Diagrams and algebraic expressions at order 3 in BMBPT

The ADG Dev Team

June 18, 2019

Valid diagrams: 396
2N valid diagrams: 59
2N canonical diagrams for the energy: 10
2N canonical diagrams for a generic operator only: 6
2N non-canonical diagrams: 43
3N valid diagrams: 167
3N canonical diagrams for the energy: 167
3N canonical diagrams for a generic operator only: 40
3N non-canonical diagrams: 130

Contents

1 Time-structure diagrams

1.1 Tree diagrams

Time-structure diagram T1:

$$\mathrm{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{1}$$

Resummation power: 1

Number of related Feynman diagrams: 267.

Related Feynman diagrams: 396, 395, 394, 393, 392, 390, 389, 388, 387, 386, 384, 383, 381, 380, 378, 377, 376, 374, 373, 371, 365, 364, 361, 357, 354, 353, 352, 350, 348, 346, 343, 342, 340, 339, 335, 334, 331, 326, 324, 323, 322, 319, 317, 316, 315, 312, 311, 309, 307, 305, 304, 301, 300, 298, 296, 294, 293, 290, 289, 288, 286, 284, 282, 280, 279, 277, 273, 272, 270, 269, 268, 266, 265, 264, 263, 262, 261, 260, 259, 258, 257, 256, 255, 253, 252, 251, 250, 249, 248, 247, 246, 245, 244, 243, 242, 240, 239, 237, 236, 235, 234, 233, 232, 230, 229, 228, 227, 226, 225, 224, 223, 222, 221, 220, 219, 218, 217, 216, 215, 214, 213, 210, 209, 208, 207, 206, 205, 204, 203, 202, 201, 200, 199, 198, 197, 196, 195, 194, 193, 192, 191, 190, 189, 188, 187, 184, 183, 182, 178, 177, 175, 174, 173, 172, 170, 169, 168, 167, 165, 164, 162, 161, 160, 159, 158, 157, 156, 155, 154, 153, 152, 150, 149, 148, 147, 146, 145, 144, 143, 140, 139, 137, 136, 135, 133, 132, 131, 127, 126, 124, 122, 121, 120, 119, 118, 117, 114, 112, 110, 109, 108, 106, 105, 104, 103, 102, 100, 99, 98, 96, 95, 94, 92, 91, 90, 87, 85, 84, 83, 79, 77, 76, 74, 73, 71, 68, 67, 65, 64, 63, 61, 60, 59, 58, 57, 56, 53, 52, 51, 49, 45, 42, 41, 37, 36, 34, 33, 32, 30, 28, 26, 24, 22, 18, 17, 16, 15, 14, 13, 12, 11, 10, 8, 7, 5, 4, 3.

Time-structure diagram T2:

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{2}$$

Resummation power: 2

Number of related Feynman diagrams: 53.

Related Feynman diagrams: 391, 382, 379, 375, 363, 362, 360, 359, 355, 351, 332, 327, 320, 318, 314, 313, 303, 285, 283, 278, 274, 271, 238, 231, 176, 163, 128, 125, 123, 113, 107, 101, 97, 88, 86, 81, 78, 75, 72, 70, 69, 66, 62, 55, 46, 38, 35, 25, 23, 21, 19, 2, 1.

Time-structure diagram T3:

$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{3}$$

Resummation power: 3

Number of related Feynman diagrams: 22.

Related Feynman diagrams: 372, 370, 369, 368, 367, 358, 356, 338, 336, 330, 328, 297, 295, 292, 151, 115, 111, 80, 54, 47, 44, 29.

Time-structure diagram T4:

$$\text{T4} = \frac{1}{a_1 a_2 a_3} \tag{4}$$

Resummation power: 6
Number of related Feynman diagrams: 1.
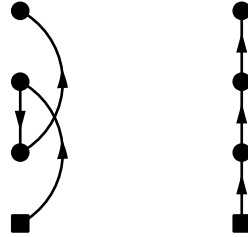Related Feynman diagrams: 366.

1.2 Non-tree diagrams

Time-structure diagram T5:

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{5}$$

Equivalent tree diagrams: T1, T1.


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Number of related Feynman diagrams: 53.

Related Feynman diagrams: 6, 9, 20, 27, 31, 39, 40, 43, 48, 50, 82, 89, 93, 116, 129, 130, 134, 138, 141, 142, 166, 171, 179, 180, 181, 185, 186, 211, 212, 241, 254, 267, 275, 276, 281, 287, 291, 299, 302, 306, 308, 310, 321, 325, 329, 333, 337, 341, 344, 345, 347, 349, 385.

2 Two-body diagrams

2.1 Two-body energy canonical diagrams

Diagram 1:

$$\text{PO3.1} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{04}_{k_5 k_6 k_7 k_1} \Omega^{04}_{k_8 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_1 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_8}}$$

$$= \frac{-(-1)^3}{(3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{04}_{k_5 k_6 k_7 k_1} \Omega^{04}_{k_8 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_5 k_6 k_7} \; \epsilon_{k_2 k_3 k_4 k_8}} \tag{6}$$

$$\to \quad \text{T2:}$$
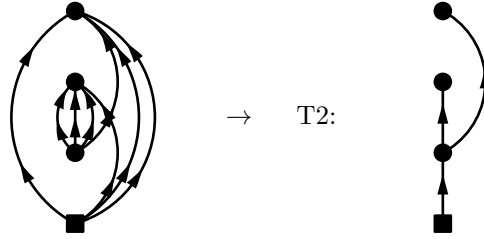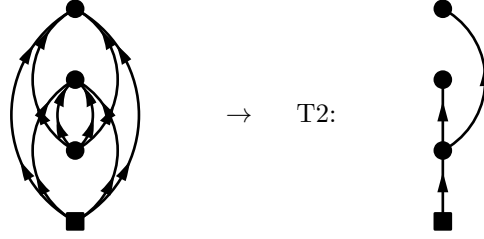
$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{7}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon_{k_1 k_5 k_6 k_7}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_8}$$

Diagram 2:

$$\text{PO3.2} = \lim_{\tau \to \infty} \frac{(-1)^3}{2(2!)^4} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{04}_{k_5 k_6 k_1 k_2} \Omega^{04}_{k_7 k_8 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_1 k_2 k_5 k_6}} e^{-\tau_3 \epsilon_{k_3 k_4 k_7 k_8}}$$

$$= \frac{(-1)^3}{2(2!)^4} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{04}_{k_5 k_6 k_1 k_2} \Omega^{04}_{k_7 k_8 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_2 k_5 k_6} \; \epsilon_{k_3 k_4 k_7 k_8}} \tag{8}$$

$$\rightarrow \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{9}$$
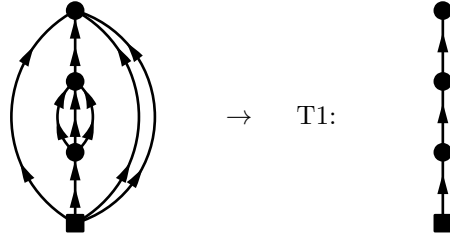
$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon_{k_1 k_2 k_5 k_6}$$
$$a_3 = \epsilon_{k_3 k_4 k_7 k_8}$$

Diagram 3:

$$\text{PO3.3} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{13}_{k_8 k_5 k_6 k_7} \Omega^{04}_{k_8 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1}} e^{-\tau_2 \epsilon^{k_8}_{k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_8}}$$

$$= \frac{(-1)^3}{(3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{13}_{k_8 k_5 k_6 k_7} \Omega^{04}_{k_8 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_6 k_7 k_2 k_3 k_4} \; \epsilon_{k_2 k_3 k_4 k_8}} \tag{10}$$

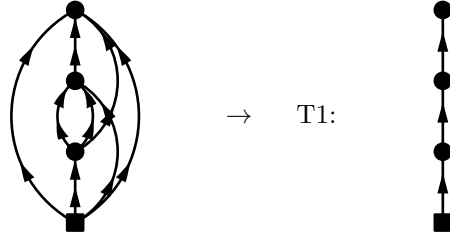$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{11}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_5 k_6 k_7}^{k_8}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_8}$$

Diagram 4:

$$\text{PO3.4} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1}^{31} \Omega_{k_8 k_5 k_6 k_2}^{13} \Omega_{k_8 k_7 k_3 k_4}^{04} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_5 k_6}^{k_8}} e^{-\tau_3 \epsilon_{k_3 k_4 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1}^{31} \Omega_{k_8 k_5 k_6 k_2}^{13} \Omega_{k_8 k_7 k_3 k_4}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_5 k_6 k_3 k_4 k_7} \ \epsilon_{k_3 k_4 k_7 k_8}} \tag{12}$$

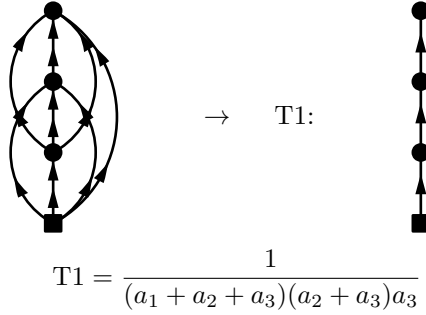$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{13}$$

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$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_5 k_6}^{k_8}$$
$$a_3 = \epsilon_{k_3 k_4 k_7 k_8}$$

Diagram 5:
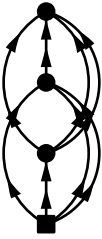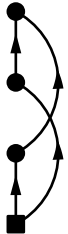
$$\text{PO3.5} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{13}_{k_8 k_5 k_2 k_3} \Omega^{04}_{k_8 k_6 k_7 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_5}^{k_8}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{13}_{k_8 k_5 k_2 k_3} \Omega^{04}_{k_8 k_6 k_7 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_5 k_4 k_6 k_7} \ \epsilon_{k_4 k_6 k_7 k_8}} \tag{14}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{15}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_5}^{k_8}$$
$$a_3 = \epsilon_{k_4 k_6 k_7 k_8}$$

Diagram 6:

$$\text{PO3.6} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{13}_{k_8 k_2 k_3 k_4} \Omega^{04}_{k_8 k_5 k_6 k_7} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_8}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{13}_{k_8 k_2 k_3 k_4} \Omega^{04}_{k_8 k_5 k_6 k_7} \left[\frac{1}{\epsilon_{k_1 k_8} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_5 k_6 k_7 k_8}} \right] \tag{16}$$
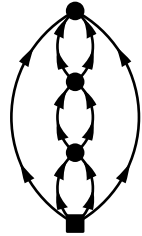
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$\rightarrow$ T5:

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{17}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_8}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8}$$

Diagram 7:

$$\text{PO3.7} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^4} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_8 k_5 k_6}^{22} \Omega_{k_7 k_8 k_3 k_4}^{04} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_5 k_6}^{k_7 k_8}} e^{-\tau_3 \epsilon_{k_3 k_4 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^4} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_8 k_5 k_6}^{22} \Omega_{k_7 k_8 k_3 k_4}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_6 k_3 k_4} \; \epsilon_{k_3 k_4 k_7 k_8}} \tag{18}$$

$\rightarrow$ T1:

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{19}$$

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$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_7 k_8}_{k_5 k_6}$$
$$a_3 = \epsilon_{k_3 k_4 k_7 k_8}$$

Diagram 8:

$$\text{PO3.8} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{22}_{k_7 k_8 k_5 k_3} \Omega^{04}_{k_7 k_8 k_6 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_3 k_5}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{22}_{k_7 k_8 k_5 k_3} \Omega^{04}_{k_7 k_8 k_6 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_5 k_4 k_6} \ \epsilon_{k_4 k_6 k_7 k_8}} \tag{20}$$

$\rightarrow$ T1:

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{21}$$

$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_7 k_8}_{k_3 k_5}$$
$$a_3 = \epsilon_{k_4 k_6 k_7 k_8}$$

Diagram 9:

$$\text{PO3.9} = \lim_{\tau \to \infty} \frac{(-1)^3}{2(2!)^4} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{22}_{k_7 k_8 k_3 k_4} \Omega^{04}_{k_7 k_8 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{2(2!)^4} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{22}_{k_7 k_8 k_3 k_4} \Omega^{04}_{k_7 k_8 k_5 k_6} \left[\frac{1}{\epsilon_{k_1 k_2 k_7 k_8} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6} \ \epsilon_{k_5 k_6 k_7 k_8}} \right] \tag{22}$$

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$$\rightarrow \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{23}$$

$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_7 k_8}_{k_3 k_4}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8}$$

Diagram 10:

$$\text{PO3.10} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{13}_{k_5 k_1 k_2 k_3} \Omega^{31}_{k_6 k_7 k_8 k_5} \Omega^{04}_{k_6 k_7 k_8 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_6 k_7 k_8}_{k_5}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{13}_{k_5 k_1 k_2 k_3} \Omega^{31}_{k_6 k_7 k_8 k_5} \Omega^{04}_{k_6 k_7 k_8 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_4} \ \epsilon_{k_4 k_6 k_7 k_8}} \tag{24}$$
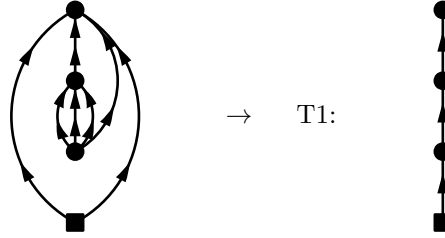

