Model for "D3"

Generated on 2026-01-27 11:08:43 by MultiPie 2.0.6

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]
  - 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]
  - 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]
- 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]
- Max. neighbor: `10`
- Search cell range: `(-2, 3), (-2, 3), (-2, 3)`
- Toroidal priority: `false`

Group and Unit Cell

- Group: PG No. 18 D_3 32 (321 setting) [trigonal]
- Unit cell:
  $a =$ `1.00000`, $b =$ `1.00000`, $c =$ `1.00000`, $\alpha =$ `90.0`, $\beta =$ `90.0`, $\gamma =$ `120.0`
- Lattice vectors (conventional cell):
  $\boldsymbol{a}_1 =$ `[ 1.00000, 0.00000, 0.00000]`
  $\boldsymbol{a}_2 =$ `[-0.50000, 0.86603, 0.00000]`
  $\boldsymbol{a}_3 =$ `[ 0.00000, 0.00000, 1.00000]`

Symmetry Operation

Table 1: Symmetry operation

	#	SO	#	SO	#	SO	#	SO	#	SO
	1	1	2	3^{+}_{001}	3	3^{-}_{001}	4	2_{110}	5	2_{100}
	6	2_{010}								

Harmonics

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	$\mathbb{G}_2(A_1)$	A_1	2	G, M	-	-	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
4	$\mathbb{Q}_2(A_1)$	A_1	2	Q, T	-	-	$-\frac{x^2}{2}-\frac{y^2}{2}+z^2$
5	$\mathbb{G}_3(A_1)$	A_1	3	G, M	-	-	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
6	$\mathbb{Q}_3(A_1)$	A_1	3	Q, T	-	-	$\frac{\sqrt{10}x\left(x^2-3y^2\right)}{4}$
7	$\mathbb{G}_4(A_1,1)$	A_1	4	G, M	1	-	$\frac{3x^4}{8}+\frac{3x^2y^2}{4}-3x^2z^2+\frac{3y^4}{8}-3y^2z^2+z^4$
8	$\mathbb{G}_4(A_1,2)$	A_1	4	G, M	2	-	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$

continued ...

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
9	$\mathbb{Q}_4(A_1,2)$	A_1	4	Q, T	2	-	$\frac{\sqrt{70}yz\left(3x^2-y^2\right)}{4}$
10	$\mathbb{G}_1(A_2)$	A_2	1	G, M	-	-	z
11	$\mathbb{Q}_1(A_2)$	A_2	1	Q, T	-	-	z
12	$\mathbb{G}_3(A_2,1)$	A_2	3	G, M	1	-	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
13	$\mathbb{G}_3(A_2,2)$	A_2	3	G, M	2	-	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
14	$\mathbb{Q}_3(A_2,1)$	A_2	3	Q, T	1	-	$-\frac{z\left(3x^2+3y^2-2z^2\right)}{2}$
15	$\mathbb{Q}_3(A_2,2)$	A_2	3	Q, T	2	-	$\frac{\sqrt{10}y\left(3x^2-y^2\right)}{4}$
16	$\mathbb{G}_4(A_2)$	A_2	4	G, M	-	-	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
17	$\mathbb{Q}_4(A_2)$	A_2	4	Q, T	-	-	$\frac{\sqrt{70}xz\left(x^2-3y^2\right)}{4}$
18	$\mathbb{G}_{1,1}(E)$	E	1	G, M	-	1	x
19	$\mathbb{G}_{1,2}(E)$					2	y
20	$\mathbb{Q}_{1,1}(E)$	E	1	Q, T	-	1	x
21	$\mathbb{Q}_{1,2}(E)$					2	y
22	$\mathbb{G}_{2,1}(E,1)$	E	2	G, M	1	1	$\sqrt{3}yz$
23	$\mathbb{G}_{2,2}(E,1)$					2	$-\sqrt{3}xz$
24	$\mathbb{G}_{2,1}(E,2)$	E	2	G, M	2	1	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
25	$\mathbb{G}_{2,2}(E,2)$					2	$-\sqrt{3}xy$
26	$\mathbb{Q}_{2,1}(E,1)$	E	2	Q, T	1	1	$\sqrt{3}yz$
27	$\mathbb{Q}_{2,2}(E,1)$					2	$-\sqrt{3}xz$
28	$\mathbb{Q}_{2,1}(E,2)$	E	2	Q, T	2	1	$\frac{\sqrt{3}(x-y)(x+y)}{2}$
29	$\mathbb{Q}_{2,2}(E,2)$					2	$-\sqrt{3}xy$

continued ...

Table 2

#	symbol	irrep.	rank	X	multiplicity	component	symmetry
30	$\mathbb{G}_{3,1}(E,1)$	E	3	G, M	1	1	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
31	$\mathbb{G}_{3,2}(E,1)$					2	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
32	$\mathbb{G}_{3,1}(E,2)$	E	3	G, M	2	1	$\sqrt{15}xyz$
33	$\mathbb{G}_{3,2}(E,2)$					2	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
34	$\mathbb{Q}_{3,1}(E,1)$	E	3	Q, T	1	1	$-\frac{\sqrt{6}x\left(x^2+y^2-4z^2\right)}{4}$
35	$\mathbb{Q}_{3,2}(E,1)$					2	$-\frac{\sqrt{6}y\left(x^2+y^2-4z^2\right)}{4}$
36	$\mathbb{Q}_{3,1}(E,2)$	E	3	Q, T	2	1	$\sqrt{15}xyz$
37	$\mathbb{Q}_{3,2}(E,2)$					2	$\frac{\sqrt{15}z(x-y)(x+y)}{2}$
38	$\mathbb{G}_{4,1}(E,1)$	E	4	G, M	1	1	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
39	$\mathbb{G}_{4,2}(E,1)$					2	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
40	$\mathbb{G}_{4,1}(E,2)$	E	4	G, M	2	1	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
41	$\mathbb{G}_{4,2}(E,2)$					2	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
42	$\mathbb{G}_{4,1}(E,3)$	E	4	G, M	3	1	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
43	$\mathbb{G}_{4,2}(E,3)$					2	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$
44	$\mathbb{Q}_{4,1}(E,1)$	E	4	Q, T	1	1	$-\frac{\sqrt{10}yz\left(3x^2+3y^2-4z^2\right)}{4}$
45	$\mathbb{Q}_{4,2}(E,1)$					2	$\frac{\sqrt{10}xz\left(3x^2+3y^2-4z^2\right)}{4}$
46	$\mathbb{Q}_{4,1}(E,2)$	E	4	Q, T	2	1	$\frac{\sqrt{35}\left(x^2-2xy-y^2\right)\left(x^2+2xy-y^2\right)}{8}$
47	$\mathbb{Q}_{4,2}(E,2)$					2	$\frac{\sqrt{35}xy(x-y)(x+y)}{2}$
48	$\mathbb{Q}_{4,1}(E,3)$	E	4	Q, T	3	1	$-\frac{\sqrt{5}(x-y)(x+y)\left(x^2+y^2-6z^2\right)}{4}$
49	$\mathbb{Q}_{4,2}(E,3)$					2	$\frac{\sqrt{5}xy\left(x^2+y^2-6z^2\right)}{2}$

Table 3: dimension = 48

#	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)	8	$\|s,\uparrow\rangle$ @A(2)	9	$\|s,\downarrow\rangle$ @A(2)
10	$\|p_x,\uparrow\rangle$ @A(2)	11	$\|p_x,\downarrow\rangle$ @A(2)	12	$\|p_y,\uparrow\rangle$ @A(2)	13	$\|p_y,\downarrow\rangle$ @A(2)	14	$\|p_z,\uparrow\rangle$ @A(2)
15	$\|p_z,\downarrow\rangle$ @A(2)	16	$\|s,\uparrow\rangle$ @A(3)	17	$\|s,\downarrow\rangle$ @A(3)	18	$\|p_x,\uparrow\rangle$ @A(3)	19	$\|p_x,\downarrow\rangle$ @A(3)
20	$\|p_y,\uparrow\rangle$ @A(3)	21	$\|p_y,\downarrow\rangle$ @A(3)	22	$\|p_z,\uparrow\rangle$ @A(3)	23	$\|p_z,\downarrow\rangle$ @A(3)	24	$\|s,\uparrow\rangle$ @A(4)
25	$\|s,\downarrow\rangle$ @A(4)	26	$\|p_x,\uparrow\rangle$ @A(4)	27	$\|p_x,\downarrow\rangle$ @A(4)	28	$\|p_y,\uparrow\rangle$ @A(4)	29	$\|p_y,\downarrow\rangle$ @A(4)
30	$\|p_z,\uparrow\rangle$ @A(4)	31	$\|p_z,\downarrow\rangle$ @A(4)	32	$\|s,\uparrow\rangle$ @A(5)	33	$\|s,\downarrow\rangle$ @A(5)	34	$\|p_x,\uparrow\rangle$ @A(5)
35	$\|p_x,\downarrow\rangle$ @A(5)	36	$\|p_y,\uparrow\rangle$ @A(5)	37	$\|p_y,\downarrow\rangle$ @A(5)	38	$\|p_z,\uparrow\rangle$ @A(5)	39	$\|p_z,\downarrow\rangle$ @A(5)
40	$\|s,\uparrow\rangle$ @A(6)	41	$\|s,\downarrow\rangle$ @A(6)	42	$\|p_x,\uparrow\rangle$ @A(6)	43	$\|p_x,\downarrow\rangle$ @A(6)	44	$\|p_y,\uparrow\rangle$ @A(6)
45	$\|p_y,\downarrow\rangle$ @A(6)	46	$\|p_z,\uparrow\rangle$ @A(6)	47	$\|p_z,\downarrow\rangle$ @A(6)				

Table 4: Atomic basis (orbital part only)

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

SAMB

744 (all 744) SAMBs

- 'A' site-cluster : A
  * bra: $\langle s,\uparrow|$, $\langle s,\downarrow|$
  * ket: $|s,\uparrow\rangle$, $|s,\downarrow\rangle$
  * wyckoff: 6c

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

z129 $\mathbb{Q}_1^{(c)}(A_2) = \mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_1^{(s)}(A_2)$

z249 $\mathbb{Q}_{1,1}^{(c)}(E) = \dfrac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$

z250 $\mathbb{Q}_{1,2}^{(c)}(E) = \dfrac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$

z251 $\mathbb{Q}_{2,1}^{(c)}(E,1) = \dfrac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$

z252 $\mathbb{Q}_{2,2}^{(c)}(E,1) = \dfrac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$

- 'A' site-cluster : A
  * 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: 6c

z2 $$\mathbb{Q}_{0}^{(c)}(A_1) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1}^{(s)}(A_2)}{3}$$

z3 $$\mathbb{Q}_{2}^{(c)}(A_1) = -\frac{\sqrt{6}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{6} - \frac{\sqrt{6}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\sqrt{6}\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1}^{(s)}(A_2)}{3}$$

z4 $$\mathbb{Q}_{2}^{(1,-1;c)}(A_1) = -\frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z5 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_1) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z6 $$\mathbb{Q}_{0}^{(1,0;c)}(A_1) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1}^{(s)}(A_2)}{3}$$

z7 $$\mathbb{Q}_{2}^{(1,0;c)}(A_1) = -\frac{\sqrt{6}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{6} - \frac{\sqrt{6}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\sqrt{6}\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1}^{(s)}(A_2)}{3}$$

z8 $$\mathbb{G}_{2}^{(c)}(A_1) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z9 $$\mathbb{G}_{0}^{(1,-1;c)}(A_1) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z10 $$\mathbb{G}_{2}^{(1,-1;c)}(A_1) = \mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{0}^{(s)}(A_1)$$

z11 $$\mathbb{G}_{3}^{(1,-1;c)}(A_1) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z12 $$\mathbb{G}_{2}^{(1,0;c)}(A_1) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z13 $$\mathbb{G}_{0}^{(1,1;c)}(A_1) = \mathbb{G}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{0}^{(s)}(A_1)$$

z130 $$\mathbb{Q}_{1}^{(c)}(A_2,a) = \mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{0}^{(s)}(A_1)$$

z131 $$\mathbb{Q}_{1}^{(c)}(A_2,b) = -\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z132 $$\mathbb{Q}_{1}^{(1,-1;c)}(A_2) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z133 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_2,2) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z134 $$\mathbb{Q}_{1}^{(1,0;c)}(A_2,a) = \mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{0}^{(s)}(A_1)$$

z135 $$\mathbb{Q}_{1}^{(1,0;c)}(A_2,b) = -\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z136 $$\mathbb{G}_{1}^{(c)}(A_2) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z137 $$\mathbb{G}_{1}^{(1,-1;c)}(A_2) = \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{10} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{10} + \frac{\sqrt{10}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1}^{(s)}(A_2)}{5}$$

z138 $$\mathbb{G}_{3}^{(1,-1;c)}(A_2,1) = -\frac{\sqrt{5}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{5} + \frac{\sqrt{5}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{5} + \frac{\sqrt{15}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1}^{(s)}(A_2)}{5}$$

