 & 0 & -\frac{\sqrt{30}}{20} \\ 0 & 0 & \frac{\sqrt{30}}{20} & 0 & 0 & \frac{\sqrt{30}i}{30} \\ 0 & 0 & 0 & -\frac{\sqrt{30}}{20} & -\frac{\sqrt{30}i}{30} & 0 \end{bmatrix}$$

$$\boxed{\text{x59}} \quad \mathbb{M}_{1,3}^{(1,1;a)}(T_1) = \begin{bmatrix} -\frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{30} & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \end{bmatrix}$$

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

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

$$\boxed{\text{x62}} \quad \mathbb{T}_{2,1}^{(1,0;a)}(T_2) = \begin{bmatrix} 0 & 0 & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & \frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \\ 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x63}} \quad \mathbb{T}_{2,2}^{(1,0;a)}(T_2) = \begin{bmatrix} 0 & \frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 \\ -\frac{\sqrt{6}i}{6} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}}{12} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{12} \\ 0 & 0 & -\frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \end{bmatrix}$$

$$\boxed{\text{x64}} \quad \mathbb{T}_{2,3}^{(1,0;a)}(T_2) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} & 0 \\ 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & -\frac{\sqrt{6}i}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}}{6} & \frac{\sqrt{6}i}{12} & 0 \\ 0 & -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$$

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## Cluster SAMB

- Site cluster

\*\* Wyckoff: 1a

$$\boxed{\text{y1}} \quad \mathbb{Q}_0^{(s)}(A_1) = [1]$$

- Bond cluster

\*\* Wyckoff: 3a@3d

$$\boxed{\text{y2}} \quad \mathbb{Q}_0^{(s)}(A_1) = \left[ \frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3} \right]$$

$$\boxed{\text{y3}} \quad \mathbb{Q}_{2,1}^{(s)}(E) = \left[ -\frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{3} \right]$$

$$\boxed{\text{y4}} \quad \mathbb{Q}_{2,2}^{(s)}(E) = \left[ \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}, 0 \right]$$

$$\boxed{\text{y5}} \quad \mathbb{T}_{1,1}^{(s)}(T_1) = [i, 0, 0]$$

$$\boxed{\text{y6}} \quad \mathbb{T}_{1,2}^{(s)}(T_1) = [0, i, 0]$$

$$\boxed{\text{y7}} \quad \mathbb{T}_{1,3}^{(s)}(T_1) = [0, 0, i]$$

\*\* Wyckoff: **6b@3c**

$$\boxed{\text{y8}} \quad \mathbb{Q}_0^{(s)}(A_1) = \left[ \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6} \right]$$

$$\boxed{\text{y9}} \quad \mathbb{Q}_{2,1}^{(s)}(E) = \left[ -\frac{\sqrt{3}}{6}, -\frac{\sqrt{3}}{6}, -\frac{\sqrt{3}}{6}, -\frac{\sqrt{3}}{6}, \frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3} \right]$$

$$\boxed{\text{y10}} \quad \mathbb{Q}_{2,2}^{(s)}(E) = \left[ \frac{1}{2}, \frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}, 0, 0 \right]$$

$$\boxed{\text{y11}} \quad \mathbb{T}_{1,1}^{(s)}(T_1) = \left[ 0, 0, \frac{i}{2}, \frac{i}{2}, \frac{i}{2}, -\frac{i}{2} \right]$$

$$\boxed{\text{y12}} \quad \mathbb{T}_{1,2}^{(s)}(T_1) = \left[ \frac{i}{2}, -\frac{i}{2}, 0, 0, \frac{i}{2}, \frac{i}{2} \right]$$

$$\boxed{\text{y13}} \quad \mathbb{T}_{1,3}^{(s)}(T_1) = \left[ \frac{i}{2}, \frac{i}{2}, \frac{i}{2}, -\frac{i}{2}, 0, 0 \right]$$

$$\boxed{\text{y14}} \quad \mathbb{Q}_{2,1}^{(s)}(T_2) = \left[ \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}, 0, 0, 0, 0 \right]$$



$$\boxed{\text{y15}} \quad \mathbb{Q}_{2,2}^{(s)}(T_2) = \left[ 0, 0, \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}, 0, 0 \right]$$

$$\boxed{\text{y16}} \quad \mathbb{Q}_{2,3}^{(s)}(T_2) = \left[ 0, 0, 0, 0, \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \right]$$