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{25}$$

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$$a_1 = \epsilon^{k_5}_{k_1 k_2 k_3}$$

$$a_2 = \epsilon^{k_6 k_7 k_8}_{k_5}$$

$$a_3 = \epsilon_{k_4 k_6 k_7 k_8}$$

2.2 Two-body canonical diagrams for a generic operator only

Diagram 11:

$$\text{PO3.11} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_3 k_4 k_5} \Omega^{04}_{k_7 k_6 k_1 k_2} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_1 k_2 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_3 k_4 k_5} \Omega^{04}_{k_7 k_6 k_1 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_5 k_1 k_2 k_6} \ \epsilon_{k_1 k_2 k_6 k_7}} \tag{26}$$
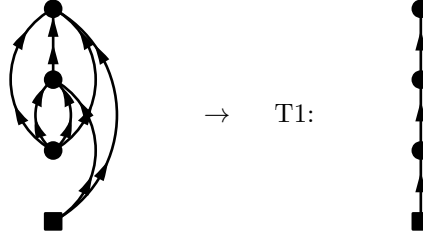

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{27}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon^{k_7}_{k_3 k_4 k_5}$$

$$a_3 = \epsilon_{k_1 k_2 k_6 k_7}$$

Diagram 12:

$$\text{PO3.12} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_3 k_4 k_1} \Omega^{04}_{k_7 k_5 k_6 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_1 k_3 k_4}} e^{-\tau_3 \epsilon_{k_2 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_3 k_4 k_1} \Omega^{04}_{k_7 k_5 k_6 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_3 k_4 k_2 k_5 k_6} \ \epsilon_{k_2 k_5 k_6 k_7}} \tag{28}$$

$\rightarrow$ T1:

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{29}$$
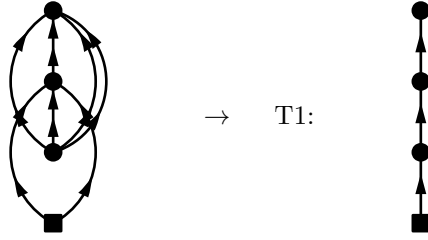
$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon^{k_7}_{k_1 k_3 k_4}$$

$$a_3 = \epsilon_{k_2 k_5 k_6 k_7}$$

Diagram 13:

$$\text{PO3.13} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_3 k_1 k_2} \Omega^{04}_{k_7 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_1 k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_3 k_1 k_2} \Omega^{04}_{k_7 k_4 k_5 k_6}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_6 k_7}} \tag{30}$$

13
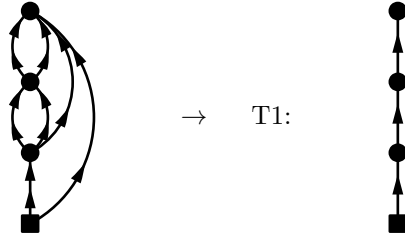
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{31}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$
$$a_2 = \epsilon^{k_7}_{k_1 k_2 k_3}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_7}$$

Diagram 14:

$$\text{PO3.14} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{22}_{k_6 k_7 k_3 k_4} \Omega^{04}_{k_6 k_7 k_5 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5}_{k_1}} e^{-\tau_2 \epsilon^{k_6 k_7}_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_2 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{22}_{k_6 k_7 k_3 k_4} \Omega^{04}_{k_6 k_7 k_5 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_2 k_5} \ \epsilon_{k_2 k_5 k_6 k_7}} \tag{32}$$

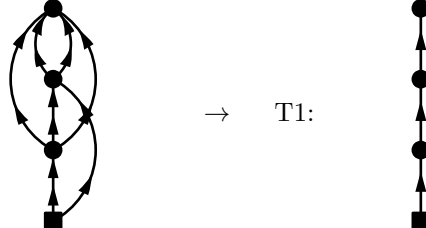$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{33}$$

14

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$

$$a_2 = \epsilon_{k_3 k_4}^{k_6 k_7}$$

$$a_3 = \epsilon_{k_2 k_5 k_6 k_7}$$

Diagram 15:

$$\text{PO3.15} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{22}_{k_6 k_7 k_3 k_2} \Omega^{04}_{k_6 k_7 k_4 k_5} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5}} e^{-\tau_2 \epsilon_{k_2 k_3}^{k_6 k_7}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{22}_{k_6 k_7 k_3 k_2} \Omega^{04}_{k_6 k_7 k_4 k_5}}{\epsilon_{k_1 k_2} \; \epsilon_{k_2 k_3 k_4 k_5} \; \epsilon_{k_4 k_5 k_6 k_7}} \tag{34}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{35}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$

$$a_2 = \epsilon_{k_2 k_3}^{k_6 k_7}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_7}$$

Diagram 16:

$$\text{PO3.16} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{22}_{k_3 k_4 k_1 k_2} \Omega^{31}_{k_5 k_6 k_7 k_3} \Omega^{04}_{k_5 k_6 k_7 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_3 k_4}} e^{-\tau_2 \epsilon_{k_3}^{k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{22}_{k_3 k_4 k_1 k_2} \Omega^{31}_{k_5 k_6 k_7 k_3} \Omega^{04}_{k_5 k_6 k_7 k_4}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4} \; \epsilon_{k_4 k_5 k_6 k_7}} \tag{36}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{37}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_3 k_4}$$
$$a_2 = \epsilon_{k_3}^{k_5 k_6 k_7}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_7}$$

2.3 Two-body non-canonical diagrams

Diagram 17:

$$\text{PO3.17} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4}^{20} \Omega_{k_5 k_3}^{11} \Omega_{k_5 k_4 k_1 k_2}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon_{k_3}^{k_5}} e^{-\tau_3 \epsilon_{k_1 k_2 k_4 k_5}}$$

$$= \frac{(-1)^3}{(2!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4}^{20} \Omega_{k_5 k_3}^{11} \Omega_{k_5 k_4 k_1 k_2}^{04}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_1 k_2 k_4} \ \epsilon_{k_1 k_2 k_4 k_5}} \tag{38}$$
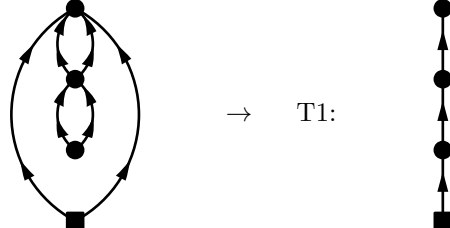

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{39}$$

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$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon^{k_5}_{k_3}$$

$$a_3 = \epsilon_{k_1 k_2 k_4 k_5}$$

Diagram 18:

$$\text{PO3.18} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{22}_{k_5 k_6 k_3 k_4} \Omega^{04}_{k_5 k_6 k_1 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6}_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_1 k_2 k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)^3} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{22}_{k_5 k_6 k_3 k_4} \Omega^{04}_{k_5 k_6 k_1 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_1 k_2} \ \epsilon_{k_1 k_2 k_5 k_6}} \tag{40}$$

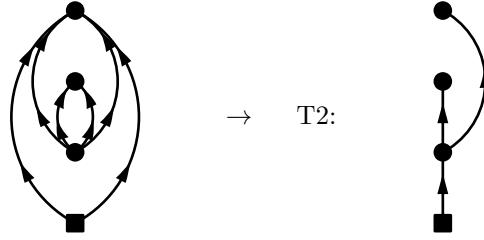$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{41}$$

$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon^{k_5 k_6}_{k_3 k_4}$$

$$a_3 = \epsilon_{k_1 k_2 k_5 k_6}$$

Diagram 19:

$$\text{PO3.19} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{02}_{k_3 k_4} \Omega^{04}_{k_5 k_6 k_1 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_1 k_2 k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)^3} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{02}_{k_3 k_4} \Omega^{04}_{k_5 k_6 k_1 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4} \ \epsilon_{k_1 k_2 k_5 k_6}} \tag{42}$$

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$\rightarrow$ T2:
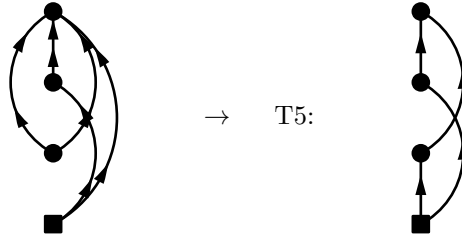
$$T2 = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{43}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$
$$a_2 = \epsilon_{k_3 k_4}$$
$$a_3 = \epsilon_{k_1 k_2 k_5 k_6}$$

Diagram 20:

$$\text{PO3.20} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{04}_{k_5 k_3 k_4 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5}_{k_1}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5}}$$

$$= \frac{(-1)^3}{(2!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{04}_{k_5 k_3 k_4 k_2} \left[\frac{1}{\epsilon_{k_2 k_5}\ \epsilon_{k_1 k_2}\ \epsilon_{k_2 k_3 k_4 k_5}} + \frac{1}{\epsilon_{k_1 k_2}\ \epsilon_{k_1 k_2 k_3 k_4}\ \epsilon_{k_2 k_3 k_4 k_5}} \right] \tag{44}$$

$\rightarrow$ T5:
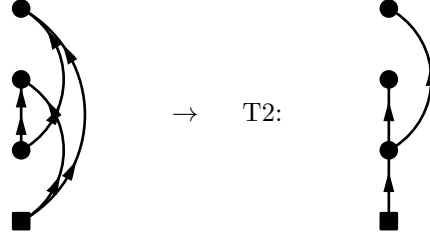
$$T5 = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{45}$$

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$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon^{k_5}_{k_1}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_5}$$

Diagram 21:

$$\text{PO3.21} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{02}_{k_3 k_1} \Omega^{02}_{k_4 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon_{k_1 k_3}} e^{-\tau_3 \epsilon_{k_2 k_4}}$$

$$= \frac{-(-1)^3}{2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{02}_{k_3 k_1} \Omega^{02}_{k_4 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_3} \ \epsilon_{k_2 k_4}} \tag{46}$$

$$\to \qquad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3) a_2 a_3} \tag{47}$$

$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon_{k_1 k_3}$$

$$a_3 = \epsilon_{k_2 k_4}$$

Diagram 22:

$$\text{PO3.22} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{22}_{k_5 k_6 k_3 k_1} \Omega^{04}_{k_5 k_6 k_4 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6}_{k_1 k_3}} e^{-\tau_3 \epsilon_{k_2 k_4 k_5 k_6}}$$

$$= \frac{-(-1)^3}{(2!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{22}_{k_5 k_6 k_3 k_1} \Omega^{04}_{k_5 k_6 k_4 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_3 k_2 k_4} \ \epsilon_{k_2 k_4 k_5 k_6}} \tag{48}$$

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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{49}$$

$$a_1 = \epsilon^{k_3 k_4}$$
$$a_2 = \epsilon^{k_5 k_6}_{k_1 k_3}$$
$$a_3 = \epsilon_{k_2 k_4 k_5 k_6}$$

Diagram 23:

$$\text{PO3.23} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{02}_{k_3 k_1} \Omega^{04}_{k_4 k_5 k_6 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon_{k_1 k_3}} e^{-\tau_3 \epsilon_{k_2 k_4 k_5 k_6}}$$

$$= \frac{-(-1)^3}{(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{02}_{k_3 k_1} \Omega^{04}_{k_4 k_5 k_6 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_3} \; \epsilon_{k_2 k_4 k_5 k_6}} \tag{50}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{51}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon_{k_1 k_3}$$

$$a_3 = \epsilon_{k_2 k_4 k_5 k_6}$$

Diagram 24:

$$\text{PO3.24} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{13}_{k_5 k_3 k_4 k_1} \Omega^{02}_{k_5 k_2} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2)e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5}_{k_1 k_3 k_4}} e^{-\tau_3 \epsilon_{k_2 k_5}}$$

$$= \frac{(-1)^3}{(2!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{13}_{k_5 k_3 k_4 k_1} \Omega^{02}_{k_5 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_3 k_4 k_2} \ \epsilon_{k_2 k_5}} \tag{52}$$

$$\to \quad \text{T1:}$$

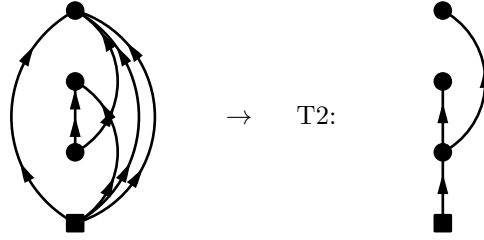$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{53}$$

$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon^{k_5}_{k_1 k_3 k_4}$$

$$a_3 = \epsilon_{k_2 k_5}$$

Diagram 25:

$$\text{PO3.25} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{02}_{k_5 k_1} \Omega^{04}_{k_6 k_2 k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_1 k_5}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_6}}$$

$$= \frac{-(-1)^3}{(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{02}_{k_5 k_1} \Omega^{04}_{k_6 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_5} \ \epsilon_{k_2 k_3 k_4 k_6}} \tag{54}$$

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$$\to \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{55}$$
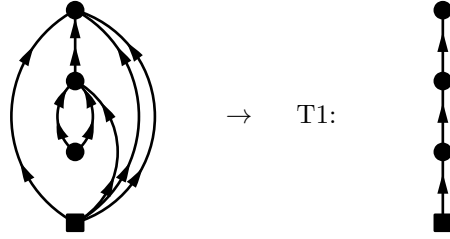
$$a_1 = \epsilon^{k_5 k_6}$$
$$a_2 = \epsilon_{k_1 k_5}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_6}$$

Diagram 26:

$$\text{PO3.26} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{13}_{k_7 k_5 k_6 k_1} \Omega^{04}_{k_7 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_1 k_5 k_6}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{13}_{k_7 k_5 k_6 k_1} \Omega^{04}_{k_7 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_5 k_6 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_7}} \tag{56}$$
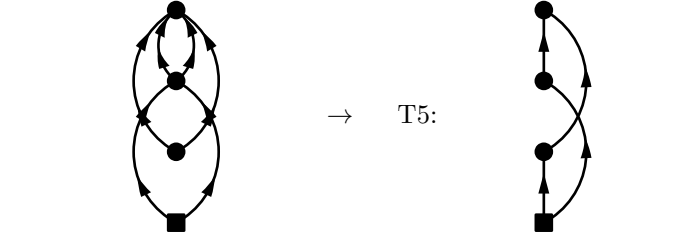