z139 $$\mathbb{G}_{3}^{(1,-1;c)}(A_2,2) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z140 $$\mathbb{G}_{1}^{(1,0;c)}(A_2) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z141 $$\mathbb{G}_{1}^{(1,1;c)}(A_2) = \mathbb{G}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1}^{(s)}(A_2)$$

z253 $$\mathbb{Q}_{1,1}^{(c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z254 $$\mathbb{Q}_{1,2}^{(c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z255 $$\mathbb{Q}_{1,1}^{(c)}(E,b) = -\frac{\sqrt{2}\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z256 $$\mathbb{Q}_{1,2}^{(c)}(E,b) = \frac{\sqrt{2}\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z257 $$\mathbb{Q}_{2,1}^{(c)}(E,1) = \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} + \frac{\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z258 $$\mathbb{Q}_{2,2}^{(c)}(E,1) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} - \frac{\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z259 $$\mathbb{Q}_{2,1}^{(c)}(E,2) = \frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z260 $$\mathbb{Q}_{2,2}^{(c)}(E,2) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z261 $$\mathbb{Q}_{3,1}^{(c)}(E,2) = \frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z262 $$\mathbb{Q}_{3,2}^{(c)}(E,2) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z263 $$\mathbb{Q}_{1,1}^{(1,-1;c)}(E) = -\frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{10} + \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{10} - \frac{\sqrt{30}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{10}$$

z264 $$\mathbb{Q}_{1,2}^{(1,-1;c)}(E) = \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{10} + \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{10} - \frac{\sqrt{30}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{10}$$

z265 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1) = \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{6} + \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z266 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1) = -\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{6} - \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{6} + \frac{\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z267 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2) = -\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6} + \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} - \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{3}$$

z268 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2) = \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{3} + \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6}$$

z269 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,1) = \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{5}$$

z270 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,1) = -\frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{5}$$

z271 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z272 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z273 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E,b) = -\frac{\sqrt{2}\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z274 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E,b) = \frac{\sqrt{2}\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z275 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,1) = \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} + \frac{\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z276 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,1) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} - \frac{\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z277 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,2) = \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z278 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,2) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z279 $$\mathbb{Q}_{3,1}^{(1,0;c)}(E,2) = \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z280 $$\mathbb{Q}_{3,2}^{(1,0;c)}(E,2) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z281 $$\mathbb{G}_{1,1}^{(c)}(E) = \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} - \frac{\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z282 $$\mathbb{G}_{1,2}^{(c)}(E) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} + \frac{\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z283 $$\mathbb{G}_{1,1}^{(1,-1;c)}(E) = \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{10}$$

z284 $$\mathbb{G}_{1,2}^{(1,-1;c)}(E) = \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{10}$$

z285 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,1) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z286 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,1) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z287 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z288 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2a) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z289 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2b) = -\frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2} + \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z290 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2b) = \frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} + \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z291 $$\mathbb{G}_{3,1}^{(1,-1;c)}(E,1) = -\frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{30} - \frac{2\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{30} + \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{5}$$

z292 $$\mathbb{G}_{3,2}^{(1,-1;c)}(E,1) = \frac{2\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{30} + \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{30} + \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{5}$$

z293 $$\mathbb{G}_{3,1}^{(1,-1;c)}(E,2) = \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{6}$$

z294 $$\mathbb{G}_{3,2}^{(1,-1;c)}(E,2) = -\frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{6} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6}$$

z295 $$\mathbb{G}_{1,1}^{(1,0;c)}(E) = \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} - \frac{\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z296 $$\mathbb{G}_{1,2}^{(1,0;c)}(E) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} + \frac{\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z297 $$\mathbb{G}_{1,1}^{(1,1;c)}(E) = \frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z298 $\mathbb{G}^{(1,1;c)}_{1,2}(E) = \frac{\sqrt{2}\mathbb{G}^{(1,1;a)}_{0}(A_1)\mathbb{Q}^{(s)}_{1,2}(E)}{2}$

z299 $\mathbb{G}^{(1,1;c)}_{2,1}(E,1) = \frac{\sqrt{2}\mathbb{G}^{(1,1;a)}_{0}(A_1)\mathbb{Q}^{(s)}_{2,1}(E,1)}{2}$

z300 $\mathbb{G}^{(1,1;c)}_{2,2}(E,1) = \frac{\sqrt{2}\mathbb{G}^{(1,1;a)}_{0}(A_1)\mathbb{Q}^{(s)}_{2,2}(E,1)}{2}$

- 'A' site-cluster : A
  * 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: 6c

z14 $\mathbb{Q}^{(c)}_{0}(A_1,a) = \mathbb{Q}^{(a)}_{0}(A_1)\mathbb{Q}^{(s)}_{0}(A_1)$

z15 $\mathbb{Q}^{(c)}_{0}(A_1,b) = \frac{\sqrt{2}\mathbb{Q}^{(a)}_{2,1}(E,1)\mathbb{Q}^{(s)}_{2,1}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}^{(a)}_{2,2}(E,1)\mathbb{Q}^{(s)}_{2,2}(E,1)}{2}$

z16 $\mathbb{Q}^{(c)}_{2}(A_1) = \mathbb{Q}^{(a)}_{2}(A_1)\mathbb{Q}^{(s)}_{0}(A_1)$

z17 $\mathbb{Q}^{(c)}_{3}(A_1) = \frac{\sqrt{2}\mathbb{Q}^{(a)}_{2,1}(E,2)\mathbb{Q}^{(s)}_{1,1}(E)}{2} + \frac{\sqrt{2}\mathbb{Q}^{(a)}_{2,2}(E,2)\mathbb{Q}^{(s)}_{1,2}(E)}{2}$

z18 $\mathbb{Q}^{(c)}_{4}(A_1,2) = \frac{\sqrt{2}\mathbb{Q}^{(a)}_{2,1}(E,2)\mathbb{Q}^{(s)}_{2,1}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}^{(a)}_{2,2}(E,2)\mathbb{Q}^{(s)}_{2,2}(E,1)}{2}$

z19 $\mathbb{Q}^{(1,-1;c)}_{0}(A_1) = \frac{\sqrt{2}\mathbb{Q}^{(1,-1;a)}_{2,1}(E,1)\mathbb{Q}^{(s)}_{2,1}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}^{(1,-1;a)}_{2,2}(E,1)\mathbb{Q}^{(s)}_{2,2}(E,1)}{2}$

z20 $\mathbb{Q}^{(1,-1;c)}_{2}(A_1) = \mathbb{Q}^{(1,-1;a)}_{2}(A_1)\mathbb{Q}^{(s)}_{0}(A_1)$

z21 $\mathbb{Q}^{(1,-1;c)}_{3}(A_1) = \frac{\sqrt{2}\mathbb{Q}^{(1,-1;a)}_{2,1}(E,2)\mathbb{Q}^{(s)}_{1,1}(E)}{2} + \frac{\sqrt{2}\mathbb{Q}^{(1,-1;a)}_{2,2}(E,2)\mathbb{Q}^{(s)}_{1,2}(E)}{2}$

z22 $\mathbb{Q}^{(1,-1;c)}_{4}(A_1,2) = \frac{\sqrt{2}\mathbb{Q}^{(1,-1;a)}_{2,1}(E,2)\mathbb{Q}^{(s)}_{2,1}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}^{(1,-1;a)}_{2,2}(E,2)\mathbb{Q}^{(s)}_{2,2}(E,1)}{2}$

z23 $\mathbb{Q}^{(1,0;c)}_{2}(A_1) = \frac{\sqrt{2}\mathbb{G}^{(1,0;a)}_{1,1}(E)\mathbb{Q}^{(s)}_{2,1}(E,1)}{2} + \frac{\sqrt{2}\mathbb{G}^{(1,0;a)}_{1,2}(E)\mathbb{Q}^{(s)}_{2,2}(E,1)}{2}$

z24 $\mathbb{Q}_0^{(1,1;c)}(A_1) = \mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_0^{(s)}(A_1)$

z25 $\mathbb{G}_2^{(c)}(A_1) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$

z26 $\mathbb{G}_2^{(1,-1;c)}(A_1) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$

z27 $\mathbb{G}_0^{(1,0;c)}(A_1) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{3} + \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{3} + \frac{\sqrt{3}\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1}^{(s)}(A_2)}{3}$

z28 $\mathbb{G}_2^{(1,0;c)}(A_1) = -\frac{\sqrt{6}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{6} - \frac{\sqrt{6}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\sqrt{6}\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1}^{(s)}(A_2)}{3}$

z142 $\mathbb{Q}_1^{(c)}(A_2,a) = \mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_1^{(s)}(A_2)$

z143 $\mathbb{Q}_1^{(c)}(A_2,b) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{10} + \frac{\sqrt{10}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1}^{(s)}(A_2)}{5}$

z144 $\mathbb{Q}_3^{(c)}(A_2,1) = -\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{5} + \frac{\sqrt{15}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1}^{(s)}(A_2)}{5}$

z145 $\mathbb{Q}_3^{(c)}(A_2,2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$

z146 $\mathbb{Q}_4^{(c)}(A_2) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$

z147 $\mathbb{Q}_1^{(1,-1;c)}(A_2) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{10} + \frac{\sqrt{10}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1}^{(s)}(A_2)}{5}$

z148 $\mathbb{Q}_3^{(1,-1;c)}(A_2,1) = -\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{5} + \frac{\sqrt{15}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1}^{(s)}(A_2)}{5}$

z149 $\mathbb{Q}_3^{(1,-1;c)}(A_2,2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$

z150 $\mathbb{Q}_4^{(1,-1;c)}(A_2) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$

z151 $\mathbb{Q}_1^{(1,0;c)}(A_2) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$

z152 $\mathbb{Q}_1^{(1,1;c)}(A_2) = \mathbb{Q}_0^{(1,1;a)}(A_1)\mathbb{Q}_1^{(s)}(A_2)$

z153 $\mathbb{G}_1^{(c)}(A_2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$

z154 $\mathbb{G}_1^{(1,-1;c)}(A_2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$

z155 $\mathbb{G}_1^{(1,0;c)}(A_2,a) = \mathbb{G}_1^{(1,0;a)}(A_2)\mathbb{Q}_0^{(s)}(A_1)$

z156 $\mathbb{G}_1^{(1,0;c)}(A_2,b) = -\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$

z301 $\mathbb{Q}_{1,1}^{(c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$

z302 $\mathbb{Q}_{1,2}^{(c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$

z303 $\mathbb{Q}_{1,1}^{(c)}(E,b) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_1^{(s)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{10}$

z304 $\mathbb{Q}_{1,2}^{(c)}(E,b) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_1^{(s)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{10} - \frac{\sqrt{5}\mathbb{Q}_2^{(a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{10}$

z305 $\mathbb{Q}_{2,1}^{(c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$

z306 $\mathbb{Q}_{2,2}^{(c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$

z307 $\mathbb{Q}_{2,1}^{(c)}(E,1b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_0^{(s)}(A_1)}{2}$

z308 $\mathbb{Q}_{2,2}^{(c)}(E,1b) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_0^{(s)}(A_1)}{2}$

z309 $\mathbb{Q}_{2,1}^{(c)}(E,1c) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{14}$

z310 $\mathbb{Q}_{2,2}^{(c)}(E,1c) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{14}$

z311 $\mathbb{Q}_{2,1}^{(c)}(E,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$

z312 $\mathbb{Q}_{2,2}^{(c)}(E,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$

z313 $\mathbb{Q}_{2,1}^{(c)}(E,2b) = -\frac{\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$

z314 $\mathbb{Q}_{2,2}^{(c)}(E,2b) = \frac{\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$

z315 $\mathbb{Q}_{3,1}^{(c)}(E,1) = -\frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{30} - \frac{2\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{5}$

z316 $\mathbb{Q}_{3,2}^{(c)}(E,1) = \frac{2\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{30} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{5}$

z317 $\mathbb{Q}_{3,1}^{(c)}(E,2) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{6}$

z318 $\mathbb{Q}_{3,2}^{(c)}(E,2) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6}$

z319 $\mathbb{Q}_{4,1}^{(c)}(E,1) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{7}$

z320 $\mathbb{Q}_{4,2}^{(c)}(E,1) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{7}$

z321 $\mathbb{Q}_{1,1}^{(1,-1;c)}(E) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{10} - \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{10}$

z322 $\mathbb{Q}_{1,2}^{(1,-1;c)}(E) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{10} - \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{10}$

z323 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z324 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z325 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1b) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{14}$$

z326 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1b) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{14}$$

z327 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z328 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z329 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2b) = -\frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z330 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2b) = \frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z331 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,1) = -\frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{30} - \frac{2\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{5}$$

z332 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,1) = \frac{2\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{30} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{5}$$

z333 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,2) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{6}$$

z334 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,2) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6}$$

z335 $$\mathbb{Q}_{4,1}^{(1,-1;c)}(E,1) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{7}$$

z336 $$\mathbb{Q}_{4,2}^{(1,-1;c)}(E,1) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{7}$$

z337 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E) = \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} - \frac{\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z338 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} + \frac{\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z339 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,1) = -\frac{\sqrt{2}\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z340 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,1) = \frac{\sqrt{2}\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z341 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,2) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z342 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,2) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z343 $$\mathbb{Q}_{1,1}^{(1,1;c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z344 $$\mathbb{Q}_{1,2}^{(1,1;c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z345 $$\mathbb{Q}_{2,1}^{(1,1;c)}(E,1) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{2,1}^{(s)}(E,1)}{2}$$

z346 $$\mathbb{Q}_{2,2}^{(1,1;c)}(E,1) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{2,2}^{(s)}(E,1)}{2}$$

z347 $$\mathbb{G}_{2,1}^{(c)}(E,1) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z348 $$\mathbb{G}_{2,2}^{(c)}(E,1) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{6} + \frac{\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z349 $$\mathbb{G}_{2,1}^{(c)}(E,2) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{3}$$

z350 $$\mathbb{G}_{2,2}^{(c)}(E,2) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6}$$

z351 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,1) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z352 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,1) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(s)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(s)}(E)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(s)}(E)}{6} + \frac{\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z353 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{3}$$

z354 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(s)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(s)}(A_2)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(s)}(E)}{6}$$

z355 $$\mathbb{G}_{1,1}^{(1,0;c)}(E) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z356 $$\mathbb{G}_{1,2}^{(1,0;c)}(E) = \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(s)}(A_1)}{2}$$

z357 $$\mathbb{G}_{2,1}^{(1,0;c)}(E,1) = \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} + \frac{\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z358 $$\mathbb{G}_{2,2}^{(1,0;c)}(E,1) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(s)}(A_2)}{2} - \frac{\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

z359 $$\mathbb{G}_{2,1}^{(1,0;c)}(E,2) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{2}$$

z360 $$\mathbb{G}_{2,2}^{(1,0;c)}(E,2) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(s)}(E)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(s)}(E)}{2}$$