$$\boxed{\text{y17}} \quad \mathbb{M}_{2,1}^{(s)}(T_2) = \left[ 0, 0, -\frac{i}{2}, -\frac{i}{2}, \frac{i}{2}, -\frac{i}{2} \right]$$

$$\boxed{\text{y18}} \quad \mathbb{M}_{2,2}^{(s)}(T_2) = \left[ \frac{i}{2}, -\frac{i}{2}, 0, 0, -\frac{i}{2}, -\frac{i}{2} \right]$$

$$\boxed{\text{y19}} \quad \mathbb{M}_{2,3}^{(s)}(T_2) = \left[ -\frac{i}{2}, -\frac{i}{2}, \frac{i}{2}, -\frac{i}{2}, 0, 0 \right]$$

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**Site and Bond**

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Table 5: Orbital of each site

#	site	orbital
1	<b>A</b>	$ s, \uparrow\rangle,  s, \downarrow\rangle,  p_x, \uparrow\rangle,  p_x, \downarrow\rangle,  p_y, \uparrow\rangle,  p_y, \downarrow\rangle,  p_z, \uparrow\rangle,  p_z, \downarrow\rangle$

Table 6: Neighbor and bra-ket of each bond

#	head	tail	neighbor	head (bra)	tail (ket)
1	<b>A</b>	<b>A</b>	[1, 2]	[s, p]	[s, p]

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**Site in Unit Cell**

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

Table 7: 'A' (#1) site cluster (1a), 432

SL	position ( $\mathbf{s}$ )	mapping
1	[ 0.00000, 0.00000, 0.00000]	[1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24]

### — 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 (3a@3d), ND,  $|\mathbf{v}|=1.0$  (cartesian)

SL	vector ( $\mathbf{v}$ )	center ( $\mathbf{c}$ )	mapping	head	tail	$\mathbf{R}$ (primitive)
1	[-1.00000, 0.00000, 0.00000]	[ 0.50000, 0.00000, 0.00000]	[1,-2,-3,4,17,-18,-19,20]	(1,1)	(1,1)	[1,0,0]
2	[ 0.00000,-1.00000, 0.00000]	[ 0.00000, 0.50000, 0.00000]	[5,-6,-7,8,13,-14,-15,16]	(1,1)	(1,1)	[0,1,0]
3	[ 0.00000, 0.00000,-1.00000]	[ 0.00000, 0.00000, 0.50000]	[9,-10,-11,12,-21,22,23,-24]	(1,1)	(1,1)	[0,0,1]

Table 9: 2-th 'A'-'A' [1] (#2) bond cluster (6b@3c), ND,  $|\mathbf{v}|=1.41421$  (cartesian)

SL	vector ( $\mathbf{v}$ )	center ( $\mathbf{c}$ )	mapping	head	tail	$\mathbf{R}$ (primitive)
1	[ 0.00000,-1.00000,-1.00000]	[ 0.00000, 0.50000, 0.50000]	[1,-4,18,-19]	(1,1)	(1,1)	[0,1,1]
2	[ 0.00000, 1.00000,-1.00000]	[ 0.00000, 0.50000, 0.50000]	[2,-3,-17,20]	(1,1)	(1,1)	[0,-1,1]

*continued ...*

Table 9

SL	vector ( $\boldsymbol{v}$ )	center ( $\boldsymbol{c}$ )	mapping	head	tail	$\boldsymbol{R}$ (primitive)
3	$[-1.00000, 0.00000, -1.00000]$	$[0.50000, 0.00000, 0.50000]$	$[5, -8, -14, 15]$	$(1, 1)$	$(1, 1)$	$[1, 0, 1]$
4	$[-1.00000, 0.00000, 1.00000]$	$[0.50000, 0.00000, 0.50000]$	$[6, -7, 13, -16]$	$(1, 1)$	$(1, 1)$	$[1, 0, -1]$
5	$[-1.00000, -1.00000, 0.00000]$	$[0.50000, 0.50000, 0.00000]$	$[9, -12, 21, -24]$	$(1, 1)$	$(1, 1)$	$[1, 1, 0]$
6	$[1.00000, -1.00000, 0.00000]$	$[0.50000, 0.50000, 0.00000]$	$[10, -11, -22, 23]$	$(1, 1)$	$(1, 1)$	$[-1, 1, 0]$