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{57}$$

$$a_1 = \epsilon^{k_5 k_6}$$

$$a_2 = \epsilon^{k_7}_{k_1 k_5 k_6}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_7}$$

Diagram 27:

$$\text{PO3.27} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{04}_{k_5 k_6 k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6}_{k_1 k_2}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)^3} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{04}_{k_5 k_6 k_3 k_4} \left[\frac{1}{\epsilon_{k_5 k_6} \ \epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_5 k_6}} + \frac{1}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6}} \right] \tag{58}$$

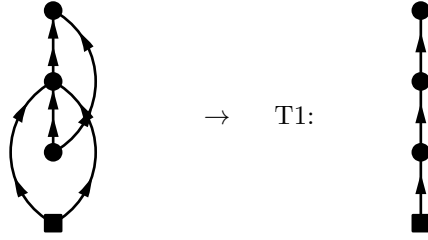$$\to \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{59}$$

$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon^{k_5 k_6}_{k_1 k_2}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6}$$

Diagram 28:

$$\text{PO3.28} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{13}_{k_5 k_3 k_1 k_2} \Omega^{02}_{k_5 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5}_{k_1 k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5}}$$

$$= \frac{(-1)^3}{(2!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{13}_{k_5 k_3 k_1 k_2} \Omega^{02}_{k_5 k_4}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5}} \tag{60}$$

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$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{61}$$
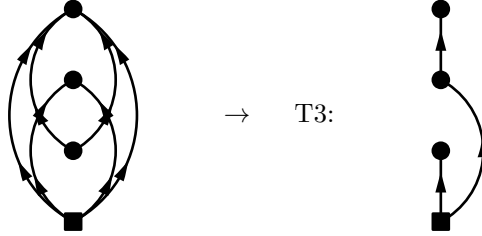
$$a_1 = \epsilon^{k_3 k_4}$$
$$a_2 = \epsilon^{k_5}_{k_1 k_2 k_3}$$
$$a_3 = \epsilon_{k_4 k_5}$$

Diagram 29:

$$\text{PO3.29} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{04}_{k_5 k_6 k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_1 k_2}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)^3} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{04}_{k_5 k_6 k_3 k_4}}{\epsilon^{k_5 k_6} \epsilon_{k_1 k_2} \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6}} \tag{62}$$

$$\rightarrow \quad \text{T3:}$$
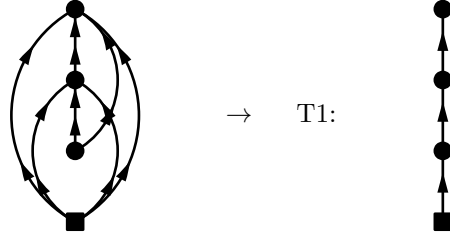
$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{63}$$

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$$a_1 = \epsilon^{k_5 k_6}$$
$$a_2 = \epsilon_{k_3 k_4 k_5 k_6}$$
$$a_3 = \epsilon_{k_1 k_2}$$

Diagram 30:

$$\text{PO3.30} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{13}_{k_7 k_5 k_1 k_2} \Omega^{04}_{k_7 k_6 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_1 k_2 k_5}} e^{-\tau_3 \epsilon_{k_3 k_4 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{13}_{k_7 k_5 k_1 k_2} \Omega^{04}_{k_7 k_6 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_5 k_3 k_4 k_6} \ \epsilon_{k_3 k_4 k_6 k_7}} \tag{64}$$
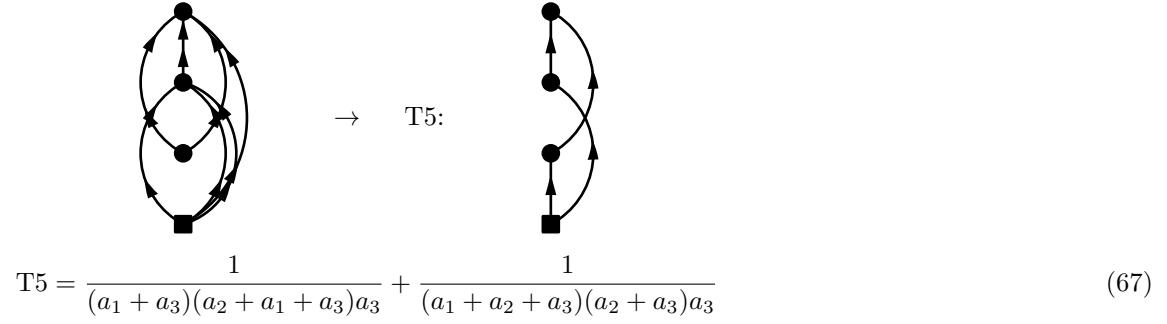

$\rightarrow$ T1:

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{65}$$

$$a_1 = \epsilon^{k_5 k_6}$$
$$a_2 = \epsilon^{k_7}_{k_1 k_2 k_5}$$
$$a_3 = \epsilon_{k_3 k_4 k_6 k_7}$$

Diagram 31:

$$\text{PO3.31} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{04}_{k_7 k_5 k_6 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_1 k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{04}_{k_7 k_5 k_6 k_4} \left[\frac{1}{\epsilon_{k_4 k_7} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5 k_6 k_7}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_6 k_7}} \right] \tag{66}$$
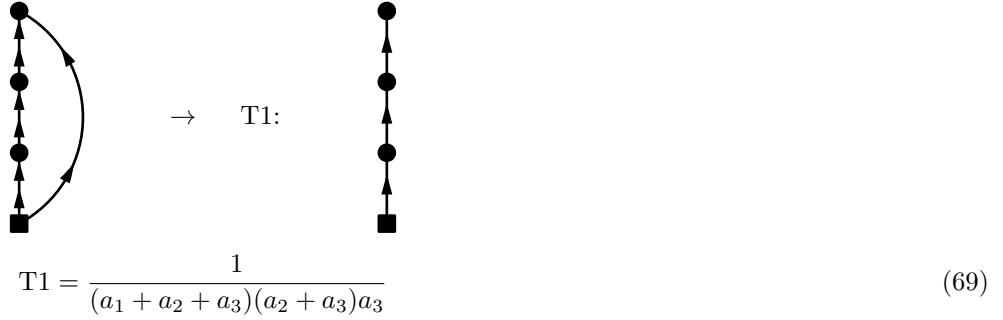
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$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{67}$$

$$a_1 = \epsilon^{k_5 k_6}$$
$$a_2 = \epsilon^{k_7}_{k_1 k_2 k_3}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_7}$$

Diagram 32:

$$\text{PO3.32} = \lim_{\tau \to \infty} (-1)^3 \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{11}_{k_3 k_1} \Omega^{11}_{k_4 k_3} \Omega^{02}_{k_4 k_2} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3}_{k_1}} e^{-\tau_2 \epsilon^{k_4}_{k_3}} e^{-\tau_3 \epsilon_{k_2 k_4}}$$

$$= (-1)^3 \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{11}_{k_3 k_1} \Omega^{11}_{k_4 k_3} \Omega^{02}_{k_4 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_2} \ \epsilon_{k_2 k_4}} \tag{68}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{69}$$

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$$a_1 = \epsilon_{k_1}^{k_3}$$

$$a_2 = \epsilon_{k_3}^{k_4}$$

$$a_3 = \epsilon_{k_2 k_4}$$

Diagram 33:

$$\text{PO3.33} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_1}^{11} \Omega_{k_4 k_5 k_6 k_3}^{31} \Omega_{k_4 k_5 k_6 k_2}^{04} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3}} e^{-\tau_2 \epsilon_{k_3}^{k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_2 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(3!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_1}^{11} \Omega_{k_4 k_5 k_6 k_3}^{31} \Omega_{k_4 k_5 k_6 k_2}^{04}}{\epsilon_{k_1 k_2} \, \epsilon_{k_3 k_2} \, \epsilon_{k_2 k_4 k_5 k_6}} \tag{70}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{71}$$

$$a_1 = \epsilon_{k_1}^{k_3}$$

$$a_2 = \epsilon_{k_3}^{k_4 k_5 k_6}$$

$$a_3 = \epsilon_{k_2 k_4 k_5 k_6}$$

Diagram 34:

$$\text{PO3.34} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_1}^{31} \Omega_{k_6 k_3}^{11} \Omega_{k_6 k_4 k_5 k_2}^{04} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5}} e^{-\tau_2 \epsilon_{k_3}^{k_6}} e^{-\tau_3 \epsilon_{k_2 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_1}^{31} \Omega_{k_6 k_3}^{11} \Omega_{k_6 k_4 k_5 k_2}^{04}}{\epsilon_{k_1 k_2} \, \epsilon_{k_3 k_2 k_4 k_5} \, \epsilon_{k_2 k_4 k_5 k_6}} \tag{72}$$
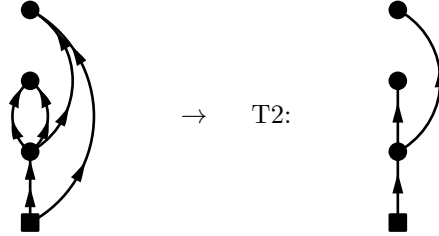
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$$\rightarrow \quad \text{T1:}$$
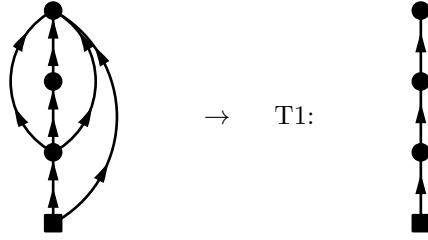
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{73}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$
$$a_2 = \epsilon_{k_3}^{k_6}$$
$$a_3 = \epsilon_{k_2 k_4 k_5 k_6}$$

Diagram 35:

$$\text{PO3.35} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{02}_{k_3 k_4} \Omega^{02}_{k_5 k_2} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5}} e^{-\tau_2 \epsilon_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_2 k_5}}$$

$$= \frac{(-1)^3}{(2!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{02}_{k_3 k_4} \Omega^{02}_{k_5 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4} \ \epsilon_{k_2 k_5}} \tag{74}$$

$$\rightarrow \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{75}$$

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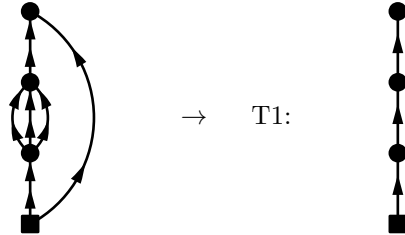
$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$

$$a_2 = \epsilon_{k_3 k_4}$$

$$a_3 = \epsilon_{k_2 k_5}$$

Diagram 36:

$$\text{PO3.36} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_1}^{31} \Omega_{k_6 k_3 k_4 k_5}^{13} \Omega_{k_6 k_2}^{02} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5}^{k_6}} e^{-\tau_3 \epsilon_{k_2 k_6}}$$

$$= \frac{(-1)^3}{(3!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_1}^{31} \Omega_{k_6 k_3 k_4 k_5}^{13} \Omega_{k_6 k_2}^{02}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_2} \; \epsilon_{k_2 k_6}} \tag{76}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{77}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$

$$a_2 = \epsilon_{k_3 k_4 k_5}^{k_6}$$

$$a_3 = \epsilon_{k_2 k_6}$$

Diagram 37:

$$\text{PO3.37} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_6 k_5}^{11} \Omega_{k_6 k_2 k_3 k_4}^{04} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5}} e^{-\tau_2 \epsilon_{k_5}^{k_6}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_6}}$$

$$= \frac{(-1)^3}{(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_6 k_5}^{11} \Omega_{k_6 k_2 k_3 k_4}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_2 k_3 k_4} \; \epsilon_{k_2 k_3 k_4 k_6}} \tag{78}$$

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→   T1:

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3}$$ (79)

$$a_1 = \epsilon_{k_1}^{k_5}$$
$$a_2 = \epsilon_{k_5}^{k_6}$$
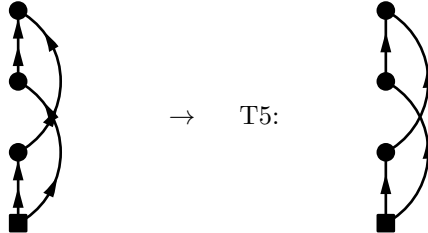$$a_3 = \epsilon_{k_2 k_3 k_4 k_6}$$

Diagram 38:

$$\text{PO3.38} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{02}_{k_5 k_6} \Omega^{04}_{k_7 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{02}_{k_5 k_6} \Omega^{04}_{k_7 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_7}}$$ (80)

→   T2:

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3}$$ (81)

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$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$

$$a_2 = \epsilon_{k_5 k_6}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_7}$$