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

z29 $$\mathbb{Q}_{0}^{(c)}(A_1) = \mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{0}^{(b)}(A_1)$$

z30 $$\mathbb{Q}_{0}^{(1,-1;c)}(A_1) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z31 $$\mathbb{G}_0^{(1,-1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z32 $$\mathbb{G}_2^{(1,-1;c)}(A_1) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z157 $$\mathbb{Q}_1^{(c)}(A_2) = \mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_1^{(b)}(A_2)$$

z158 $$\mathbb{Q}_1^{(1,-1;c)}(A_2) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z159 $$\mathbb{G}_1^{(1,-1;c)}(A_2, a) = \mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_0^{(b)}(A_1)$$

z160 $$\mathbb{G}_1^{(1,-1;c)}(A_2, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z361 $$\mathbb{Q}_{1,1}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z362 $$\mathbb{Q}_{1,2}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z363 $$\mathbb{Q}_{2,1}^{(c)}(E, 1) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E, 1)}{2}$$

z364 $$\mathbb{Q}_{2,2}^{(c)}(E, 1) = \frac{\sqrt{2}\mathbb{Q}_0^{(a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E, 1)}{2}$$

z365 $$\mathbb{Q}_{1,1}^{(1,-1;c)}(E) = \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z366 $$\mathbb{Q}_{1,2}^{(1,-1;c)}(E) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z367 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E, 1) = \frac{\sqrt{2}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z368 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E, 1) = -\frac{\sqrt{2}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z369 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2)=\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}-\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z370 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2)=-\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}-\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z371 $$\mathbb{G}_{1,1}^{(1,-1;c)}(E)=\frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z372 $$\mathbb{G}_{1,2}^{(1,-1;c)}(E)=\frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z373 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,1)=\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2}+\frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z374 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,1)=-\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2}-\frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z375 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2)=\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}-\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z376 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2)=-\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}-\frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

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

z33 $$\mathbb{Q}_{0}^{(c)}(A_1,a)=\frac{\sqrt{3}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{3}+\frac{\sqrt{3}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{3}+\frac{\sqrt{3}\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1}^{(b)}(A_2)}{3}$$

z34 $$\mathbb{Q}_{0}^{(c)}(A_1,b)=\frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3}+\frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3}+\frac{\sqrt{3}\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z35 $$\mathbb{Q}_{2}^{(c)}(A_1,a)=-\frac{\sqrt{6}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{6}-\frac{\sqrt{6}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{6}+\frac{\sqrt{6}\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1}^{(b)}(A_2)}{3}$$

z36 $$\mathbb{Q}_{2}^{(c)}(A_1,b)=-\frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6}-\frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6}+\frac{\sqrt{6}\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z37 $$\mathbb{Q}_{2}^{(1,-1;c)}(A_1,a) = -\frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z38 $$\mathbb{Q}_{2}^{(1,-1;c)}(A_1,b) = -\frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z39 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_1,a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z40 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_1,b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z41 $$\mathbb{Q}_{0}^{(1,0;c)}(A_1,a) = \frac{\sqrt{3}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1}^{(b)}(A_2)}{3}$$

z42 $$\mathbb{Q}_{0}^{(1,0;c)}(A_1,b) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z43 $$\mathbb{Q}_{2}^{(1,0;c)}(A_1,a) = -\frac{\sqrt{6}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1}^{(b)}(A_2)}{3}$$

z44 $$\mathbb{Q}_{2}^{(1,0;c)}(A_1,b) = -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z45 $$\mathbb{G}_{0}^{(c)}(A_1) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{T}_{1,2}^{(a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z46 $$\mathbb{G}_{2}^{(c)}(A_1) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z47 $$\mathbb{G}_{0}^{(1,-1;c)}(A_1) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z48 $$\mathbb{G}_{2}^{(1,-1;c)}(A_1,a) = \mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{0}^{(b)}(A_1)$$

z49 $$\mathbb{G}_{2}^{(1,-1;c)}(A_1,b) = \mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{0}^{(b)}(A_1)$$

z50 $$\mathbb{G}_{2}^{(1,-1;c)}(A_1,c) = -\frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z51 $\mathbb{G}_3^{(1,-1;c)}(A_1,a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$

z52 $\mathbb{G}_3^{(1,-1;c)}(A_1,b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z53 $\mathbb{G}_0^{(1,0;c)}(A_1) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$

z54 $\mathbb{G}_2^{(1,0;c)}(A_1) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$

z55 $\mathbb{G}_0^{(1,1;c)}(A_1,a) = \mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_0^{(b)}(A_1)$

z56 $\mathbb{G}_0^{(1,1;c)}(A_1,b) = \mathbb{M}_0^{(1,1;a)}(A_1)\mathbb{T}_0^{(b)}(A_1)$

z161 $\mathbb{Q}_1^{(c)}(A_2,a) = \mathbb{Q}_1^{(a)}(A_2)\mathbb{Q}_0^{(b)}(A_1)$

z162 $\mathbb{Q}_1^{(c)}(A_2,b) = -\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$

z163 $\mathbb{Q}_1^{(c)}(A_2,c) = \mathbb{T}_1^{(a)}(A_2)\mathbb{T}_0^{(b)}(A_1)$

z164 $\mathbb{Q}_1^{(c)}(A_2,d) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{1,2}^{(a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$

z165 $\mathbb{Q}_1^{(1,-1;c)}(A_2,a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$

z166 $\mathbb{Q}_1^{(1,-1;c)}(A_2,b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{2}$

z167 $\mathbb{Q}_3^{(1,-1;c)}(A_2,2a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$

z168 $\mathbb{Q}_3^{(1,-1;c)}(A_2,2b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{2}$

z169 $\mathbb{Q}_1^{(1,0;c)}(A_2,a) = \mathbb{Q}_1^{(1,0;a)}(A_2)\mathbb{Q}_0^{(b)}(A_1)$

z170 $\mathbb{Q}_{1}^{(1,0;c)}(A_2,b) = -\frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$

z171 $\mathbb{Q}_{1}^{(1,0;c)}(A_2,c) = \mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{0}^{(b)}(A_1)$

z172 $\mathbb{Q}_{1}^{(1,0;c)}(A_2,d) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$

z173 $\mathbb{G}_{1}^{(c)}(A_2,a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$

z174 $\mathbb{G}_{1}^{(c)}(A_2,b) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z175 $\mathbb{G}_{1}^{(1,-1;c)}(A_2,a) = \frac{\sqrt{30}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1}^{(b)}(A_2)}{5}$

z176 $\mathbb{G}_{1}^{(1,-1;c)}(A_2,b) = \frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{5}$

z177 $\mathbb{G}_{3}^{(1,-1;c)}(A_2,1a) = -\frac{\sqrt{5}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{5} + \frac{\sqrt{15}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1}^{(b)}(A_2)}{5}$

z178 $\mathbb{G}_{3}^{(1,-1;c)}(A_2,1b) = -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{5} + \frac{\sqrt{15}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{5}$

z179 $\mathbb{G}_{3}^{(1,-1;c)}(A_2,2a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$

z180 $\mathbb{G}_{3}^{(1,-1;c)}(A_2,2b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z181 $\mathbb{G}_{1}^{(1,0;c)}(A_2,a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$

z182 $\mathbb{G}_{1}^{(1,0;c)}(A_2,b) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z183 $\mathbb{G}_{1}^{(1,1;c)}(A_2,a) = \mathbb{G}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1}^{(b)}(A_2)$

z184 $$\mathbb{G}_{1}^{(1,1;c)}(A_2,b) = \mathbb{M}_{0}^{(1,1;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)$$

z377 $$\mathbb{Q}_{1,1}^{(c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z378 $$\mathbb{Q}_{1,2}^{(c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z379 $$\mathbb{Q}_{1,1}^{(c)}(E,b) = -\frac{\sqrt{2}\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z380 $$\mathbb{Q}_{1,2}^{(c)}(E,b) = \frac{\sqrt{2}\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z381 $$\mathbb{Q}_{1,1}^{(c)}(E,c) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z382 $$\mathbb{Q}_{1,2}^{(c)}(E,c) = \frac{\sqrt{2}\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z383 $$\mathbb{Q}_{1,1}^{(c)}(E,d) = -\frac{\sqrt{2}\mathbb{T}_{1}^{(a)}(A_2)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z384 $$\mathbb{Q}_{1,2}^{(c)}(E,d) = \frac{\sqrt{2}\mathbb{T}_{1}^{(a)}(A_2)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z385 $$\mathbb{Q}_{2,1}^{(c)}(E,1a) = \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z386 $$\mathbb{Q}_{2,2}^{(c)}(E,1a) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z387 $$\mathbb{Q}_{2,1}^{(c)}(E,1b) = \frac{\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z388 $$\mathbb{Q}_{2,2}^{(c)}(E,1b) = -\frac{\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z389 $$\mathbb{Q}_{2,1}^{(c)}(E,2a) = \frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z390 $$\mathbb{Q}_{2,2}^{(c)}(E,2a) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z391 $$\mathbb{Q}_{2,1}^{(c)}(E,2b) = \frac{\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z392 $$\mathbb{Q}_{2,2}^{(c)}(E,2b) = -\frac{\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z393 $$\mathbb{Q}_{3,1}^{(c)}(E,2) = \frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z394 $$\mathbb{Q}_{3,2}^{(c)}(E,2) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z395 $$\mathbb{Q}_{1,1}^{(1,-1;c)}(E,a) = -\frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{10} + \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{10} - \frac{\sqrt{30}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{10}$$

z396 $$\mathbb{Q}_{1,2}^{(1,-1;c)}(E,a) = \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{10} + \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{10} - \frac{\sqrt{30}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{10}$$

z397 $$\mathbb{Q}_{1,1}^{(1,-1;c)}(E,b) = \frac{\sqrt{42}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{14} - \frac{\sqrt{42}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{14} - \frac{\sqrt{14}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{M}_{1,1}^{(b)}(E)}{14}$$

z398 $$\mathbb{Q}_{1,2}^{(1,-1;c)}(E,b) = -\frac{\sqrt{42}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{14} - \frac{\sqrt{42}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{14} - \frac{\sqrt{14}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{M}_{1,2}^{(b)}(E)}{14}$$

z399 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1a) = \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{6} + \frac{\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z400 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1a) = -\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{6} + \frac{\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z401 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1b) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z402 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1b) = -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z403 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2a) = -\frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{3}$$

z404 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2a) = \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{3} + \frac{\sqrt{3}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6}$$

z405 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2b) = -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z406 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2b) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6}$$

z407 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,1a) = \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{5}$$

z408 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,1a) = -\frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{5}$$

z409 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,1b) = \frac{\sqrt{7}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{14} - \frac{\sqrt{7}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{14} + \frac{\sqrt{21}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{M}_{1,1}^{(b)}(E)}{7}$$

z410 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,1b) = -\frac{\sqrt{7}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{14} - \frac{\sqrt{7}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{14} + \frac{\sqrt{21}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{M}_{1,2}^{(b)}(E)}{7}$$

z411 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,2) = \frac{\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z412 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,2) = -\frac{\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z413 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z414 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z415 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E,b) = -\frac{\sqrt{2}\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z416 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E,b) = \frac{\sqrt{2}\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z417 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E,c) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z418 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E,c) = \frac{\sqrt{2}\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z419 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E,d) = -\frac{\sqrt{2}\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z420 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E,d) = \frac{\sqrt{2}\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z421 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,1a) = \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z422 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,1a) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z423 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,1b) = \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z424 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,1b) = -\frac{\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z425 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,2a) = \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z426 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,2a) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z427 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,2b) = \frac{\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z428 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,2b) = -\frac{\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z429 $$\mathbb{Q}_{3,1}^{(1,0;c)}(E,2) = \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z430 $$\mathbb{Q}_{3,2}^{(1,0;c)}(E,2) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z431 $$\mathbb{Q}_{1,1}^{(1,1;c)}(E) = \frac{\sqrt{2}\mathbb{M}_{0}^{(1,1;a)}(A_1)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z432 $$\mathbb{Q}_{1,2}^{(1,1;c)}(E) = \frac{\sqrt{2}\mathbb{M}_{0}^{(1,1;a)}(A_1)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z433 $$\mathbb{G}_{1,1}^{(c)}(E,a) = \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z434 $$\mathbb{G}_{1,2}^{(c)}(E,a) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z435 $$\mathbb{G}_{1,1}^{(c)}(E,b) = \frac{\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z436 $$\mathbb{G}_{1,2}^{(c)}(E,b) = -\frac{\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z437 $$\mathbb{G}_{2,1}^{(c)}(E,2) = \frac{\mathbb{T}_{1,1}^{(a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z438 $$\mathbb{G}_{2,2}^{(c)}(E,2) = -\frac{\mathbb{T}_{1,1}^{(a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z439 $$\mathbb{G}_{1,1}^{(1,-1;c)}(E,a) = \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{10}$$

z440 $$\mathbb{G}_{1,2}^{(1,-1;c)}(E,a) = \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{10}$$

z441 $$\mathbb{G}_{1,1}^{(1,-1;c)}(E,b) = \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{10}$$

z442 $$\mathbb{G}_{1,2}^{(1,-1;c)}(E,b) = \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{10}$$

z443 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,1a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z444 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,1a) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z445 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,1b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z446 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,1b) = \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z447 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z448 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2a) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z449 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2b) = -\frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z450 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2b) = \frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} + \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z451 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2c) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z452 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2c) = \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z453 $$\mathbb{G}_{3,1}^{(1,-1;c)}(E,1a) = -\frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{30} - \frac{2\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{5}$$

z454 $$\mathbb{G}_{3,2}^{(1,-1;c)}(E,1a) = \frac{2\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{5}$$

z455 $$\mathbb{G}_{3,1}^{(1,-1;c)}(E,1b) = -\frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{30} - \frac{2\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{5}$$

z456 $$\mathbb{G}_{3,2}^{(1,-1;c)}(E,1b) = \frac{2\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{5}$$

z457 $$\mathbb{G}_{3,1}^{(1,-1;c)}(E,2a) = \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{6}$$

z458 $$\mathbb{G}_{3,2}^{(1,-1;c)}(E,2a) = -\frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{6}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6}$$

z459 $$\mathbb{G}_{3,1}^{(1,-1;c)}(E,2b) = \frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6}$$

z460 $$\mathbb{G}_{3,2}^{(1,-1;c)}(E,2b) = -\frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6}$$

z461 $$\mathbb{G}_{1,1}^{(1,0;c)}(E,a) = \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z462 $$\mathbb{G}_{1,2}^{(1,0;c)}(E,a) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z463 $$\mathbb{G}_{1,1}^{(1,0;c)}(E,b) = \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z464 $$\mathbb{G}_{1,2}^{(1,0;c)}(E,b) = -\frac{\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z465 $$\mathbb{G}_{2,1}^{(1,0;c)}(E,2) = \frac{\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z466 $$\mathbb{G}_{2,2}^{(1,0;c)}(E,2) = -\frac{\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z467 $$\mathbb{G}_{1,1}^{(1,1;c)}(E,a) = \frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z468 $$\mathbb{G}_{1,2}^{(1,1;c)}(E,a) = \frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z469 $$\mathbb{G}_{1,1}^{(1,1;c)}(E,b) = \frac{\sqrt{2}\mathbb{M}_{0}^{(1,1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z470 $$\mathbb{G}_{1,2}^{(1,1;c)}(E,b) = \frac{\sqrt{2}\mathbb{M}_{0}^{(1,1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z471 $$\mathbb{G}_{2,1}^{(1,1;c)}(E,1) = \frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z472 $$\mathbb{G}_{2,2}^{(1,1;c)}(E,1) = \frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

- 'A'-'A' bond-cluster : `A;A_001_1`

* bra: $\langle p_x,\uparrow|$, $\langle p_x,\downarrow|$, $\langle p_y,\uparrow|$, $\langle p_y,\downarrow|$, $\langle p_z,\uparrow|$, $\langle p_z,\downarrow|$
* ket: $|p_x,\uparrow\rangle$, $|p_x,\downarrow\rangle$, $|p_y,\uparrow\rangle$, $|p_y,\downarrow\rangle$, $|p_z,\uparrow\rangle$, $|p_z,\downarrow\rangle$
* wyckoff: `6a@6c`

z57 $$\mathbb{Q}_{0}^{(c)}(A_1,a) = \mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{0}^{(b)}(A_1)$$

z58 $$\mathbb{Q}_{0}^{(c)}(A_1,b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z59 $$\mathbb{Q}_{0}^{(c)}(A_1,c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z60 $$\mathbb{Q}_{2}^{(c)}(A_1) = \mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{0}^{(b)}(A_1)$$

z61 $$\mathbb{Q}_{3}^{(c)}(A_1) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z62 $$\mathbb{Q}_{4}^{(c)}(A_1,2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z63 $$\mathbb{Q}_{0}^{(1,-1;c)}(A_1,a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z64 $$\mathbb{Q}_{0}^{(1,-1;c)}(A_1,b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z65 $$\mathbb{Q}_{2}^{(1,-1;c)}(A_1,a) = \mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{0}^{(b)}(A_1)$$

z66 $$\mathbb{Q}_{2}^{(1,-1;c)}(A_1,b) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z67 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_1,a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z68 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_1,b) = -\frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{4} - \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{4} + \frac{\sqrt{3}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1}^{(b)}(A_2)}{2}$$

z69 $$\mathbb{Q}_{4}^{(1,-1;c)}(A_1,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z70 $$\mathbb{Q}_{4}^{(1,-1;c)}(A_1,2b) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z71 $$\mathbb{Q}_{2}^{(1,0;c)}(A_1,a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z72 $$\mathbb{Q}_{2}^{(1,0;c)}(A_1,b) = \mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{0}^{(b)}(A_1)$$

z73 $$\mathbb{Q}_{2}^{(1,0;c)}(A_1,c) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z74 $$\mathbb{Q}_{3}^{(1,0;c)}(A_1) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z75 $$\mathbb{Q}_{0}^{(1,1;c)}(A_1,a) = \mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{0}^{(b)}(A_1)$$

z76 $$\mathbb{Q}_{0}^{(1,1;c)}(A_1,b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z77 $$\mathbb{G}_{0}^{(c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

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

z79 $$\mathbb{G}_{2}^{(c)}(A_1,b) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z80 $$\mathbb{G}_{0}^{(1,-1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

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

z82 $$\mathbb{G}_{2}^{(1,-1;c)}(A_1,b) = \frac{\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{7} + \frac{\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{7} + \frac{\sqrt{21}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1}^{(b)}(A_2)}{7}$$

z83 $$\mathbb{G}_{2}^{(1,-1;c)}(A_1,c) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z84 $\mathbb{G}_{3}^{(1,-1;c)}(A_1) = \mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{0}^{(b)}(A_1)$

z85 $\mathbb{G}_{4}^{(1,-1;c)}(A_1,1) = -\frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{14} - \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{14} + \frac{2\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1}^{(b)}(A_2)}{7}$

z86 $\mathbb{G}_{4}^{(1,-1;c)}(A_1,2) = \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{4} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{4} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1}^{(b)}(A_2)}{2}$

z87 $\mathbb{G}_{0}^{(1,0;c)}(A_1) = \frac{\sqrt{3}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1}^{(b)}(A_2)}{3}$

z88 $\mathbb{G}_{2}^{(1,0;c)}(A_1,a) = -\frac{\sqrt{6}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1}^{(b)}(A_2)}{3}$

z89 $\mathbb{G}_{2}^{(1,0;c)}(A_1,b) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z90 $\mathbb{G}_{3}^{(1,0;c)}(A_1) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{2}$

z91 $\mathbb{G}_{0}^{(1,1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$

z92 $\mathbb{G}_{2}^{(1,1;c)}(A_1) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$

z185 $\mathbb{Q}_{1}^{(c)}(A_2,a) = \mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{1}^{(b)}(A_2)$

z186 $\mathbb{Q}_{1}^{(c)}(A_2,b) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1}^{(b)}(A_2)}{5}$

z187 $\mathbb{Q}_{1}^{(c)}(A_2,c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z188 $\mathbb{Q}_{3}^{(c)}(A_2,1) = -\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{5} + \frac{\sqrt{15}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1}^{(b)}(A_2)}{5}$

z189 $\mathbb{Q}_{3}^{(c)}(A_2,2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$

z190 $$\mathbb{Q}_{4}^{(c)}(A_2) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z191 $$\mathbb{Q}_{1}^{(1,-1;c)}(A_2,a) = \frac{\sqrt{30}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1}^{(b)}(A_2)}{5}$$

z192 $$\mathbb{Q}_{1}^{(1,-1;c)}(A_2,b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z193 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_2,1a) = -\frac{\sqrt{5}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{5} + \frac{\sqrt{15}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1}^{(b)}(A_2)}{5}$$

z194 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_2,1b) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z195 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_2,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z196 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_2,2b) = -\frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{4} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{4} - \frac{\sqrt{3}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{2}$$

z197 $$\mathbb{Q}_{4}^{(1,-1;c)}(A_2,a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z198 $$\mathbb{Q}_{4}^{(1,-1;c)}(A_2,b) = -\frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z199 $$\mathbb{Q}_{1}^{(1,0;c)}(A_2,a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z200 $$\mathbb{Q}_{1}^{(1,0;c)}(A_2,b) = \frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{5}$$

z201 $$\mathbb{Q}_{3}^{(1,0;c)}(A_2,1) = -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{5} + \frac{\sqrt{15}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{5}$$

z202 $$\mathbb{Q}_{3}^{(1,0;c)}(A_2,2) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z203 $$\mathbb{Q}_{1}^{(1,1;c)}(A_2,a) = \mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1}^{(b)}(A_2)$$

z204 $\mathbb{Q}_{1}^{(1,1;c)}(A_2,b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z205 $\mathbb{G}_{1}^{(c)}(A_2,a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$

z206 $\mathbb{G}_{1}^{(c)}(A_2,b) = \mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{0}^{(b)}(A_1)$

z207 $\mathbb{G}_{1}^{(c)}(A_2,c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$

z208 $\mathbb{G}_{1}^{(1,-1;c)}(A_2,a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$

z209 $\mathbb{G}_{1}^{(1,-1;c)}(A_2,b) = \mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{0}^{(b)}(A_1)$

z210 $\mathbb{G}_{1}^{(1,-1;c)}(A_2,c) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$

z211 $\mathbb{G}_{3}^{(1,-1;c)}(A_2,1a) = \mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{0}^{(b)}(A_1)$

z212 $\mathbb{G}_{3}^{(1,-1;c)}(A_2,1b) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{2}$

z213 $\mathbb{G}_{3}^{(1,-1;c)}(A_2,2) = \mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{0}^{(b)}(A_1)$

z214 $\mathbb{G}_{4}^{(1,-1;c)}(A_2) = -\frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{4} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{4} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{2}$

z215 $\mathbb{G}_{1}^{(1,0;c)}(A_2,a) = \mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{0}^{(b)}(A_1)$

z216 $\mathbb{G}_{1}^{(1,0;c)}(A_2,b) = -\frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$

z217 $\mathbb{G}_{1}^{(1,0;c)}(A_2,c) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{2}$

z218 $\mathbb{G}_{3}^{(1,0;c)}(A_2,2) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{2}$

z219 $\mathbb{G}_{1}^{(1,1;c)}(A_2,a) = \mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{0}^{(b)}(A_1)$

z220 $\mathbb{G}_{1}^{(1,1;c)}(A_2,b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$

z473 $\mathbb{Q}_{1,1}^{(c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$

z474 $\mathbb{Q}_{1,2}^{(c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$

z475 $\mathbb{Q}_{1,1}^{(c)}(E,b) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{10}$

z476 $\mathbb{Q}_{1,2}^{(c)}(E,b) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{10}$

z477 $\mathbb{Q}_{1,1}^{(c)}(E,c) = \frac{\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z478 $\mathbb{Q}_{1,2}^{(c)}(E,c) = -\frac{\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z479 $\mathbb{Q}_{2,1}^{(c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$