Diagram 39:

$$\text{PO3.39} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_1}^{11} \Omega_{k_4 k_2}^{11} \Omega_{k_4 k_3}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3}} e^{-\tau_2 \epsilon_{k_2}^{k_4}} e^{-\tau_3 \epsilon_{k_3 k_4}}$$

$$= \frac{-(-1)^3}{2} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_1}^{11} \Omega_{k_4 k_2}^{11} \Omega_{k_4 k_3}^{02} \left[\frac{1}{\epsilon_{k_1 k_4} \; \epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4}} + \frac{1}{\epsilon_{k_1 k_2} \; \epsilon_{k_2 k_3} \; \epsilon_{k_3 k_4}} \right] \tag{82}$$
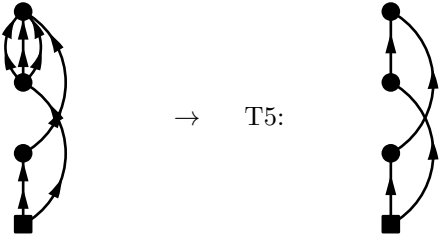

$$\to \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{83}$$

$$a_1 = \epsilon_{k_1}^{k_3}$$

$$a_2 = \epsilon_{k_2}^{k_4}$$

$$a_3 = \epsilon_{k_3 k_4}$$

Diagram 40:

$$\text{PO3.40} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_1}^{11} \Omega_{k_4 k_5 k_6 k_2}^{31} \Omega_{k_4 k_5 k_6 k_3}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3}} e^{-\tau_2 \epsilon_{k_2}^{k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{-(-1)^3}{(3!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_1}^{11} \Omega_{k_4 k_5 k_6 k_2}^{31} \Omega_{k_4 k_5 k_6 k_3}^{04} \left[\frac{1}{\epsilon_{k_1 k_4 k_5 k_6} \; \epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6}} + \frac{1}{\epsilon_{k_1 k_2} \; \epsilon_{k_2 k_3} \; \epsilon_{k_3 k_4 k_5 k_6}} \right] \tag{84}$$
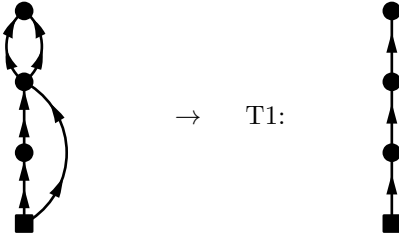
31

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{85}$$

$$a_1 = \epsilon_{k_1}^{k_3}$$
$$a_2 = \epsilon_{k_2}^{k_4 k_5 k_6}$$
$$a_3 = \epsilon_{k_3 k_4 k_5 k_6}$$

Diagram 41:

$$\text{PO3.41} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_1}^{11} \Omega_{k_4 k_5 k_3 k_2}^{22} \Omega_{k_4 k_5}^{02} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3}} e^{-\tau_2 \epsilon_{k_2 k_3}^{k_4 k_5}} e^{-\tau_3 \epsilon_{k_4 k_5}}$$

$$= \frac{(-1)^3}{(2!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_1}^{11} \Omega_{k_4 k_5 k_3 k_2}^{22} \Omega_{k_4 k_5}^{02}}{\epsilon_{k_1 k_2} \epsilon_{k_2 k_3} \epsilon_{k_4 k_5}} \tag{86}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{87}$$

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$$a_1 = \epsilon_{k_1}^{k_3}$$
$$a_2 = \epsilon_{k_2 k_3}^{k_4 k_5}$$
$$a_3 = \epsilon_{k_4 k_5}$$

Diagram 42:
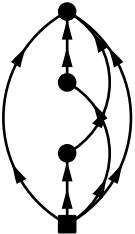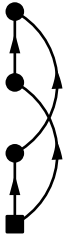
$$\text{PO3.42} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_1}^{31} \Omega_{k_6 k_3 k_4 k_2}^{13} \Omega_{k_6 k_5}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_6}} e^{-\tau_3 \epsilon_{k_5 k_6}}$$

$$= \frac{-(-1)^3}{(2!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_1}^{31} \Omega_{k_6 k_3 k_4 k_2}^{13} \Omega_{k_6 k_5}^{02}}{\epsilon_{k_1 k_2} \ \epsilon_{k_2 k_3 k_4 k_5} \ \epsilon_{k_5 k_6}} \tag{88}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{89}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$
$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_6}$$
$$a_3 = \epsilon_{k_5 k_6}$$

Diagram 43:

$$\text{PO3.43} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2(2!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_6 k_2}^{11} \Omega_{k_6 k_5 k_3 k_4}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5}} e^{-\tau_2 \epsilon_{k_2}^{k_6}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{-(-1)^3}{2(2!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_6 k_2}^{11} \Omega_{k_6 k_5 k_3 k_4}^{04} \left[\frac{1}{\epsilon_{k_1 k_3 k_4 k_6} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5} \ \epsilon_{k_3 k_4 k_5 k_6}} \right] \tag{90}$$

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$$T5 = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{91}$$
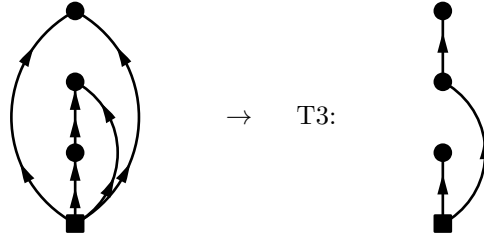
$$a_1 = \epsilon_{k_1}^{k_5}$$
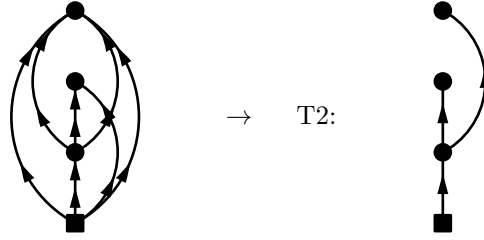$$a_2 = \epsilon_{k_2}^{k_6}$$
$$a_3 = \epsilon_{k_3 k_4 k_5 k_6}$$

Diagram 44:

$$\text{PO3.44} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_5 k_2}^{02} \Omega_{k_3 k_4}^{02} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_5}} e^{-\tau_2 \epsilon_{k_2 k_5}} e^{-\tau_3 \epsilon_{k_3 k_4}}$$

$$= \frac{(-1)^3}{(2!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_5 k_2}^{02} \Omega_{k_3 k_4}^{02}}{\epsilon_{k_1}^{k_5} \epsilon_{k_2 k_5 k_3 k_4} \epsilon_{k_3 k_4}} \tag{92}$$

$$T3 = \frac{1}{a_1(a_2 + a_3)a_3} \tag{93}$$

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$$a_1 = \epsilon_{k_1}^{k_5}$$

$$a_2 = \epsilon_{k_2 k_5}$$

$$a_3 = \epsilon_{k_3 k_4}$$

Diagram 45:

$$\text{PO3.45} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{22}_{k_6 k_7 k_5 k_2} \Omega^{04}_{k_6 k_7 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5}} e^{-\tau_2 \epsilon_{k_2 k_5}^{k_6 k_7}} e^{-\tau_3 \epsilon_{k_3 k_4 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{22}_{k_6 k_7 k_5 k_2} \Omega^{04}_{k_6 k_7 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_5 k_3 k_4} \ \epsilon_{k_3 k_4 k_6 k_7}} \tag{94}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{95}$$

$$a_1 = \epsilon_{k_1}^{k_5}$$

$$a_2 = \epsilon_{k_2 k_5}^{k_6 k_7}$$

$$a_3 = \epsilon_{k_3 k_4 k_6 k_7}$$

Diagram 46:

$$\text{PO3.46} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{02}_{k_5 k_2} \Omega^{04}_{k_6 k_7 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_5}} e^{-\tau_3 \epsilon_{k_3 k_4 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{02}_{k_5 k_2} \Omega^{04}_{k_6 k_7 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_5} \ \epsilon_{k_3 k_4 k_6 k_7}} \tag{96}$$

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$\rightarrow$ T2:

$$\mathrm{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{97}$$
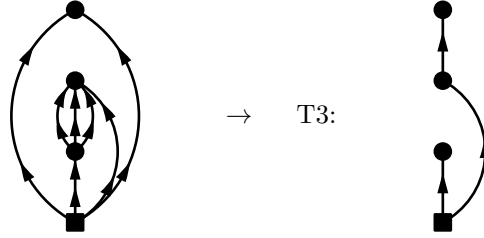
$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_5}$$
$$a_3 = \epsilon_{k_3 k_4 k_6 k_7}$$

Diagram 47:

$$\mathrm{PO3.47} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{04}_{k_5 k_6 k_7 k_2} \Omega^{02}_{k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_3 k_4}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{04}_{k_5 k_6 k_7 k_2} \Omega^{02}_{k_3 k_4}}{\epsilon_{k_1}^{k_5 k_6 k_7} \ \epsilon_{k_2 k_5 k_6 k_7 k_3 k_4} \ \epsilon_{k_3 k_4}} \tag{98}$$

$\rightarrow$ T3:

$$\mathrm{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{99}$$

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$$a_1 = \epsilon^{k_5 k_6 k_7}_{k_1}$$

$$a_2 = \epsilon_{k_2 k_5 k_6 k_7}$$

$$a_3 = \epsilon_{k_3 k_4}$$

Diagram 48:

$$\text{PO3.48} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{22}_{k_6 k_7 k_2 k_3} \Omega^{04}_{k_6 k_7 k_5 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5}_{k_1}} e^{-\tau_2 \epsilon^{k_6 k_7}_{k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{22}_{k_6 k_7 k_2 k_3} \Omega^{04}_{k_6 k_7 k_5 k_4} \left[\frac{1}{\epsilon_{k_1 k_4 k_6 k_7} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5 k_6 k_7}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5} \ \epsilon_{k_4 k_5 k_6 k_7}} \right] \tag{100}$$
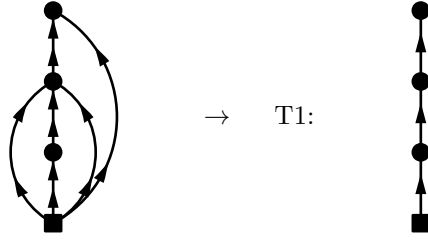

$\rightarrow$ T5:

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{101}$$

$$a_1 = \epsilon^{k_5}_{k_1}$$

$$a_2 = \epsilon^{k_6 k_7}_{k_2 k_3}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_7}$$

Diagram 49:

$$\text{PO3.49} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{13}_{k_6 k_5 k_2 k_3} \Omega^{02}_{k_6 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5}_{k_1}} e^{-\tau_2 \epsilon^{k_6}_{k_2 k_3 k_5}} e^{-\tau_3 \epsilon_{k_4 k_6}}$$

$$= \frac{(-1)^3}{(2!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{13}_{k_6 k_5 k_2 k_3} \Omega^{02}_{k_6 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_5 k_4} \ \epsilon_{k_4 k_6}} \tag{102}$$
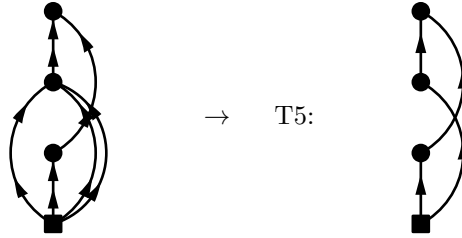
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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{103}$$

$$a_1 = \epsilon_{k_1}^{k_5}$$
$$a_2 = \epsilon_{k_2 k_3 k_5}^{k_6}$$
$$a_3 = \epsilon_{k_4 k_6}$$

Diagram 50:

$$\text{PO3.50} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_6 k_2 k_3 k_4}^{13} \Omega_{k_6 k_5}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2)e^{-\tau_1 \epsilon_{k_1}^{k_5}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_6}} e^{-\tau_3 \epsilon_{k_5 k_6}}$$

$$= \frac{-(-1)^3}{(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_6 k_2 k_3 k_4}^{13} \Omega_{k_6 k_5}^{02} \left[\frac{1}{\epsilon_{k_1 k_6} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5} \ \epsilon_{k_5 k_6}} \right] \tag{104}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{105}$$

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$$a_1 = \epsilon_{k_1}^{k_5}$$
$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_6}$$
$$a_3 = \epsilon_{k_5 k_6}$$

Diagram 51:

$$\text{PO3.51} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_1 k_2}^{22} \Omega_{k_5 k_3}^{11} \Omega_{k_5 k_4}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_3 k_4}} e^{-\tau_2 \epsilon_{k_3}^{k_5}} e^{-\tau_3 \epsilon_{k_4 k_5}}$$

$$= \frac{(-1)^3}{(2!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_1 k_2}^{22} \Omega_{k_5 k_3}^{11} \Omega_{k_5 k_4}^{02}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4} \ \epsilon_{k_4 k_5}} \tag{106}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{107}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_3 k_4}$$
$$a_2 = \epsilon_{k_3}^{k_5}$$
$$a_3 = \epsilon_{k_4 k_5}$$

Diagram 52:

$$\text{PO3.52} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_1 k_2}^{22} \Omega_{k_5 k_6 k_3 k_4}^{22} \Omega_{k_5 k_6}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_3 k_4}} e^{-\tau_2 \epsilon_{k_3 k_4}^{k_5 k_6}} e^{-\tau_3 \epsilon_{k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)^3} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_1 k_2}^{22} \Omega_{k_5 k_6 k_3 k_4}^{22} \Omega_{k_5 k_6}^{02}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4} \ \epsilon_{k_5 k_6}} \tag{108}$$

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$\rightarrow$ T1:

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{109}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_3 k_4}$$
$$a_2 = \epsilon_{k_3 k_4}^{k_5 k_6}$$
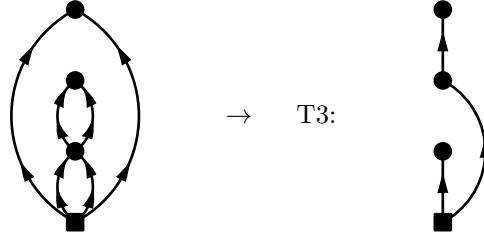$$a_3 = \epsilon_{k_5 k_6}$$

Diagram 53:

$$\text{PO3.53} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_5}^{11} \Omega_{k_7 k_6 k_3 k_4}^{04} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_5}^{k_7}} e^{-\tau_3 \epsilon_{k_3 k_4 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_5}^{11} \Omega_{k_7 k_6 k_3 k_4}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_3 k_4 k_6} \ \epsilon_{k_3 k_4 k_6 k_7}} \tag{110}$$

$\rightarrow$ T1:

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{111}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6}$$

$$a_2 = \epsilon_{k_5}^{k_7}$$

$$a_3 = \epsilon_{k_3 k_4 k_6 k_7}$$

Diagram 54:

$$\text{PO3.54} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{02}_{k_5 k_6} \Omega^{02}_{k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_3 k_4}}$$

$$= \frac{(-1)^3}{(2!)^3} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{02}_{k_5 k_6} \Omega^{02}_{k_3 k_4}}{\epsilon_{k_1 k_2}^{k_5 k_6} \ \epsilon_{k_5 k_6 k_3 k_4} \ \epsilon_{k_3 k_4}} \tag{112}$$
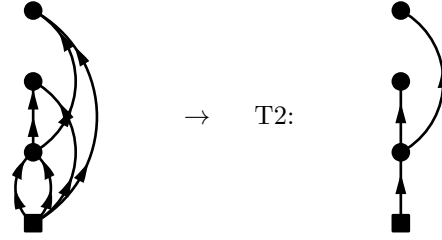

$$\to \quad \text{T3:}$$

$$\text{T3} = \frac{1}{a_1 (a_2 + a_3) a_3} \tag{113}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6}$$

$$a_2 = \epsilon_{k_5 k_6}$$

$$a_3 = \epsilon_{k_3 k_4}$$

Diagram 55:

$$\text{PO3.55} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2(2!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{02}_{k_5 k_3} \Omega^{02}_{k_6 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_3 k_5}} e^{-\tau_3 \epsilon_{k_4 k_6}}$$

$$= \frac{-(-1)^3}{2(2!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{02}_{k_5 k_3} \Omega^{02}_{k_6 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_5} \ \epsilon_{k_4 k_6}} \tag{114}$$

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$$\rightarrow \quad \text{T2:}$$
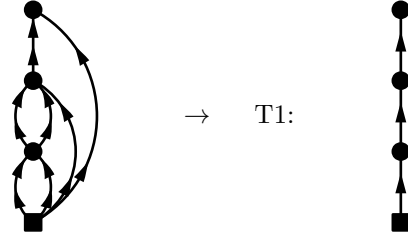
$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{115}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6}$$
$$a_2 = \epsilon_{k_3 k_5}$$
$$a_3 = \epsilon_{k_4 k_6}$$

Diagram 56:

$$\text{PO3.56} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_5 k_6 k_3}^{13} \Omega_{k_7 k_4}^{02} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_3 k_5 k_6}^{k_7}} e^{-\tau_3 \epsilon_{k_4 k_7}}$$

$$= \frac{(-1)^3}{(2!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_5 k_6 k_3}^{13} \Omega_{k_7 k_4}^{02}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_3 k_5 k_6 k_4} \; \epsilon_{k_4 k_7}} \tag{116}$$
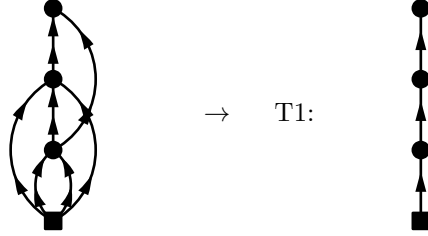

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{117}$$

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$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_7}_{k_3 k_5 k_6}$$
$$a_3 = \epsilon_{k_4 k_7}$$

Diagram 57:

$$\text{PO3.57} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{13}_{k_7 k_5 k_3 k_4} \Omega^{02}_{k_7 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_7}_{k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{13}_{k_7 k_5 k_3 k_4} \Omega^{02}_{k_7 k_6}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7}} \tag{118}$$
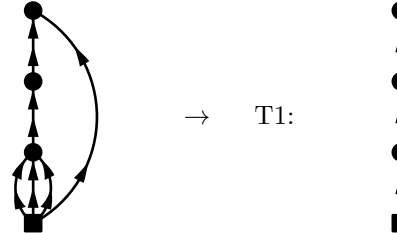

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{119}$$

$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_7}_{k_3 k_4 k_5}$$
$$a_3 = \epsilon_{k_6 k_7}$$

Diagram 58:

$$\text{PO3.58} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{13}_{k_5 k_1 k_2 k_3} \Omega^{11}_{k_6 k_5} \Omega^{02}_{k_6 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_6}_{k_5}} e^{-\tau_3 \epsilon_{k_4 k_6}}$$

$$= \frac{(-1)^3}{(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{13}_{k_5 k_1 k_2 k_3} \Omega^{11}_{k_6 k_5} \Omega^{02}_{k_6 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_4} \ \epsilon_{k_4 k_6}} \tag{120}$$

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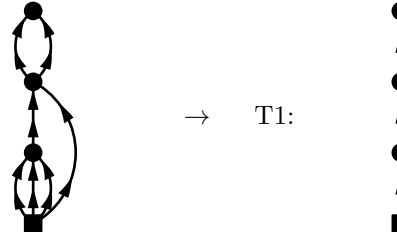$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{121}$$

$$a_1 = \epsilon^{k_5}_{k_1 k_2 k_3}$$

$$a_2 = \epsilon^{k_6}_{k_5}$$

$$a_3 = \epsilon_{k_4 k_6}$$

Diagram 59:

$$\text{PO3.59} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{13}_{k_5 k_1 k_2 k_3} \Omega^{22}_{k_6 k_7 k_5 k_4} \Omega^{02}_{k_6 k_7} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_6 k_7}_{k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{13}_{k_5 k_1 k_2 k_3} \Omega^{22}_{k_6 k_7 k_5 k_4} \Omega^{02}_{k_6 k_7}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5} \ \epsilon_{k_6 k_7}} \tag{122}$$

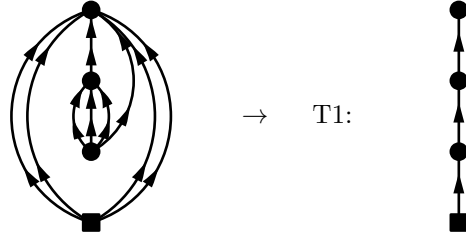$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{123}$$

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$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_5}$$

$$a_2 = \epsilon_{k_4 k_5}^{k_6 k_7}$$

$$a_3 = \epsilon_{k_6 k_7}$$

3 Three-body diagrams

3.1 Three-body energy canonical diagrams

Diagram 60:

$$\text{PO3.60} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8}^{40} \Omega_{k_9 k_5 k_6 k_7}^{13} \Omega_{k_9 k_8 k_1 k_2 k_3 k_4}^{06} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_5 k_6 k_7}^{k_9}} e^{-\tau_3 \epsilon_{k_1 k_2 k_3 k_4 k_8 k_9}}$$

$$= \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8}^{40} \Omega_{k_9 k_5 k_6 k_7}^{13} \Omega_{k_9 k_8 k_1 k_2 k_3 k_4}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_6 k_7 k_1 k_2 k_3 k_4 k_8} \; \epsilon_{k_1 k_2 k_3 k_4 k_8 k_9}} \tag{124}$$
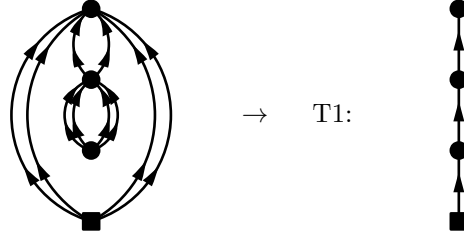

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{125}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_5 k_6 k_7}^{k_9}$$

$$a_3 = \epsilon_{k_1 k_2 k_3 k_4 k_8 k_9}$$

Diagram 61:

$$\text{PO3.61} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_5 k_6 k_7 k_8} \Omega^{06}_{k_9 k_{10} k_1 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_5 k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_1 k_2 k_3 k_4 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_5 k_6 k_7 k_8} \Omega^{06}_{k_9 k_{10} k_1 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_6 k_7 k_8 k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_2 k_3 k_4 k_9 k_{10}}} \tag{126}$$

$$\to \quad \text{T1:}$$

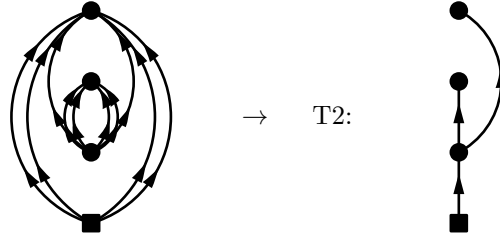$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{127}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon^{k_9 k_{10}}_{k_5 k_6 k_7 k_8}$$
$$a_3 = \epsilon_{k_1 k_2 k_3 k_4 k_9 k_{10}}$$

Diagram 62:

$$\text{PO3.62} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_5 k_6 k_7 k_8} \Omega^{06}_{k_9 k_{10} k_1 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_5 k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_1 k_2 k_3 k_4 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_5 k_6 k_7 k_8} \Omega^{06}_{k_9 k_{10} k_1 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_6 k_7 k_8} \; \epsilon_{k_1 k_2 k_3 k_4 k_9 k_{10}}} \tag{128}$$

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$$\rightarrow \quad \text{T2:}$$

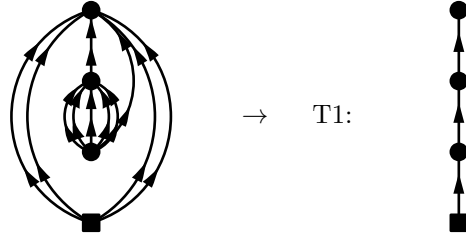$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{129}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}$$
$$a_2 = \epsilon_{k_5 k_6 k_7 k_8}$$
$$a_3 = \epsilon_{k_1 k_2 k_3 k_4 k_9 k_{10}}$$

Diagram 63:

$$\text{PO3.63} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_5 k_6 k_7 k_8 k_9} \Omega^{06}_{k_{11} k_{10} k_1 k_2 k_3 k_4} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon^{k_{11}}_{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_1 k_2 k_3 k_4}}$$

$$= \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_5 k_6 k_7 k_8 k_9} \Omega^{06}_{k_{11} k_{10} k_1 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4}\ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_1 k_2 k_3 k_4 k_{10}}\ \epsilon_{k_1 k_2 k_3 k_4 k_{10} k_{11}}} \tag{130}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{131}$$
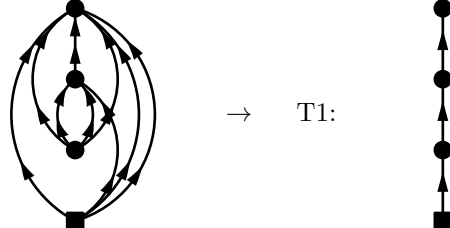
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$$a_1 = \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon^{k_{11}}_{k_5 k_6 k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_1 k_2 k_3 k_4 k_{10} k_{11}}$$

Diagram 64:

$$\text{PO3.64} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_5 k_6 k_1} \Omega^{06}_{k_9 k_7 k_8 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_5 k_6}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_5 k_6 k_1} \Omega^{06}_{k_9 k_7 k_8 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_5 k_6 k_2 k_3 k_4 k_7 k_8} \; \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}} \tag{132}$$

$$\to \quad \text{T1:}$$

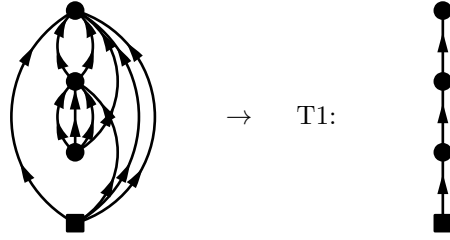$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{133}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_5 k_6}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}$$

Diagram 65:

$$\text{PO3.65} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_5 k_6 k_7 k_1} \Omega^{06}_{k_9 k_{10} k_8 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_1 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_5 k_6 k_7 k_1} \Omega^{06}_{k_9 k_{10} k_8 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_5 k_6 k_7 k_2 k_3 k_4 k_8} \; \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}} \tag{134}$$

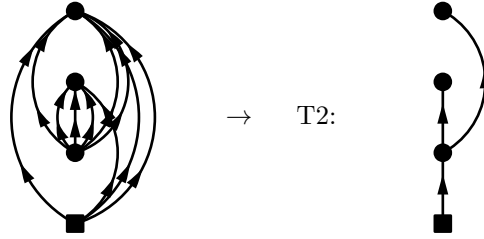$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{135}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon^{k_9 k_{10}}_{k_1 k_5 k_6 k_7}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}$$

Diagram 66:

$$\text{PO3.66} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)^3} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_5 k_6 k_7 k_1} \Omega^{06}_{k_8 k_9 k_{10} k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_1 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(3!)^3} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_5 k_6 k_7 k_1} \Omega^{06}_{k_8 k_9 k_{10} k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_5 k_6 k_7} \ \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}} \tag{136}$$

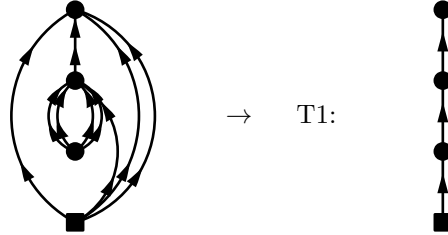$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{137}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_1 k_5 k_6 k_7}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}$$