z480 $\mathbb{Q}_{2,2}^{(c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$

z481 $\mathbb{Q}_{2,1}^{(c)}(E,1b) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$

z482 $\mathbb{Q}_{2,2}^{(c)}(E,1b) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$

z483 $\mathbb{Q}_{2,1}^{(c)}(E,1c) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{14}$

z484 $\mathbb{Q}_{2,2}^{(c)}(E,1c) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{14}$

z485 $$\mathbb{Q}_{2,1}^{(c)}(E,1d) = \frac{\sqrt{2}\mathbb{M}_{1}^{(a)}(A_2)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z486 $$\mathbb{Q}_{2,2}^{(c)}(E,1d) = -\frac{\sqrt{2}\mathbb{M}_{1}^{(a)}(A_2)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z487 $$\mathbb{Q}_{2,1}^{(c)}(E,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z488 $$\mathbb{Q}_{2,2}^{(c)}(E,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z489 $$\mathbb{Q}_{2,1}^{(c)}(E,2b) = -\frac{\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z490 $$\mathbb{Q}_{2,2}^{(c)}(E,2b) = \frac{\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z491 $$\mathbb{Q}_{2,1}^{(c)}(E,2c) = \frac{\mathbb{M}_{1,1}^{(a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z492 $$\mathbb{Q}_{2,2}^{(c)}(E,2c) = -\frac{\mathbb{M}_{1,1}^{(a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z493 $$\mathbb{Q}_{3,1}^{(c)}(E,1) = -\frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{30} - \frac{2\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{5}$$

z494 $$\mathbb{Q}_{3,2}^{(c)}(E,1) = \frac{2\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{5}$$

z495 $$\mathbb{Q}_{3,1}^{(c)}(E,2) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{6}$$

z496 $$\mathbb{Q}_{3,2}^{(c)}(E,2) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6}$$

z497 $$\mathbb{Q}_{4,1}^{(c)}(E,1) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{7}$$

z498 $$\mathbb{Q}_{4,2}^{(c)}(E,1) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{7}$$

z499 $$\mathbb{Q}_{1,1}^{(1,-1;c)}(E,a) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{10}$$

z500 $$\mathbb{Q}_{1,2}^{(1,-1;c)}(E,a) = \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{10}$$

z501 $$\mathbb{Q}_{1,1}^{(1,-1;c)}(E,b) = \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z502 $$\mathbb{Q}_{1,2}^{(1,-1;c)}(E,b) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z503 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z504 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z505 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1b) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{14}$$

z506 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1b) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{14} + \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{14} + \frac{\sqrt{14}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{14}$$

z507 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1c) = \frac{\sqrt{130}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{26} - \frac{\sqrt{130}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{26} - \frac{\sqrt{78}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{M}_{1,2}^{(b)}(E)}{26}$$

z508 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1c) = -\frac{\sqrt{130}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{26} - \frac{\sqrt{130}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{26} + \frac{\sqrt{78}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{M}_{1,1}^{(b)}(E)}{26}$$

z509 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1d) = \frac{\sqrt{2}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z510 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1d) = -\frac{\sqrt{2}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z511 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z512 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2a) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z513 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2b) = -\frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z514 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2b) = \frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} + \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z515 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2c) = -\frac{\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{8} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{8} + \frac{\sqrt{15}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{M}_{1,1}^{(b)}(E)}{8} + \frac{\sqrt{15}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{M}_{1,2}^{(b)}(E)}{8}$$

z516 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2c) = \frac{\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{8} + \frac{\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{8} + \frac{\sqrt{15}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{M}_{1,2}^{(b)}(E)}{8} - \frac{\sqrt{15}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{M}_{1,1}^{(b)}(E)}{8}$$

z517 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2d) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z518 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2d) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z519 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,1a) = -\frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{30} - \frac{2\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{5}$$

z520 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,1a) = \frac{2\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{15}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{5}$$

z521 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,1b) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{12} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{12} - \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z522 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,1b) = -\frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{12} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z523 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,2a) = \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{6}$$

z524 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,2a) = -\frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{6}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6}$$

z525 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,2b) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{12} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{12} - \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{4} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,2}^{(b)}(E)}{4}$$

z526 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,2b) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{12} + \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{12} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{4} - \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,1}^{(b)}(E)}{4}$$

z527 $$\mathbb{Q}_{4,1}^{(1,-1;c)}(E,1a) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{7}$$

z528 $$\mathbb{Q}_{4,2}^{(1,-1;c)}(E,1a) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{7}$$

z529 $$\mathbb{Q}_{4,1}^{(1,-1;c)}(E,1b) = \frac{\sqrt{39}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{26} - \frac{\sqrt{39}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{26} + \frac{\sqrt{65}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{M}_{1,2}^{(b)}(E)}{13}$$

z530 $$\mathbb{Q}_{4,2}^{(1,-1;c)}(E,1b) = -\frac{\sqrt{39}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{26} - \frac{\sqrt{39}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{26} - \frac{\sqrt{65}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{M}_{1,1}^{(b)}(E)}{13}$$

z531 $$\mathbb{Q}_{4,1}^{(1,-1;c)}(E,2) = \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{M}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z532 $$\mathbb{Q}_{4,2}^{(1,-1;c)}(E,2) = \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{M}_{1,2}^{(b)}(E)}{2} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z533 $$\mathbb{Q}_{4,1}^{(1,-1;c)}(E,3) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{8} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{8} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{M}_{1,1}^{(b)}(E)}{8} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{M}_{1,2}^{(b)}(E)}{8}$$

z534 $$\mathbb{Q}_{4,2}^{(1,-1;c)}(E,3) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{8} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{8} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{M}_{1,2}^{(b)}(E)}{8} - \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{M}_{1,1}^{(b)}(E)}{8}$$

z535 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E,a) = \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z536 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E,a) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z537 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E,b) = \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{10}$$

z538 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E,b) = \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{10}$$

z539 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,1a) = -\frac{\sqrt{2}\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z540 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,1a) = \frac{\sqrt{2}\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z541 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,1b) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z542 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,1b) = \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z543 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,1c) = \frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{10} + \frac{\sqrt{30}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{M}_{1,1}^{(b)}(E)}{10}$$

z544 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,1c) = -\frac{\sqrt{10}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{10}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{10} + \frac{\sqrt{30}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{M}_{1,2}^{(b)}(E)}{10}$$

z545 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,2a) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z546 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,2a) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z547 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,2b) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z548 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,2b) = \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z549 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,2c) = -\frac{\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{2} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z550 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,2c) = \frac{\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{M}_{1,2}^{(b)}(E)}{2} + \frac{\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z551 $$\mathbb{Q}_{3,1}^{(1,0;c)}(E,1) = -\frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{30} - \frac{2\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{5}$$

z552 $$\mathbb{Q}_{3,2}^{(1,0;c)}(E,1) = \frac{2\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{5}$$

z553 $$\mathbb{Q}_{3,1}^{(1,0;c)}(E,2) = \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6}$$

z554 $$\mathbb{Q}_{3,2}^{(1,0;c)}(E,2) = -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6}$$

z555 $$\mathbb{Q}_{1,1}^{(1,1;c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z556 $$\mathbb{Q}_{1,2}^{(1,1;c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z557 $$\mathbb{Q}_{1,1}^{(1,1;c)}(E,b) = \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z558 $$\mathbb{Q}_{1,2}^{(1,1;c)}(E,b) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z559 $$\mathbb{Q}_{2,1}^{(1,1;c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{2,1}^{(b)}(E,1)}{2}$$

z560 $$\mathbb{Q}_{2,2}^{(1,1;c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{2,2}^{(b)}(E,1)}{2}$$

z561 $$\mathbb{Q}_{2,1}^{(1,1;c)}(E,1b) = \frac{\sqrt{2}\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z562 $$\mathbb{Q}_{2,2}^{(1,1;c)}(E,1b) = -\frac{\sqrt{2}\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z563 $$\mathbb{Q}_{2,1}^{(1,1;c)}(E,2) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2}$$

z564 $$\mathbb{Q}_{2,2}^{(1,1;c)}(E,2) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{M}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{M}_{1,1}^{(b)}(E)}{2}$$

z565 $$\mathbb{G}_{1,1}^{(c)}(E) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z566 $$\mathbb{G}_{1,2}^{(c)}(E) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z567 $$\mathbb{G}_{2,1}^{(c)}(E,1a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z568 $$\mathbb{G}_{2,2}^{(c)}(E,1a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z569 $$\mathbb{G}_{2,1}^{(c)}(E,1b) = \frac{\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z570 $$\mathbb{G}_{2,2}^{(c)}(E,1b) = -\frac{\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z571 $$\mathbb{G}_{2,1}^{(c)}(E,2a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{3}$$

z572 $$\mathbb{G}_{2,2}^{(c)}(E,2a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6}$$

z573 $$\mathbb{G}_{2,1}^{(c)}(E,2b) = \frac{\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z574 $$\mathbb{G}_{2,2}^{(c)}(E,2b) = -\frac{\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z575 $$\mathbb{G}_{1,1}^{(1,-1;c)}(E) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z576 $$\mathbb{G}_{1,2}^{(1,-1;c)}(E) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z577 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,1a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z578 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,1a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{6} + \frac{\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z579 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,1b) = \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{42} + \frac{2\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{21} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{42} - \frac{\sqrt{14}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,2}^{(b)}(E)}{14}$$

z580 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,1b) = -\frac{2\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{21} - \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{42} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{42} + \frac{\sqrt{14}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,1}^{(b)}(E)}{14}$$

z581 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,1c) = \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z582 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,1c) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z583 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2a) = -\frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{3}$$

z584 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2a) = \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1}^{(b)}(A_2)}{3} + \frac{\sqrt{3}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{6}$$

z585 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2b) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{42} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{42} + \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{42} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{14} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,2}^{(b)}(E)}{14}$$

z586 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2b) = \frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{42} - \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{42} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{42} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{14} - \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,1}^{(b)}(E)}{14}$$

z587 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2c) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z588 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2c) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z589 $$\mathbb{G}_{3,1}^{(1,-1;c)}(E,1) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z590 $$\mathbb{G}_{3,2}^{(1,-1;c)}(E,1) = \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z591 $$\mathbb{G}_{3,1}^{(1,-1;c)}(E,2) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z592 $$\mathbb{G}_{3,2}^{(1,-1;c)}(E,2) = \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{0}^{(b)}(A_1)}{2}$$

z593 $$\mathbb{G}_{4,1}^{(1,-1;c)}(E,1) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{28} + \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{28} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{28} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,2}^{(b)}(E)}{14}$$

z594 $$\mathbb{G}_{4,2}^{(1,-1;c)}(E,1) = -\frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{28} + \frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{28} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{28} - \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,1}^{(b)}(E)}{14}$$

z595 $$\mathbb{G}_{4,1}^{(1,-1;c)}(E,2) = \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z596 $$\mathbb{G}_{4,2}^{(1,-1;c)}(E,2) = \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{2} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z597 $$\mathbb{G}_{4,1}^{(1,-1;c)}(E,3) = \frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{28} - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{28} + \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{14} - \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{28} - \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,2}^{(b)}(E)}{28}$$

z598 $$\mathbb{G}_{4,2}^{(1,-1;c)}(E,3) = -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{28} - \frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{14} - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{28} - \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{28} + \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,1}^{(b)}(E)}{28}$$

z599 $$\mathbb{G}_{1,1}^{(1,0;c)}(E,a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z600 $$\mathbb{G}_{1,2}^{(1,0;c)}(E,a) = \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z601 $$\mathbb{G}_{1,1}^{(1,0;c)}(E,b) = \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{M}_{1,1}^{(b)}(E)}{5}$$

z602 $$\mathbb{G}_{1,2}^{(1,0;c)}(E,b) = -\frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{M}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{M}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{M}_{1,2}^{(b)}(E)}{5}$$

z603 $$\mathbb{G}_{2,1}^{(1,0;c)}(E,1a) = \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z604 $$\mathbb{G}_{2,2}^{(1,0;c)}(E,1a) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z605 $$\mathbb{G}_{2,1}^{(1,0;c)}(E,1b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z606 $$\mathbb{G}_{2,2}^{(1,0;c)}(E,1b) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z607 $$\mathbb{G}_{2,1}^{(1,0;c)}(E,2a) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z608 $$\mathbb{G}_{2,2}^{(1,0;c)}(E,2a) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z609 $$\mathbb{G}_{2,1}^{(1,0;c)}(E,2b) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z610 $$\mathbb{G}_{2,2}^{(1,0;c)}(E,2b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6}$$

z611 $\mathbb{G}_{1,1}^{(1,1;c)}(E) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$

z612 $\mathbb{G}_{1,2}^{(1,1;c)}(E) = \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{0}^{(b)}(A_1)}{2}$

z613 $\mathbb{G}_{2,1}^{(1,1;c)}(E,1) = \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z614 $\mathbb{G}_{2,2}^{(1,1;c)}(E,1) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z615 $\mathbb{G}_{2,1}^{(1,1;c)}(E,2) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z616 $\mathbb{G}_{2,2}^{(1,1;c)}(E,2) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

- 'A'-'A' bond-cluster : `A;A_002_1`
  * bra: $\langle s,\uparrow|$, $\langle s,\downarrow|$
  * ket: $|s,\uparrow\rangle$, $|s,\downarrow\rangle$
  * wyckoff: `3a@3b`

z93 $\mathbb{Q}_{0}^{(c)}(A_1) = \mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{0}^{(b)}(A_1)$

z94 $\mathbb{G}_{0}^{(1,-1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$

z95 $\mathbb{G}_{2}^{(1,-1;c)}(A_1) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$

z221 $\mathbb{Q}_{1}^{(1,-1;c)}(A_2) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z617 $\mathbb{Q}_{1,1}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$

z618 $\mathbb{Q}_{1,2}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$

z619 $\mathbb{Q}_{1,1}^{(1,-1;c)}(E) = \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z620 $\mathbb{Q}_{1,2}^{(1,-1;c)}(E) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z621 $\mathbb{G}_{2,1}^{(1,-1;c)}(E,1) = \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z622 $\mathbb{G}_{2,2}^{(1,-1;c)}(E,1) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z623 $\mathbb{G}_{2,1}^{(1,-1;c)}(E,2) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z624 $\mathbb{G}_{2,2}^{(1,-1;c)}(E,2) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

- 'A'-'A' bond-cluster : A;A_002_1
  * 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@3b

z96 $\mathbb{Q}_{0}^{(c)}(A_1,a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$

z97 $\mathbb{Q}_{0}^{(c)}(A_1,b) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$

z98 $\mathbb{Q}_{2}^{(c)}(A_1) = -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$

z99 $\mathbb{Q}_{2}^{(1,-1;c)}(A_1,a) = -\frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$

z100 $\mathbb{Q}_{2}^{(1,-1;c)}(A_1,b) = -\frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z101 $\mathbb{Q}_{0}^{(1,0;c)}(A_1,a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$

z102 $\mathbb{Q}_0^{(1,0;c)}(A_1,b) = \frac{\sqrt{3}\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$

z103 $\mathbb{Q}_2^{(1,0;c)}(A_1) = -\frac{\sqrt{6}\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$

z104 $\mathbb{G}_2^{(1,-1;c)}(A_1) = \mathbb{G}_2^{(1,-1;a)}(A_1)\mathbb{Q}_0^{(b)}(A_1)$

z105 $\mathbb{G}_3^{(1,-1;c)}(A_1,a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$

z106 $\mathbb{G}_3^{(1,-1;c)}(A_1,b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z107 $\mathbb{G}_0^{(1,1;c)}(A_1) = \mathbb{G}_0^{(1,1;a)}(A_1)\mathbb{Q}_0^{(b)}(A_1)$

z222 $\mathbb{Q}_1^{(c)}(A_2) = \mathbb{Q}_1^{(a)}(A_2)\mathbb{Q}_0^{(b)}(A_1)$

z223 $\mathbb{Q}_1^{(1,0;c)}(A_2) = \mathbb{Q}_1^{(1,0;a)}(A_2)\mathbb{Q}_0^{(b)}(A_1)$

z224 $\mathbb{G}_1^{(c)}(A_2,a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$

z225 $\mathbb{G}_1^{(c)}(A_2,b) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z226 $\mathbb{G}_1^{(1,-1;c)}(A_2,a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$

z227 $\mathbb{G}_1^{(1,-1;c)}(A_2,b) = \frac{\sqrt{30}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{5}$

z228 $\mathbb{G}_3^{(1,-1;c)}(A_2,1) = -\frac{\sqrt{5}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{5} + \frac{\sqrt{15}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{5}$

z229 $\mathbb{G}_3^{(1,-1;c)}(A_2,2a) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$

z230 $\mathbb{G}_3^{(1,-1;c)}(A_2,2b) = \frac{\sqrt{2}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z231 $$\mathbb{G}_{1}^{(1,0;c)}(A_2,a) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z232 $$\mathbb{G}_{1}^{(1,0;c)}(A_2,b) = \frac{\sqrt{2}\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z233 $$\mathbb{G}_{1}^{(1,1;c)}(A_2) = \mathbb{M}_{0}^{(1,1;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)$$

z625 $$\mathbb{Q}_{1,1}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z626 $$\mathbb{Q}_{1,2}^{(c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z627 $$\mathbb{Q}_{2,1}^{(c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z628 $$\mathbb{Q}_{2,2}^{(c)}(E,1a) = -\frac{\sqrt{2}\mathbb{Q}_{1}^{(a)}(A_2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z629 $$\mathbb{Q}_{2,1}^{(c)}(E,1b) = \frac{\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z630 $$\mathbb{Q}_{2,2}^{(c)}(E,1b) = -\frac{\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z631 $$\mathbb{Q}_{2,1}^{(c)}(E,2a) = \frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z632 $$\mathbb{Q}_{2,2}^{(c)}(E,2a) = -\frac{\mathbb{Q}_{1,1}^{(a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z633 $$\mathbb{Q}_{2,1}^{(c)}(E,2b) = \frac{\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z634 $$\mathbb{Q}_{2,2}^{(c)}(E,2b) = -\frac{\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z635 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1a) = \frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{10} + \frac{\sqrt{30}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{10}$$

z636 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1a) = -\frac{\sqrt{10}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{10}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{10} + \frac{\sqrt{30}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{10}$$

z637 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1b) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z638 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1b) = -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z639 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2a) = -\frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2} + \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z640 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2a) = \frac{\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2} + \frac{\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z641 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2b) = -\frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z642 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2b) = \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{3} + \frac{\sqrt{3}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6}$$

z643 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z644 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E) = \frac{\sqrt{2}\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z645 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,1a) = \frac{\sqrt{2}\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z646 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,1a) = -\frac{\sqrt{2}\mathbb{Q}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z647 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,1b) = \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z648 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,1b) = -\frac{\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z649 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,2a) = \frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z650 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,2a) = -\frac{\mathbb{Q}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z651 $$\mathbb{Q}_{2,1}^{(1,0;c)}(E,2b) = \frac{\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z652 $$\mathbb{Q}_{2,2}^{(1,0;c)}(E,2b) = -\frac{\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z653 $$\mathbb{G}_{1,1}^{(c)}(E) = \frac{\mathbb{T}_{1,2}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z654 $$\mathbb{G}_{1,2}^{(c)}(E) = -\frac{\mathbb{T}_{1,1}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{T}_{1}^{(a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z655 $$\mathbb{G}_{1,1}^{(1,-1;c)}(E,a) = \frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{5}$$

z656 $$\mathbb{G}_{1,2}^{(1,-1;c)}(E,a) = -\frac{\sqrt{15}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{G}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{5}$$

z657 $$\mathbb{G}_{1,1}^{(1,-1;c)}(E,b) = \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{10}$$

z658 $$\mathbb{G}_{1,2}^{(1,-1;c)}(E,b) = \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{10}$$

z659 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,1) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z660 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,1) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z661 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2) = \frac{\sqrt{2}\mathbb{G}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z662 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2) = \frac{\sqrt{2}\mathbb{G}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z663 $$\mathbb{G}_{3,1}^{(1,-1;c)}(E,1) = -\frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{30} - \frac{2\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{5}$$

z664 $$\mathbb{G}_{3,2}^{(1,-1;c)}(E,1)=\frac{2\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{15}+\frac{\sqrt{15}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{30}+\frac{\sqrt{15}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{30}+\frac{\sqrt{5}\mathbb{M}_{2}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{5}$$

z665 $$\mathbb{G}_{3,1}^{(1,-1;c)}(E,2)=\frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6}-\frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6}-\frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6}$$

z666 $$\mathbb{G}_{3,2}^{(1,-1;c)}(E,2)=-\frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6}+\frac{\sqrt{6}\mathbb{M}_{2,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6}-\frac{\sqrt{6}\mathbb{M}_{2,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6}$$

z667 $$\mathbb{G}_{1,1}^{(1,0;c)}(E)=\frac{\mathbb{T}_{1,2}^{(1,0;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2}-\frac{\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z668 $$\mathbb{G}_{1,2}^{(1,0;c)}(E)=-\frac{\mathbb{T}_{1,1}^{(1,0;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2}+\frac{\mathbb{T}_{1}^{(1,0;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z669 $$\mathbb{G}_{1,1}^{(1,1;c)}(E,a)=\frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z670 $$\mathbb{G}_{1,2}^{(1,1;c)}(E,a)=\frac{\sqrt{2}\mathbb{G}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z671 $$\mathbb{G}_{1,1}^{(1,1;c)}(E,b)=\frac{\sqrt{2}\mathbb{M}_{0}^{(1,1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z672 $$\mathbb{G}_{1,2}^{(1,1;c)}(E,b)=\frac{\sqrt{2}\mathbb{M}_{0}^{(1,1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

- 'A'-'A' bond-cluster : `A;A_002_1`
  * bra: $\langle p_x,\uparrow|$, $\langle p_x,\downarrow|$, $\langle p_y,\uparrow|$, $\langle p_y,\downarrow|$, $\langle p_z,\uparrow|$, $\langle p_z,\downarrow|$
  * ket: $|p_x,\uparrow\rangle$, $|p_x,\downarrow\rangle$, $|p_y,\uparrow\rangle$, $|p_y,\downarrow\rangle$, $|p_z,\uparrow\rangle$, $|p_z,\downarrow\rangle$
  * wyckoff: `3a@3b`

z108 $$\mathbb{Q}_{0}^{(c)}(A_1)=\mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{0}^{(b)}(A_1)$$

z109 $$\mathbb{Q}_{2}^{(c)}(A_1)=\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{0}^{(b)}(A_1)$$

z110 $$\mathbb{Q}_{3}^{(c)}(A_1)=\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}+\frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z111 $$\mathbb{Q}_{2}^{(1,-1;c)}(A_1)=\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{0}^{(b)}(A_1)$$

z112 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_1,a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z113 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_1,b) = -\frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{4} - \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{4} + \frac{\sqrt{3}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1}^{(b)}(A_2)}{2}$$

z114 $$\mathbb{Q}_{3}^{(1,0;c)}(A_1) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z115 $$\mathbb{Q}_{0}^{(1,1;c)}(A_1) = \mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{0}^{(b)}(A_1)$$

z116 $$\mathbb{G}_{0}^{(c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z117 $$\mathbb{G}_{2}^{(c)}(A_1,a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z118 $$\mathbb{G}_{2}^{(c)}(A_1,b) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z119 $$\mathbb{G}_{0}^{(1,-1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z120 $$\mathbb{G}_{2}^{(1,-1;c)}(A_1,a) = -\frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z121 $$\mathbb{G}_{2}^{(1,-1;c)}(A_1,b) = \frac{\sqrt{14}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{7} + \frac{\sqrt{14}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{7} + \frac{\sqrt{21}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1}^{(b)}(A_2)}{7}$$

z122 $$\mathbb{G}_{2}^{(1,-1;c)}(A_1,c) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z123 $$\mathbb{G}_{4}^{(1,-1;c)}(A_1,1) = -\frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{14} - \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{14} + \frac{2\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1}^{(b)}(A_2)}{7}$$

z124 $$\mathbb{G}_{4}^{(1,-1;c)}(A_1,2) = \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{4} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{4} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1}^{(b)}(A_2)}{2}$$

z125 $$\mathbb{G}_{0}^{(1,0;c)}(A_1) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2} + \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z126 $$\mathbb{G}_{2}^{(1,0;c)}(A_1) = -\frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z127 $$\mathbb{G}_{0}^{(1,1;c)}(A_1) = \frac{\sqrt{3}\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{3} + \frac{\sqrt{3}\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z128 $$\mathbb{G}_{2}^{(1,1;c)}(A_1) = -\frac{\sqrt{6}\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$$

z234 $$\mathbb{Q}_{1}^{(c)}(A_2, a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z235 $$\mathbb{Q}_{1}^{(c)}(A_2, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z236 $$\mathbb{Q}_{3}^{(c)}(A_2, 2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z237 $$\mathbb{Q}_{1}^{(1,-1;c)}(A_2, a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z238 $$\mathbb{Q}_{1}^{(1,-1;c)}(A_2, b) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z239 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_2, 1) = \frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z240 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_2, 2a) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z241 $$\mathbb{Q}_{3}^{(1,-1;c)}(A_2, 2b) = -\frac{\sqrt{2}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{4} + \frac{\sqrt{2}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{4} - \frac{\sqrt{3}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{2}$$

z242 $$\mathbb{Q}_{1}^{(1,0;c)}(A_2, a) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z243 $$\mathbb{Q}_{1}^{(1,0;c)}(A_2, b) = \frac{\sqrt{30}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{30}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{10} + \frac{\sqrt{10}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{5}$$