Diagram 67:

$$\text{PO3.67} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_5 k_6 k_7 k_8 k_1} \Omega^{04}_{k_9 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_5 k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_9}}$$

$$= \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_5 k_6 k_7 k_8 k_1} \Omega^{04}_{k_9 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_5 k_6 k_7 k_8 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_9}} \tag{138}$$

$$\rightarrow \quad \text{T1:}$$

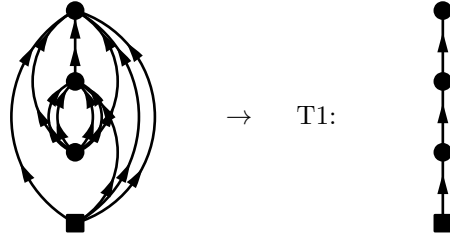$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{139}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_5 k_6 k_7 k_8}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_9}$$

Diagram 68:

$$\text{PO3.68} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_5 k_6 k_7 k_8 k_1} \Omega^{06}_{k_{11} k_9 k_{10} k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon^{k_{11}}_{k_1 k_5 k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_2 k_3}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_5 k_6 k_7 k_8 k_1} \Omega^{06}_{k_{11} k_9 k_{10} k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_5 k_6 k_7 k_8 k_2 k_3 k_4 k_9 k_{10}} \ \epsilon_{k_2 k_3 k_4 k_9 k_{10} k_{11}}} \tag{140}$$

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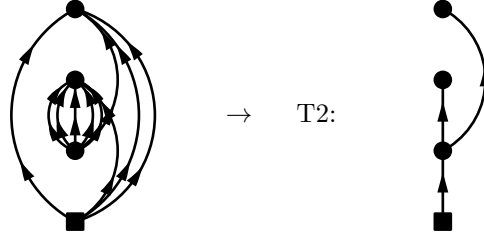$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{141}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}$$
$$a_2 = \epsilon^{k_{11}}_{k_1 k_5 k_6 k_7 k_8}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_9 k_{10} k_{11}}$$

Diagram 69:

$$\text{PO3.69} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)(5!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{06}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{04}_{k_{10} k_2 k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_1 k_5 k_6 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_{10}}}$$

$$= \frac{-(-1)^3}{(3!)(5!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{06}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{04}_{k_{10} k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_5 k_6 k_7 k_8 k_9} \ \epsilon_{k_2 k_3 k_4 k_{10}}} \tag{142}$$

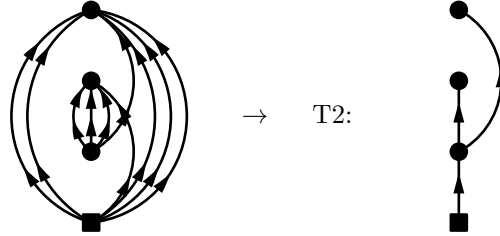$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{143}$$

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$$a_1 = \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_1 k_5 k_6 k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_{10}}$$

Diagram 70:

$$PO3.70 = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_7 k_8 k_9 k_1} \Omega^{06}_{k_{10} k_2 k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_1 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{10}}}$$

$$= \frac{-(-1)^3}{(3!)(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_7 k_8 k_9 k_1} \Omega^{06}_{k_{10} k_2 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_1 k_7 k_8 k_9} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{10}}} \tag{144}$$

$$\to \quad \text{T2:}$$

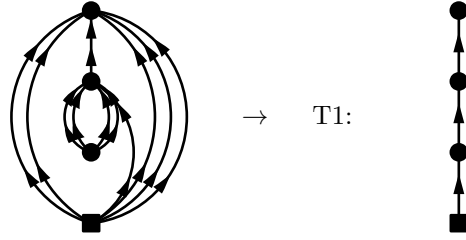$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{145}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_1 k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{10}}$$

Diagram 71:

$$PO3.71 = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_7 k_8 k_9 k_{10} k_1} \Omega^{06}_{k_{11} k_2 k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon^{k_{11}}_{k_1 k_7 k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{11}}}$$

$$= \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_7 k_8 k_9 k_{10} k_1} \Omega^{06}_{k_{11} k_2 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_1 k_7 k_8 k_9 k_{10} k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{11}}} \tag{146}$$

$$\rightarrow \quad \text{T1:}$$

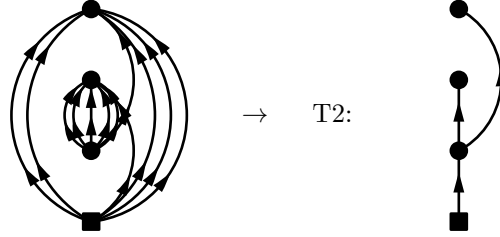$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{147}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}$$
$$a_2 = \epsilon^{k_{11}}_{k_1 k_7 k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{11}}$$

Diagram 72:

$$\text{PO3.72} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(5!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{60}_{k_7 k_8 k_9 k_{10} k_{11} k_{12}} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{06}_{k_{12} k_2 k_3 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10} k_{11} k_{12}}} e^{-\tau_2 \epsilon_{k_1 k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k}}$$

$$= \frac{-(-1)^3}{(5!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{60}_{k_7 k_8 k_9 k_{10} k_{11} k_{12}} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{06}_{k_{12} k_2 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_1 k_7 k_8 k_9 k_{10} k_{11}} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{12}}} \tag{148}$$

$$\rightarrow \quad \text{T2:}$$

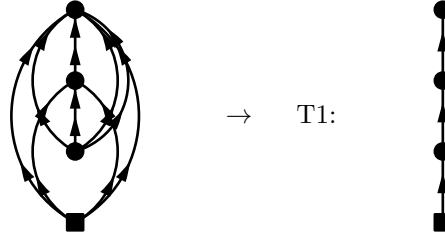$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{149}$$

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$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10} k_{11} k_{12}}$$

$$a_2 = \epsilon_{k_1 k_7 k_8 k_9 k_{10} k_{11}}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{12}}$$

Diagram 73:

$$\text{PO3.73} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_5 k_1 k_2} \Omega^{06}_{k_9 k_6 k_7 k_8 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_5}} e^{-\tau_3 \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_5 k_1 k_2} \Omega^{06}_{k_9 k_6 k_7 k_8 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_5 k_3 k_4 k_6 k_7 k_8} \ \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}} \tag{150}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{151}$$

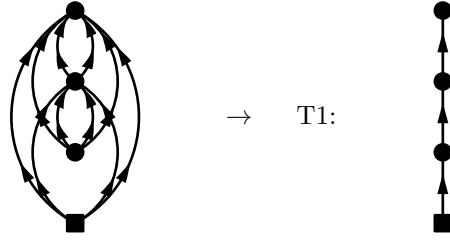$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_5}$$

$$a_3 = \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}$$

Diagram 74:

$$\text{PO3.74} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^5} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_5 k_6 k_1 k_2} \Omega^{06}_{k_9 k_{10} k_7 k_8 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_1 k_2 k_5 k_6}} e^{-\tau_3 \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^5} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_5 k_6 k_1 k_2} \Omega^{06}_{k_9 k_{10} k_7 k_8 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_5 k_6 k_3 k_4 k_7 k_8} \ \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}} \tag{152}$$

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$$\rightarrow \quad \text{T1:}$$

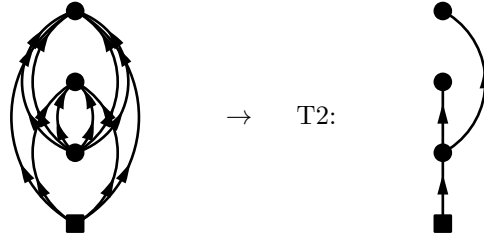$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{153}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon^{k_9 k_{10}}_{k_1 k_2 k_5 k_6}$$
$$a_3 = \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}$$

Diagram 75:

$$\text{PO3.75} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_5 k_6 k_1 k_2} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_1 k_2 k_5 k_6}} e^{-\tau_3 \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_5 k_6 k_1 k_2} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_5 k_6} \ \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}} \tag{154}$$

$$\rightarrow \quad \text{T2:}$$

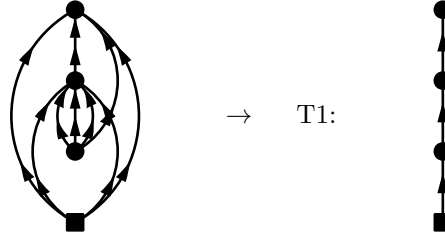$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{155}$$

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$$a_1 = \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_1 k_2 k_5 k_6}$$

$$a_3 = \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}$$

Diagram 76:

$$\text{PO3.76} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_5 k_6 k_7 k_1 k_2} \Omega^{04}_{k_9 k_8 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_3 k_4 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_5 k_6 k_7 k_1 k_2} \Omega^{04}_{k_9 k_8 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_2 k_5 k_6 k_7 k_3 k_4 k_8} \; \epsilon_{k_3 k_4 k_8 k_9}} \tag{156}$$

$$\to \quad \text{T1:}$$

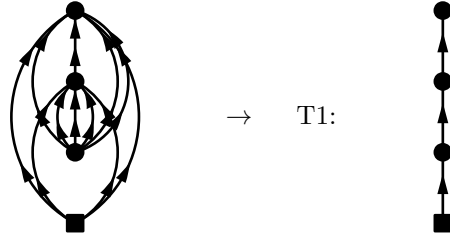$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{157}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_5 k_6 k_7}$$

$$a_3 = \epsilon_{k_3 k_4 k_8 k_9}$$

Diagram 77:

$$\text{PO3.77} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_5 k_6 k_7 k_1 k_2} \Omega^{06}_{k_{11} k_8 k_9 k_{10} k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon^{k_{11}}_{k_1 k_2 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_3 k_4 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_5 k_6 k_7 k_1 k_2} \Omega^{06}_{k_{11} k_8 k_9 k_{10} k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_2 k_5 k_6 k_7 k_3 k_4 k_8 k_9 k_{10}} \; \epsilon_{k_3 k_4 k_8 k_9 k_{10} k_{11}}} \tag{158}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{159}$$

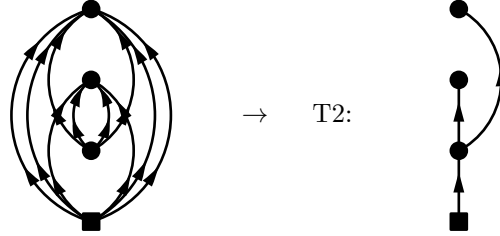$$a_1 = \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}$$
$$a_2 = \epsilon^{k_{11}}_{k_1 k_2 k_5 k_6 k_7}$$
$$a_3 = \epsilon_{k_3 k_4 k_8 k_9 k_{10} k_{11}}$$

Diagram 78:

$$\text{PO3.78} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_7 k_8 k_1 k_2} \Omega^{06}_{k_9 k_{10} k_3 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_1 k_2 k_7 k_8}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_7 k_8 k_1 k_2} \Omega^{06}_{k_9 k_{10} k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6}\ \epsilon_{k_1 k_2 k_7 k_8}\ \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}} \tag{160}$$

$$\to \quad \text{T2:}$$
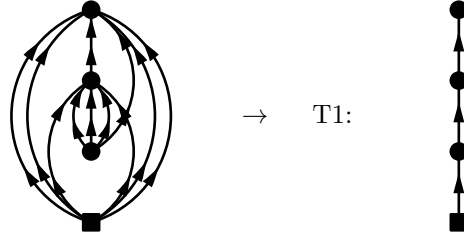
$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{161}$$

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$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_1 k_2 k_7 k_8}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}$$

Diagram 79:

$$\text{PO3.79} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_7 k_8 k_9 k_1 k_2} \Omega^{06}_{k_{11} k_{10} k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon^{k_{11}}_{k_1 k_2 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_7 k_8 k_9 k_1 k_2} \Omega^{06}_{k_{11} k_{10} k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \, \epsilon_{k_1 k_2 k_7 k_8 k_9 k_3 k_4 k_5 k_6 k_{10}} \, \epsilon_{k_3 k_4 k_5 k_6 k_{10} k_{11}}} \tag{162}$$

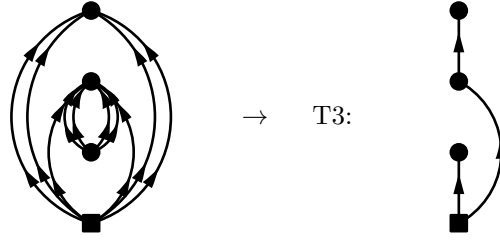$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3) a_3} \tag{163}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon^{k_{11}}_{k_1 k_2 k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_{10} k_{11}}$$

Diagram 80:

$$\text{PO3.80} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{04}_{k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_1 k_2 k_7 k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{04}_{k_3 k_4 k_5 k_6}}{\epsilon^{k_7 k_8 k_9 k_{10}} \, \epsilon_{k_1 k_2 k_7 k_8 k_9 k_{10} k_3 k_4 k_5 k_6} \, \epsilon_{k_3 k_4 k_5 k_6}} \tag{164}$$
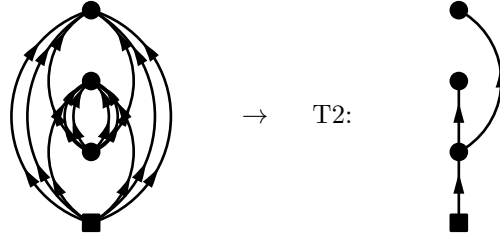
$$\text{T3} = \frac{1}{a_1(a_2+a_3)a_3} \tag{165}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}$$
$$a_2 = \epsilon_{k_1 k_2 k_7 k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_3 k_4 k_5 k_6}$$

Diagram 81:

$$\text{PO3.81} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{60}_{k_7 k_8 k_9 k_{10} k_{11} k_{12}} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{06}_{k_{11} k_{12} k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10} k_{11} k_{12}}} e^{-\tau_2 \epsilon_{k_1 k_2 k_7 k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{60}_{k_7 k_8 k_9 k_{10} k_{11} k_{12}} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{06}_{k_{11} k_{12} k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6}\ \epsilon_{k_1 k_2 k_7 k_8 k_9 k_{10}}\ \epsilon_{k_3 k_4 k_5 k_6 k_{11} k_{12}}} \tag{166}$$

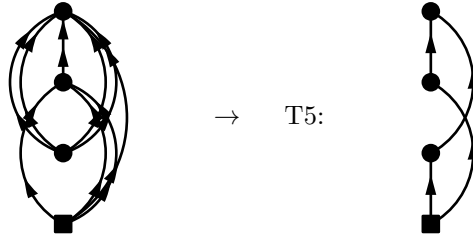$$\text{T2} = \frac{1}{(a_1+a_2+a_3)a_2 a_3} \tag{167}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10} k_{11} k_{12}}$$

$$a_2 = \epsilon_{k_1 k_2 k_7 k_8 k_9 k_{10}}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_{11} k_{12}}$$

Diagram 82:

$$\text{PO3.82} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_1 k_2 k_3} \Omega^{06}_{k_9 k_5 k_6 k_7 k_8 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_1 k_2 k_3} \Omega^{06}_{k_9 k_5 k_6 k_7 k_8 k_4} \left[\frac{1}{\epsilon_{k_4 k_9} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \right]$$
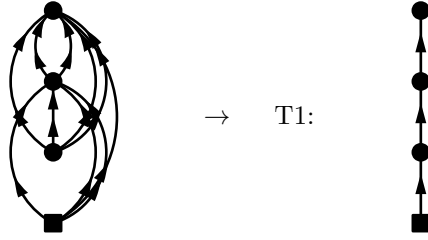
(168)

$$\rightarrow \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3) a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3) a_3}$$

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$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_3}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 83:

$$\text{PO3.83} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_5 k_1 k_2 k_3} \Omega^{06}_{k_9 k_{10} k_6 k_7 k_8 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_1 k_2 k_3 k_5}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_5 k_1 k_2 k_3} \Omega^{06}_{k_9 k_{10} k_6 k_7 k_8 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_3 k_5 k_4 k_6 k_7 k_8} \ \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}}$$

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$$\rightarrow \quad \text{T1:}$$

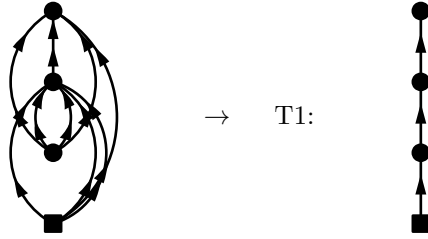$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{171}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon^{k_9 k_{10}}_{k_1 k_2 k_3 k_5}$$
$$a_3 = \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 84:

$$\text{PO3.84} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_5 k_6 k_1 k_2 k_3} \Omega^{04}_{k_9 k_7 k_8 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_3 k_5 k_6}} e^{-\tau_3 \epsilon_{k_4 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_5 k_6 k_1 k_2 k_3} \Omega^{04}_{k_9 k_7 k_8 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_2 k_3 k_5 k_6 k_4 k_7 k_8} \; \epsilon_{k_4 k_7 k_8 k_9}} \tag{172}$$
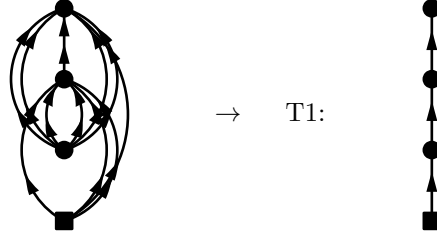

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{173}$$

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$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_3 k_5 k_6}$$

$$a_3 = \epsilon_{k_4 k_7 k_8 k_9}$$

Diagram 85:

$$\text{PO3.85} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_5 k_6 k_1 k_2 k_3} \Omega^{06}_{k_{11} k_7 k_8 k_9 k_{10} k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon^{k_{11}}_{k_1 k_2 k_3 k_5 k_6}} e^{-\tau_3 \epsilon_{k_4 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_5 k_6 k_1 k_2 k_3} \Omega^{06}_{k_{11} k_7 k_8 k_9 k_{10} k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_2 k_3 k_5 k_6 k_4 k_7 k_8 k_9 k_{10}} \; \epsilon_{k_4 k_7 k_8 k_9 k_{10} k_{11}}} \tag{174}$$
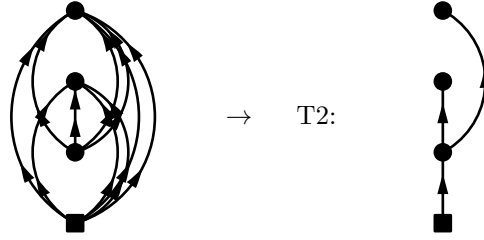

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{175}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon^{k_{11}}_{k_1 k_2 k_3 k_5 k_6}$$

$$a_3 = \epsilon_{k_4 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 86:

$$\text{PO3.86} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)^3} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_7 k_1 k_2 k_3} \Omega^{06}_{k_8 k_9 k_{10} k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_1 k_2 k_3 k_7}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(3!)^3} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_7 k_1 k_2 k_3} \Omega^{06}_{k_8 k_9 k_{10} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_1 k_2 k_3 k_7} \; \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}} \tag{176}$$

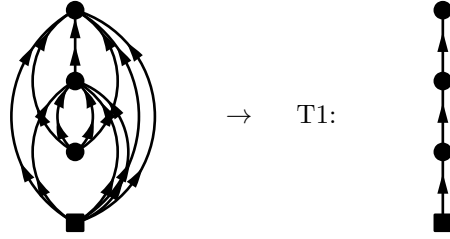$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{177}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}$$
$$a_2 = \epsilon_{k_1 k_2 k_3 k_7}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}$$

Diagram 87:

$$\text{PO3.87} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_7 k_8 k_1 k_2 k_3} \Omega^{06}_{k_{11} k_9 k_{10} k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon^{k_{11}}_{k_1 k_2 k_3 k_7 k_8}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_9 k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_7 k_8 k_1 k_2 k_3} \Omega^{06}_{k_{11} k_9 k_{10} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_1 k_2 k_3 k_7 k_8 k_4 k_5 k_6 k_9 k_{10}} \ \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}} \tag{178}$$
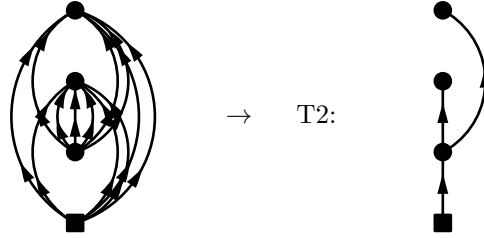

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{179}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon^{k_{11}}_{k_1 k_2 k_3 k_7 k_8}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}$$

Diagram 88:

$$\text{PO3.88} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2(3!)^4} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{60}_{k_7 k_8 k_9 k_{10} k_{11} k_{12}} \Omega^{06}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{06}_{k_{10} k_{11} k_{12} k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10} k_{11} k_{12}}} e^{-\tau_2 \epsilon_{k_1 k_2 k_3 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_{10}}}$$

$$= \frac{-(-1)^3}{2(3!)^4} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{60}_{k_7 k_8 k_9 k_{10} k_{11} k_{12}} \Omega^{06}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{06}_{k_{10} k_{11} k_{12} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_1 k_2 k_3 k_7 k_8 k_9} \ \epsilon_{k_4 k_5 k_6 k_{10} k_{11} k_{12}}} \tag{180}$$
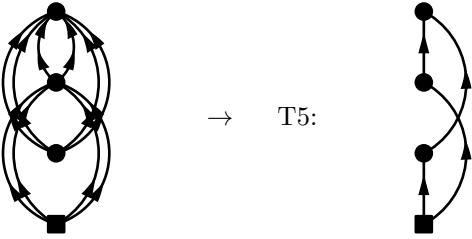

$$\to \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3) a_2 a_3} \tag{181}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10} k_{11} k_{12}}$$

$$a_2 = \epsilon_{k_1 k_2 k_3 k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_{10} k_{11} k_{12}}$$

Diagram 89:

$$\text{PO3.89} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_1 k_2 k_3 k_4} \Omega^{06}_{k_9 k_{10} k_5 k_6 k_7 k_8} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_1 k_2 k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_1 k_2 k_3 k_4} \Omega^{06}_{k_9 k_{10} k_5 k_6 k_7 k_8} \left[\frac{1}{\epsilon_{k_9 k_{10}} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \right] \tag{182}$$

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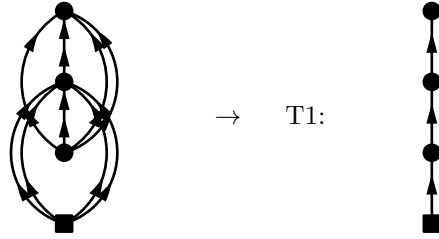$$T5 = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{183}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon^{k_9 k_{10}}_{k_1 k_2 k_3 k_4}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 90:

$$\text{PO3.90} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_5 k_1 k_2 k_3 k_4} \Omega^{04}_{k_9 k_6 k_7 k_8} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_5 k_1 k_2 k_3 k_4} \Omega^{04}_{k_9 k_6 k_7 k_8}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8} \; \epsilon_{k_6 k_7 k_8 k_9}} \tag{184}$$
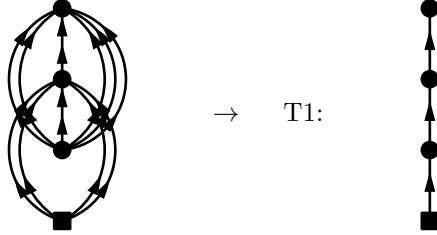

$$T1 = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{185}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_3 k_4 k_5}$$

$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 91:

$$\text{PO3.91} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_5 k_1 k_2 k_3 k_4} \Omega^{06}_{k_{11} k_6 k_7 k_8 k_9 k_{10}} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon^{k_{11}}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{60}_{k_5 k_6 k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_5 k_1 k_2 k_3 k_4} \Omega^{06}_{k_{11} k_6 k_7 k_8 k_9 k_{10}}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8 k_9 k_{10}} \; \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}} \tag{186}$$
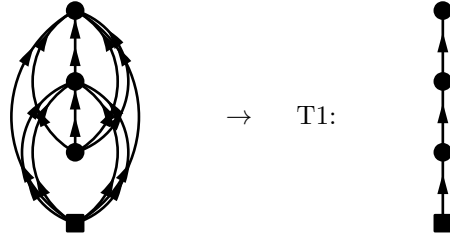

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{187}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon^{k_{11}}_{k_1 k_2 k_3 k_4 k_5}$$

$$a_3 = \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 92:

$$\text{PO3.92} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_7 k_1 k_2 k_3 k_4} \Omega^{06}_{k_{11} k_8 k_9 k_{10} k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon^{k_{11}}_{k_1 k_2 k_3 k_4 k_7}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_7 k_1 k_2 k_3 k_4} \Omega^{06}_{k_{11} k_8 k_9 k_{10} k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_1 k_2 k_3 k_4 k_7 k_5 k_6 k_8 k_9 k_{10}} \; \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}} \tag{188}$$

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$$\to \quad \text{T1:}$$

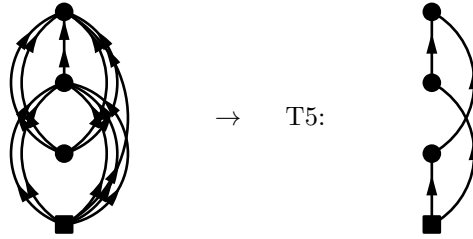$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{189}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}$$
$$a_2 = \epsilon^{k_{11}}_{k_1 k_2 k_3 k_4 k_7}$$
$$a_3 = \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}$$

Diagram 93:

$$\text{PO3.93} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_1 k_2 k_3 k_4 k_5} \Omega^{06}_{k_{11} k_7 k_8 k_9 k_{10} k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon^{k_{11}}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{40}_{k_7 k_8 k_9 k_{10}} \Omega^{15}_{k_{11} k_1 k_2 k_3 k_4 k_5} \Omega^{06}_{k_{11} k_7 k_8 k_9 k_{10} k_6} \left[\frac{1}{\epsilon_{k_6 k_{11}} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8 k_9 k_{10}} \ \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}} \right] \tag{190}$$
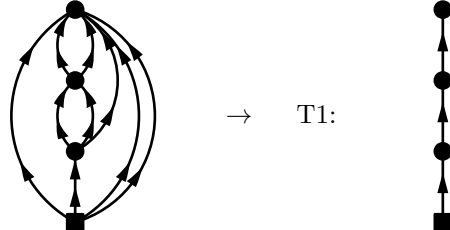

$$\to \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{191}$$

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$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon^{k_{11}}_{k_1 k_2 k_3 k_4 k_5}$$

$$a_3 = \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 94:

$$\text{PO3.94} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{22}_{k_8 k_9 k_5 k_6} \Omega^{06}_{k_8 k_9 k_7 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1}} e^{-\tau_2 \epsilon^{k_8 k_9}_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{22}_{k_8 k_9 k_5 k_6} \Omega^{06}_{k_8 k_9 k_7 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_2 k_3 k_4 k_7} \ \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}} \tag{192}$$
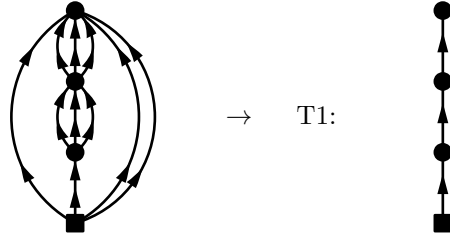