z244 $$\mathbb{Q}_{3}^{(1,0;c)}(A_2, 1) = -\frac{\sqrt{5}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{5} + \frac{\sqrt{5}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{5} + \frac{\sqrt{15}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{5}$$

z245 $$\mathbb{Q}_{3}^{(1,0;c)}(A_2,2) = \frac{\sqrt{2}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z246 $$\mathbb{Q}_{1}^{(1,1;c)}(A_2) = \frac{\sqrt{2}\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\sqrt{2}\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z247 $$\mathbb{G}_{4}^{(1,-1;c)}(A_2) = -\frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{4} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{4} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1}^{(b)}(A_2)}{2}$$

z248 $$\mathbb{G}_{1}^{(1,0;c)}(A_2) = \mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{0}^{(b)}(A_1)$$

z673 $$\mathbb{Q}_{1,1}^{(c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z674 $$\mathbb{Q}_{1,2}^{(c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z675 $$\mathbb{Q}_{1,1}^{(c)}(E,b) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{14} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{14} - \frac{\sqrt{14}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{14}$$

z676 $$\mathbb{Q}_{1,2}^{(c)}(E,b) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{14} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{14} - \frac{\sqrt{14}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{14}$$

z677 $$\mathbb{Q}_{1,1}^{(c)}(E,c) = \frac{\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z678 $$\mathbb{Q}_{1,2}^{(c)}(E,c) = -\frac{\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z679 $$\mathbb{Q}_{2,1}^{(c)}(E,1) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z680 $$\mathbb{Q}_{2,2}^{(c)}(E,1) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z681 $$\mathbb{Q}_{2,1}^{(c)}(E,2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z682 $$\mathbb{Q}_{2,2}^{(c)}(E,2) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z683 $$\mathbb{Q}_{3,1}^{(c)}(E,1) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{7}$$

z684 $$\mathbb{Q}_{3,2}^{(c)}(E,1) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{7}$$

z685 $$\mathbb{Q}_{3,1}^{(c)}(E,2) = \frac{\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z686 $$\mathbb{Q}_{3,2}^{(c)}(E,2) = -\frac{\mathbb{Q}_{2,1}^{(a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{2,2}^{(a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z687 $$\mathbb{Q}_{1,1}^{(1,-1;c)}(E,a) = \frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{14} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{14} - \frac{\sqrt{14}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{14}$$

z688 $$\mathbb{Q}_{1,2}^{(1,-1;c)}(E,a) = -\frac{\sqrt{42}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{14} - \frac{\sqrt{42}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{14} - \frac{\sqrt{14}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{14}$$

z689 $$\mathbb{Q}_{1,1}^{(1,-1;c)}(E,b) = \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z690 $$\mathbb{Q}_{1,2}^{(1,-1;c)}(E,b) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z691 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,1) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z692 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,1) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z693 $$\mathbb{Q}_{2,1}^{(1,-1;c)}(E,2) = \frac{\sqrt{2}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z694 $$\mathbb{Q}_{2,2}^{(1,-1;c)}(E,2) = \frac{\sqrt{2}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z695 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,1a) = \frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{7}$$

z696 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,1a) = -\frac{\sqrt{7}\mathbb{Q}_{2,1}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,2}^{(b)}(E)}{14} - \frac{\sqrt{7}\mathbb{Q}_{2,2}^{(1,-1;a)}(E,2)\mathbb{Q}_{1,1}^{(b)}(E)}{14} + \frac{\sqrt{21}\mathbb{Q}_{2}^{(1,-1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{7}$$

z697 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,1b) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{12} + \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{12} - \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z698 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,1b) = -\frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{12} + \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{12} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z699 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,2a) = \frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z700 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,2a) = -\frac{\mathbb{Q}_{2,1}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{Q}_{2,2}^{(1,-1;a)}(E,1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z701 $$\mathbb{Q}_{3,1}^{(1,-1;c)}(E,2b) = \frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{12} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{12} - \frac{\sqrt{6}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{4} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,2}^{(b)}(E)}{4}$$

z702 $$\mathbb{Q}_{3,2}^{(1,-1;c)}(E,2b) = -\frac{\sqrt{15}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{12} + \frac{\sqrt{6}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{15}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{12} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{4} - \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,1}^{(b)}(E)}{4}$$

z703 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E,a) = -\frac{\sqrt{2}\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z704 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E,a) = \frac{\sqrt{2}\mathbb{G}_{1}^{(1,0;a)}(A_2)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z705 $$\mathbb{Q}_{1,1}^{(1,0;c)}(E,b) = \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{10}$$

z706 $$\mathbb{Q}_{1,2}^{(1,0;c)}(E,b) = \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{10} - \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{10} - \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{10}$$

z707 $$\mathbb{Q}_{3,1}^{(1,0;c)}(E,1) = -\frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{30} - \frac{2\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{5}$$

z708 $$\mathbb{Q}_{3,2}^{(1,0;c)}(E,1) = \frac{2\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{15} + \frac{\sqrt{15}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{30} + \frac{\sqrt{15}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{30} + \frac{\sqrt{5}\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{5}$$

z709 $$\mathbb{Q}_{3,1}^{(1,0;c)}(E,2) = \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6}$$

z710 $$\mathbb{Q}_{3,2}^{(1,0;c)}(E,2) = -\frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{6}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{6}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6}$$

z711 $$\mathbb{Q}_{1,1}^{(1,1;c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z712 $$\mathbb{Q}_{1,2}^{(1,1;c)}(E,a) = \frac{\sqrt{2}\mathbb{Q}_{0}^{(1,1;a)}(A_1)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z713 $$\mathbb{Q}_{1,1}^{(1,1;c)}(E,b) = \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z714 $$\mathbb{Q}_{1,2}^{(1,1;c)}(E,b) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z715 $$\mathbb{G}_{2,1}^{(c)}(E,1) = \frac{\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z716 $$\mathbb{G}_{2,2}^{(c)}(E,1) = -\frac{\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z717 $$\mathbb{G}_{2,1}^{(c)}(E,2) = \frac{\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z718 $$\mathbb{G}_{2,2}^{(c)}(E,2) = -\frac{\mathbb{M}_{1,1}^{(a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z719 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,1a) = \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{42} + \frac{2\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{21} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{42} - \frac{\sqrt{14}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,2}^{(b)}(E)}{14}$$

z720 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,1a) = -\frac{2\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{21} - \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{42} - \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{42} + \frac{\sqrt{14}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,1}^{(b)}(E)}{14}$$

z721 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,1b) = \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z722 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,1b) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(1,-1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z723 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2a) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{42} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{42} + \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{42} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{14} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,2}^{(b)}(E)}{14}$$

z724 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2a) = \frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{42} - \frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{42} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{42} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{14} - \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,1}^{(b)}(E)}{14}$$

z725 $$\mathbb{G}_{2,1}^{(1,-1;c)}(E,2b) = \frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z726 $$\mathbb{G}_{2,2}^{(1,-1;c)}(E,2b) = -\frac{\mathbb{M}_{1,1}^{(1,-1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,-1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z727 $$\mathbb{G}_{4,1}^{(1,-1;c)}(E,1) = -\frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{28} + \frac{\sqrt{210}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{28} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{28} + \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,2}^{(b)}(E)}{14}$$

z728 $$\mathbb{G}_{4,2}^{(1,-1;c)}(E,1) = -\frac{\sqrt{210}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{28} + \frac{\sqrt{21}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{28} + \frac{\sqrt{21}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{28} - \frac{\sqrt{35}\mathbb{M}_{3}^{(1,-1;a)}(A_2,1)\mathbb{T}_{1,1}^{(b)}(E)}{14}$$

z729 $$\mathbb{G}_{4,1}^{(1,-1;c)}(E,2) = \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z730 $$\mathbb{G}_{4,2}^{(1,-1;c)}(E,2) = \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{2} + \frac{\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z731 $$\mathbb{G}_{4,1}^{(1,-1;c)}(E,3) = \frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{28} - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{28} + \frac{\sqrt{42}\mathbb{M}_{3,2}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{14} - \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{28} - \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,2}^{(b)}(E)}{28}$$

z732 $$\mathbb{G}_{4,2}^{(1,-1;c)}(E,3) = -\frac{\sqrt{105}\mathbb{M}_{3,1}^{(1,-1;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{28} - \frac{\sqrt{42}\mathbb{M}_{3,1}^{(1,-1;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{14} - \frac{\sqrt{105}\mathbb{M}_{3,2}^{(1,-1;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{28} - \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{28} + \frac{\sqrt{7}\mathbb{M}_{3}^{(1,-1;a)}(A_2,2)\mathbb{T}_{1,1}^{(b)}(E)}{28}$$

z733 $$\mathbb{G}_{1,1}^{(1,0;c)}(E) = \frac{\sqrt{2}\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z734 $$\mathbb{G}_{1,2}^{(1,0;c)}(E) = \frac{\sqrt{2}\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{0}^{(b)}(A_1)}{2}$$

z735 $$\mathbb{G}_{2,1}^{(1,0;c)}(E,1) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,1}^{(b)}(E)}{2}$$

z736 $$\mathbb{G}_{2,2}^{(1,0;c)}(E,1) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1}^{(b)}(A_2)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\mathbb{T}_{2}^{(1,0;a)}(A_1)\mathbb{T}_{1,2}^{(b)}(E)}{2}$$

z737 $$\mathbb{G}_{2,1}^{(1,0;c)}(E,2a) = \frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2}$$

z738 $$\mathbb{G}_{2,2}^{(1,0;c)}(E,2a) = -\frac{\mathbb{G}_{1,1}^{(1,0;a)}(E)\mathbb{Q}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{G}_{1,2}^{(1,0;a)}(E)\mathbb{Q}_{1,1}^{(b)}(E)}{2}$$

z739 $\mathbb{G}_{2,1}^{(1,0;c)}(E,2b) = -\frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} - \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{3}$

z740 $\mathbb{G}_{2,2}^{(1,0;c)}(E,2b) = \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,1)\mathbb{T}_{1,2}^{(b)}(E)}{6} + \frac{\sqrt{3}\mathbb{T}_{2,1}^{(1,0;a)}(E,2)\mathbb{T}_{1}^{(b)}(A_2)}{3} + \frac{\sqrt{3}\mathbb{T}_{2,2}^{(1,0;a)}(E,1)\mathbb{T}_{1,1}^{(b)}(E)}{6}$

z741 $\mathbb{G}_{2,1}^{(1,1;c)}(E,1) = \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} + \frac{\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z742 $\mathbb{G}_{2,2}^{(1,1;c)}(E,1) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1}^{(b)}(A_2)}{2} - \frac{\mathbb{M}_{1}^{(1,1;a)}(A_2)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

z743 $\mathbb{G}_{2,1}^{(1,1;c)}(E,2) = \frac{\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2}$

z744 $\mathbb{G}_{2,2}^{(1,1;c)}(E,2) = -\frac{\mathbb{M}_{1,1}^{(1,1;a)}(E)\mathbb{T}_{1,2}^{(b)}(E)}{2} - \frac{\mathbb{M}_{1,2}^{(1,1;a)}(E)\mathbb{T}_{1,1}^{(b)}(E)}{2}$

Atomic SAMB

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

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

x2 $\mathbb{M}_{1}^{(1,-1;a)}(A_2) = \begin{bmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & -\frac{\sqrt{2}}{2} \end{bmatrix}$

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

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

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

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

x5 $\mathbb{Q}_1^{(a)}(A_2) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{1}{2} \end{bmatrix}$

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

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

x8 $\mathbb{Q}_1^{(1,0;a)}(A_2) = \begin{bmatrix} 0 & -\frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 & 0 \end{bmatrix}$

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

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

x11 $\mathbb{G}_2^{(1,-1;a)}(A_1) = \begin{bmatrix} 0 & -\frac{\sqrt{6}i}{12} & 0 & -\frac{\sqrt{6}}{12} & \frac{\sqrt{6}i}{6} & 0 \\ -\frac{\sqrt{6}i}{12} & 0 & \frac{\sqrt{6}}{12} & 0 & 0 & -\frac{\sqrt{6}i}{6} \end{bmatrix}$

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

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

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

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

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

x17 $\mathbb{M}_2^{(1,-1;a)}(A_1) = \begin{bmatrix} 0 & -\frac{\sqrt{6}}{12} & 0 & \frac{\sqrt{6}i}{12} & \frac{\sqrt{6}}{6} & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$

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

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

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

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

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

x23 $\mathbb{T}_1^{(a)}(A_2) = \begin{bmatrix} 0 & 0 & 0 & 0 & \frac{i}{2} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{i}{2} \end{bmatrix}$

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

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

x26 $\mathbb{T}_1^{(1,0;a)}(A_2) = \begin{bmatrix} 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$

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

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

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

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

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

x30 $\mathbb{Q}_2^{(a)}(A_1) = \begin{bmatrix} -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{3}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{3}}{3} \end{bmatrix}$

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

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

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

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

x35 $\mathbb{Q}_2^{(1,-1;a)}(A_1) = \begin{bmatrix} 0 & 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & -\frac{\sqrt{6}}{12} \\ 0 & 0 & 0 & \frac{\sqrt{6}i}{6} & \frac{\sqrt{6}}{12} & 0 \\ \frac{\sqrt{6}i}{6} & 0 & 0 & 0 & 0 & \frac{\sqrt{6}i}{12} \\ 0 & -\frac{\sqrt{6}i}{6} & 0 & 0 & \frac{\sqrt{6}i}{12} & 0 \\ 0 & \frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 \\ -\frac{\sqrt{6}}{12} & 0 & -\frac{\sqrt{6}i}{12} & 0 & 0 & 0 \end{bmatrix}$

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

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

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

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

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

x41 $\mathbb{G}_1^{(1,0;a)}(A_2) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}}{4} & 0 \\ 0 & -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$

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

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

x44 $\mathbb{M}_1^{(a)}(A_2) = \begin{bmatrix} 0 & 0 & -\frac{i}{2} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{i}{2} & 0 & 0 \\ \frac{i}{2} & 0 & 0 & 0 & 0 & 0 \\ 0 & \frac{i}{2} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

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

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

x47 $\mathbb{M}_{3}^{(1,-1;a)}(A_1) = \begin{bmatrix} 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & -\frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

x48 $\mathbb{M}_{1}^{(1,-1;a)}(A_2) = \begin{bmatrix} \frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 & 0 \\ 0 & -\frac{\sqrt{6}}{6} & 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{\sqrt{6}}{6} & 0 & 0 & 0 \\ 0 & 0 & 0 & -\frac{\sqrt{6}}{6} & 0 & 0 \\ 0 & 0 & 0 & 0 & \frac{\sqrt{6}}{6} & 0 \\ 0 & 0 & 0 & 0 & 0 & -\frac{\sqrt{6}}{6} \end{bmatrix}$

x49 $\mathbb{M}_{3}^{(1,-1;a)}(A_2, 1) = \begin{bmatrix} -\frac{\sqrt{5}}{10} & 0 & 0 & 0 & 0 & -\frac{\sqrt{5}}{10} \\ 0 & \frac{\sqrt{5}}{10} & 0 & 0 & -\frac{\sqrt{5}}{10} & 0 \\ 0 & 0 & -\frac{\sqrt{5}}{10} & 0 & 0 & \frac{\sqrt{5}i}{10} \\ 0 & 0 & 0 & \frac{\sqrt{5}}{10} & -\frac{\sqrt{5}i}{10} & 0 \\ 0 & -\frac{\sqrt{5}}{10} & 0 & \frac{\sqrt{5}i}{10} & \frac{\sqrt{5}}{5} & 0 \\ -\frac{\sqrt{5}}{10} & 0 & -\frac{\sqrt{5}i}{10} & 0 & 0 & -\frac{\sqrt{5}}{5} \end{bmatrix}$

x50 $\mathbb{M}_{3}^{(1,-1;a)}(A_2, 2) = \begin{bmatrix} 0 & -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \\ 0 & \frac{\sqrt{2}}{4} & 0 & \frac{\sqrt{2}i}{4} & 0 & 0 \\ \frac{\sqrt{2}}{4} & 0 & -\frac{\sqrt{2}i}{4} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

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

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

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

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

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

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

x57 $\mathbb{M}_{1}^{(1,1;a)}(A_2) = \begin{bmatrix} -\frac{\sqrt{30}}{30} & 0 & 0 & 0 & 0 & \frac{\sqrt{30}}{20} \\ 0 & \frac{\sqrt{30}}{30} & 0 & 0 & \frac{\sqrt{30}}{20} & 0 \\ 0 & 0 & -\frac{\sqrt{30}}{30} & 0 & 0 & -\frac{\sqrt{30}i}{20} \\ 0 & 0 & 0 & \frac{\sqrt{30}}{30} & \frac{\sqrt{30}i}{20} & 0 \\ 0 & \frac{\sqrt{30}}{20} & 0 & -\frac{\sqrt{30}i}{20} & \frac{\sqrt{30}}{15} & 0 \\ \frac{\sqrt{30}}{20} & 0 & \frac{\sqrt{30}i}{20} & 0 & 0 & -\frac{\sqrt{30}}{15} \end{bmatrix}$

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

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

x60 $\mathbb{T}_{2}^{(1,0;a)}(A_1) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}i}{4} \\ 0 & 0 & 0 & 0 & -\frac{\sqrt{2}i}{4} & 0 \\ 0 & 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} \\ 0 & 0 & 0 & 0 & \frac{\sqrt{2}}{4} & 0 \\ 0 & \frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 \\ -\frac{\sqrt{2}i}{4} & 0 & \frac{\sqrt{2}}{4} & 0 & 0 & 0 \end{bmatrix}$

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

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

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

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

Cluster SAMB

- Site cluster

** Wyckoff: 6c

y1 $\mathbb{Q}^{(s)}_0(A_1) = \left[\frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}\right]$

y2 $\mathbb{Q}^{(s)}_1(A_2) = \left[\frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}\right]$

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

y4 $\mathbb{Q}_{1,2}^{(s)}(E) = \left[\frac{\sqrt{7}}{14}, \frac{\sqrt{7}}{7}, -\frac{3\sqrt{7}}{14}, \frac{3\sqrt{7}}{14}, -\frac{\sqrt{7}}{14}, -\frac{\sqrt{7}}{7}\right]$

y5 $\mathbb{Q}_{2,1}^{(s)}(E, 1) = \left[\frac{\sqrt{7}}{14}, \frac{\sqrt{7}}{7}, -\frac{3\sqrt{7}}{14}, -\frac{3\sqrt{7}}{14}, \frac{\sqrt{7}}{14}, \frac{\sqrt{7}}{7}\right]$

y6 $\mathbb{Q}_{2,2}^{(s)}(E, 1) = \left[-\frac{5\sqrt{21}}{42}, \frac{2\sqrt{21}}{21}, \frac{\sqrt{21}}{42}, -\frac{\sqrt{21}}{42}, \frac{5\sqrt{21}}{42}, -\frac{2\sqrt{21}}{21}\right]$

- Bond cluster

** Wyckoff: `3a@3b`

y7 $\mathbb{Q}_{0}^{(s)}(A_1) = \left[\frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3}, \frac{\sqrt{3}}{3}\right]$

y8 $\mathbb{T}_{1}^{(s)}(A_2) = \left[\frac{\sqrt{3}i}{3}, \frac{\sqrt{3}i}{3}, \frac{\sqrt{3}i}{3}\right]$

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

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

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

y12 $\mathbb{T}_{1,2}^{(s)}(E) = \left[\frac{\sqrt{6}i}{3}, -\frac{\sqrt{6}i}{6}, -\frac{\sqrt{6}i}{6}\right]$

** Wyckoff: `6a@6c`

y13 $\mathbb{Q}_{0}^{(s)}(A_1) = \left[\frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}\right]$

y14 $\mathbb{T}_{0}^{(s)}(A_1) = \left[\frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}\right]$

y15 $\mathbb{Q}_{1}^{(s)}(A_2) = \left[\frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, \frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}, -\frac{\sqrt{6}}{6}\right]$

y16 $\mathbb{T}_{1}^{(s)}(A_2) = \left[\frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, \frac{\sqrt{6}i}{6}, -\frac{\sqrt{6}i}{6}, -\frac{\sqrt{6}i}{6}, -\frac{\sqrt{6}i}{6}\right]$

y17 $\mathbb{Q}_{1,1}^{(s)}(E) = \left[\frac{5\sqrt{21}}{42}, -\frac{2\sqrt{21}}{21}, -\frac{\sqrt{21}}{42}, -\frac{\sqrt{21}}{42}, \frac{5\sqrt{21}}{42}, -\frac{2\sqrt{21}}{21}\right]$

y18 $\mathbb{Q}_{1,2}^{(s)}(E) = \left[\frac{\sqrt{7}}{14}, \frac{\sqrt{7}}{7}, -\frac{3\sqrt{7}}{14}, \frac{3\sqrt{7}}{14}, -\frac{\sqrt{7}}{14}, -\frac{\sqrt{7}}{7}\right]$

y19 $\mathbb{T}_{1,1}^{(s)}(E) = \left[\frac{5\sqrt{21}i}{42}, -\frac{2\sqrt{21}i}{21}, -\frac{\sqrt{21}i}{42}, -\frac{\sqrt{21}i}{42}, \frac{5\sqrt{21}i}{42}, -\frac{2\sqrt{21}i}{21}\right]$

y20 $\mathbb{T}_{1,2}^{(s)}(E) = \left[\frac{\sqrt{7}i}{14}, \frac{\sqrt{7}i}{7}, -\frac{3\sqrt{7}i}{14}, \frac{3\sqrt{7}i}{14}, -\frac{\sqrt{7}i}{14}, -\frac{\sqrt{7}i}{7}\right]$

y21 $\mathbb{M}_{1,1}^{(s)}(E) = \left[\frac{\sqrt{7}i}{14}, \frac{\sqrt{7}i}{7}, -\frac{3\sqrt{7}i}{14}, -\frac{3\sqrt{7}i}{14}, \frac{\sqrt{7}i}{14}, \frac{\sqrt{7}i}{7}\right]$

y22 $\mathbb{M}_{1,2}^{(s)}(E) = \left[-\frac{5\sqrt{21}i}{42}, \frac{2\sqrt{21}i}{21}, \frac{\sqrt{21}i}{42}, -\frac{\sqrt{21}i}{42}, \frac{5\sqrt{21}i}{42}, -\frac{2\sqrt{21}i}{21}\right]$

y23 $\mathbb{Q}_{2,1}^{(s)}(E,1) = \left[\frac{\sqrt{7}}{14}, \frac{\sqrt{7}}{7}, -\frac{3\sqrt{7}}{14}, -\frac{3\sqrt{7}}{14}, \frac{\sqrt{7}}{14}, \frac{\sqrt{7}}{7}\right]$

y24 $\mathbb{Q}_{2,2}^{(s)}(E,1) = \left[-\frac{5\sqrt{21}}{42}, \frac{2\sqrt{21}}{21}, \frac{\sqrt{21}}{42}, -\frac{\sqrt{21}}{42}, \frac{5\sqrt{21}}{42}, -\frac{2\sqrt{21}}{21}\right]$

Site and Bond

Table 5: Orbital of each site

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

Table 6: Neighbor and bra-ket of each bond

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

Site in Unit Cell

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

Table 7: 'A' (#1) site cluster (6c), 1

SL	position ($\boldsymbol{s}$)	mapping
1	[1.00000, 0.00000, 1.00000]	[1]
2	[0.00000, 1.00000, 1.00000]	[2]
3	[-1.00000,-1.00000, 1.00000]	[3]

continued ...

Table 7

SL	position ($\boldsymbol{s}$)	mapping
4	[0.00000, 1.00000,-1.00000]	[4]
5	[1.00000, 0.00000,-1.00000]	[5]
6	[-1.00000,-1.00000,-1.00000]	[6]

Bond in Unit Cell

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

Table 8: 1-th 'A'-'A' [1] (#1) bond cluster (6a@6c), D, $|\boldsymbol{v}|$= 1.73205 (cartesian)

SL	vector ($\boldsymbol{v}$)	center ($\boldsymbol{c}$)	mapping	head	tail	$\boldsymbol{R}$ (primitive)
1	[-1.00000, 1.00000, 0.00000]	[0.50000, 0.50000, 1.00000]	[1]	(2,1)	(1,1)	[0,0,0]
2	[-1.00000,-2.00000, 0.00000]	[-0.50000, 0.00000, 1.00000]	[2]	(3,1)	(2,1)	[0,0,0]
3	[2.00000, 1.00000, 0.00000]	[0.00000,-0.50000, 1.00000]	[3]	(1,1)	(3,1)	[0,0,0]
4	[1.00000,-1.00000, 0.00000]	[0.50000, 0.50000,-1.00000]	[4]	(5,1)	(4,1)	[0,0,0]
5	[-2.00000,-1.00000, 0.00000]	[0.00000,-0.50000,-1.00000]	[5]	(6,1)	(5,1)	[0,0,0]
6	[1.00000, 2.00000, 0.00000]	[-0.50000, 0.00000,-1.00000]	[6]	(4,1)	(6,1)	[0,0,0]

Table 9: 2-th 'A'-'A' [1] (#2) bond cluster (3a@3b), ND, $|\boldsymbol{v}|$= 2.0 (cartesian)

SL	vector ($\boldsymbol{v}$)	center ($\boldsymbol{c}$)	mapping	head	tail	$\boldsymbol{R}$ (primitive)
1	[0.00000, 0.00000,-2.00000]	[1.00000, 0.00000, 0.00000]	[1,-5]	(5,1)	(1,1)	[0,0,0]
2	[0.00000, 0.00000,-2.00000]	[0.00000, 1.00000, 0.00000]	[2,-4]	(4,1)	(2,1)	[0,0,0]
3	[0.00000, 0.00000,-2.00000]	[-1.00000,-1.00000, 0.00000]	[3,-6]	(6,1)	(3,1)	[0,0,0]