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{193}$$

$$a_1 = \epsilon^{k_5 k_6 k_7}_{k_1}$$

$$a_2 = \epsilon^{k_8 k_9}_{k_5 k_6}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}$$

Diagram 95:

$$\text{PO3.95} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)^3} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_5 k_6 k_7} \Omega^{06}_{k_8 k_9 k_{10} k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10}}_{k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(3!)^3} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_5 k_6 k_7} \Omega^{06}_{k_8 k_9 k_{10} k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}} \tag{194}$$

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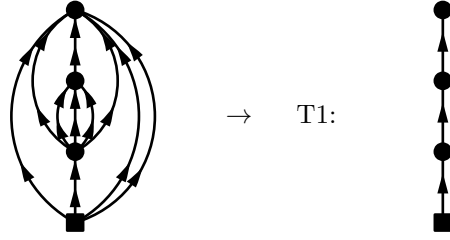$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{195}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_5 k_6 k_7}^{k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}$$

Diagram 96:

$$\text{PO3.96} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_5 k_6 k_7}^{13} \Omega_{k_{10} k_8 k_9 k_2 k_3 k_4}^{06} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_5 k_6 k_7}^{k_{10}}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_5 k_6 k_7}^{13} \Omega_{k_{10} k_8 k_9 k_2 k_3 k_4}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_2 k_3 k_4 k_8 k_9} \ \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}} \tag{196}$$

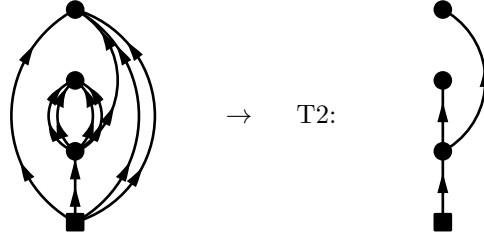$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{197}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_5 k_6 k_7}^{k_{10}}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_8 k_9 k_{10}}$$

Diagram 97:

$$\text{PO3.97} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{04}_{k_5 k_6 k_7 k_8} \Omega^{04}_{k_9 k_2 k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_5 k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_9}}$$

$$= \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{04}_{k_5 k_6 k_7 k_8} \Omega^{04}_{k_9 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_6 k_7 k_8} \; \epsilon_{k_2 k_3 k_4 k_9}} \tag{198}$$
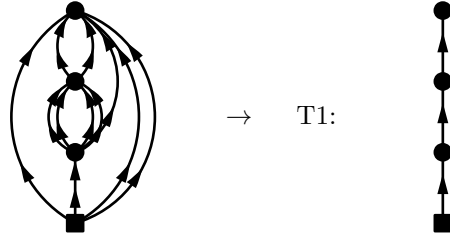

$$\to \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3) a_2 a_3} \tag{199}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_5 k_6 k_7 k_8}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_9}$$

Diagram 98:

$$\text{PO3.98} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{24}_{k_{10} k_{11} k_5 k_6 k_7 k_8} \Omega^{06}_{k_{10} k_{11} k_9 k_2 k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_5 k_6 k_7 k_8}^{k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_9}^{k}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{24}_{k_{10} k_{11} k_5 k_6 k_7 k_8} \Omega^{06}_{k_{10} k_{11} k_9 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_6 k_7 k_8 k_2 k_3 k_4 k_9} \; \epsilon_{k_2 k_3 k_4 k_9 k_{10} k_{11}}} \tag{200}$$
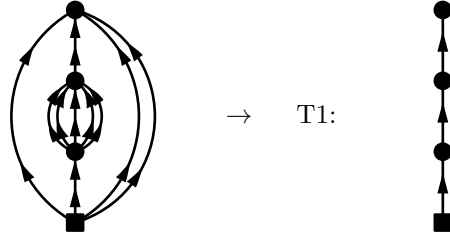
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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{201}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_5 k_6 k_7 k_8}^{k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_9 k_{10} k_{11}}$$

Diagram 99:

$$\text{PO3.99} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(5!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_5 k_6 k_7 k_8 k_9}^{15} \Omega_{k_{10} k_2 k_3 k_4}^{04} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_5 k_6 k_7 k_8 k_9}^{k_{10}}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_{10}}}$$

$$= \frac{(-1)^3}{(3!)(5!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_5 k_6 k_7 k_8 k_9}^{15} \Omega_{k_{10} k_2 k_3 k_4}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_{10}}} \tag{202}$$
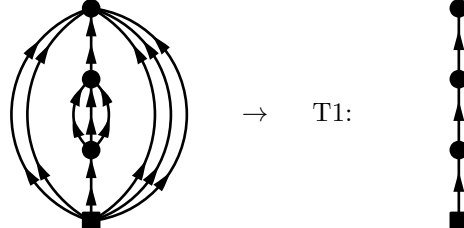

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{203}$$

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$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_5 k_6 k_7 k_8 k_9}^{k_{10}}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_{10}}$$

Diagram 100:

$$\text{PO3.100} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{13}_{k_{10} k_7 k_8 k_9} \Omega^{06}_{k_{10} k_2 k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_7 k_8 k_9}^{k_{10}}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{10}}}$$

$$= \frac{(-1)^3}{(3!)(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{13}_{k_{10} k_7 k_8 k_9} \Omega^{06}_{k_{10} k_2 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8 k_9 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{10}}} \tag{204}$$

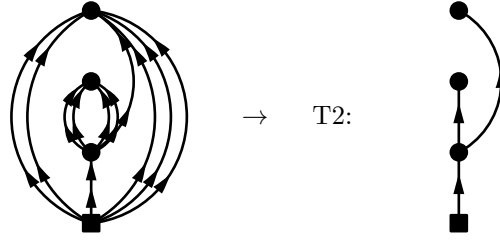$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{205}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_7 k_8 k_9}^{k_{10}}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{10}}$$

Diagram 101:

$$\text{PO3.101} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{04}_{k_7 k_8 k_9 k_{10}} \Omega^{06}_{k_{11} k_2 k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_2 \epsilon_{k_7 k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{11}}}$$

$$= \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{04}_{k_7 k_8 k_9 k_{10}} \Omega^{06}_{k_{11} k_2 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8 k_9 k_{10}} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{11}}} \tag{206}$$

$$\text{T2:} \qquad \text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \qquad (207)$$
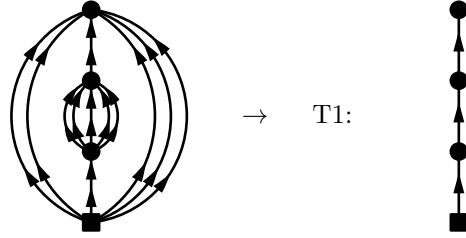
$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}$$

$$a_2 = \epsilon_{k_7 k_8 k_9 k_{10}}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{11}}$$

Diagram 102:

$$\text{PO3.102} = \lim_{\tau \to \infty} \frac{(-1)^3}{(5!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_{11} k_1}^{51} \Omega_{k_{12} k_7 k_8 k_9 k_{10} k_{11}}^{15} \Omega_{k_{12} k_2 k_3 k_4 k_5 k_6}^{06} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_2 \epsilon_{k_7 k_8 k_9 k_{10} k_{11}}^{k_{12}}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{12}}}$$

$$= \frac{(-1)^3}{(5!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_{11} k_1}^{51} \Omega_{k_{12} k_7 k_8 k_9 k_{10} k_{11}}^{15} \Omega_{k_{12} k_2 k_3 k_4 k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_8 k_9 k_{10} k_{11} k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{12}}} \qquad (208)$$

$$\text{T1:} \qquad \text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \qquad (209)$$

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$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10} k_{11}}_{k_1}$$

$$a_2 = \epsilon^{k_{12}}_{k_7 k_8 k_9 k_{10} k_{11}}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_{12}}$$

Diagram 103:

$$\text{PO3.103} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{22}_{k_8 k_9 k_5 k_2} \Omega^{06}_{k_8 k_9 k_6 k_7 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1}} e^{-\tau_2 \epsilon^{k_8 k_9}_{k_2 k_5}} e^{-\tau_3 \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^3} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{22}_{k_8 k_9 k_5 k_2} \Omega^{06}_{k_8 k_9 k_6 k_7 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_5 k_3 k_4 k_6 k_7} \ \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}} \tag{210}$$
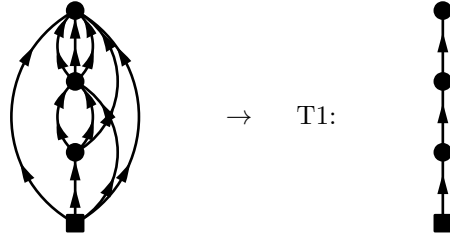

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{211}$$

$$a_1 = \epsilon^{k_5 k_6 k_7}_{k_1}$$

$$a_2 = \epsilon^{k_8 k_9}_{k_2 k_5}$$

$$a_3 = \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}$$

Diagram 104:

$$\text{PO3.104} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2 (3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_5 k_6 k_2} \Omega^{06}_{k_8 k_9 k_{10} k_7 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10}}_{k_2 k_5 k_6}} e^{-\tau_3 \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)^2 (3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_5 k_6 k_2} \Omega^{06}_{k_8 k_9 k_{10} k_7 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_5 k_6 k_3 k_4 k_7} \ \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}} \tag{212}$$

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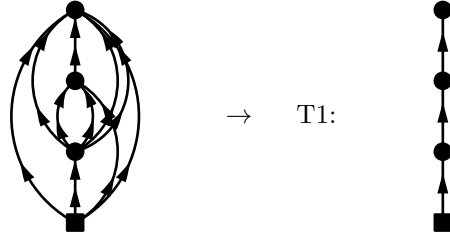$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{213}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_5 k_6}^{k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}$$

Diagram 105:

$$\text{PO3.105} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_5 k_6 k_2}^{13} \Omega_{k_{10} k_7 k_8 k_9 k_3 k_4}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_5 k_6}^{k_{10}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_5 k_6 k_2}^{13} \Omega_{k_{10} k_7 k_8 k_9 k_3 k_4}^{06}}{\epsilon_{k_1 k_2 k_3 k_4}\ \epsilon_{k_2 k_5 k_6 k_3 k_4 k_7 k_8 k_9}\ \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}} \tag{214}$$
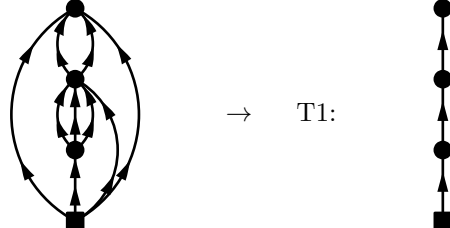

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{215}$$

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$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_5 k_6}^{k_{10}}$$
$$a_3 = \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}$$

Diagram 106:

$$\text{PO3.106} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{24}_{k_8 k_9 k_5 k_6 k_7 k_2} \Omega^{04}_{k_8 k_9 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_5 k_6 k_7}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_3 k_4 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{24}_{k_8 k_9 k_5 k_6 k_7 k_2} \Omega^{04}_{k_8 k_9 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_2 k_5 k_6 k_7 k_3 k_4} \; \epsilon_{k_3 k_4 k_8 k_9}} \tag{216}$$

$$\to \quad \text{T1:}$$

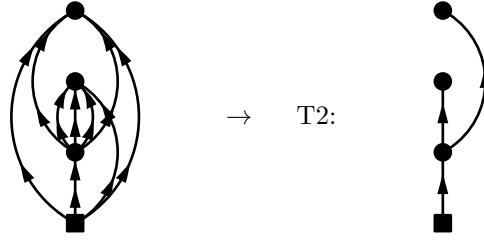$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{217}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_5 k_6 k_7}^{k_8 k_9}$$
$$a_3 = \epsilon_{k_3 k_4 k_8 k_9}$$

Diagram 107:

$$\text{PO3.107} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{04}_{k_5 k_6 k_7 k_2} \Omega^{04}_{k_8 k_9 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_3 k_4 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{04}_{k_5 k_6 k_7 k_2} \Omega^{04}_{k_8 k_9 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_2 k_5 k_6 k_7} \; \epsilon_{k_3 k_4 k_8 k_9}} \tag{218}$$

$$\rightarrow \quad \text{T2:}$$
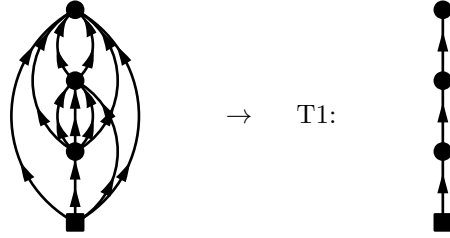
$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{219}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_5 k_6 k_7}$$
$$a_3 = \epsilon_{k_3 k_4 k_8 k_9}$$

Diagram 108:

$$\text{PO3.108} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3 (3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{24}_{k_{10} k_{11} k_5 k_6 k_7 k_2} \Omega^{06}_{k_{10} k_{11} k_8 k_9 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_5 k_6 k_7}^{k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3 (3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{24}_{k_{10} k_{11} k_5 k_6 k_7 k_2} \Omega^{06}_{k_{10} k_{11} k_8 k_9 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_2 k_5 k_6 k_7 k_3 k_4 k_8 k_9} \; \epsilon_{k_3 k_4 k_8 k_9 k_{10} k_{11}}} \tag{220}$$

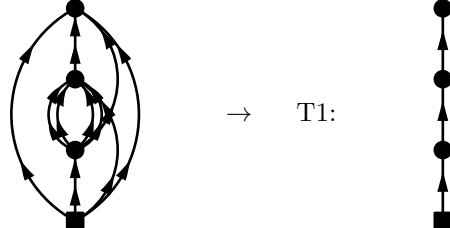$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{221}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_5 k_6 k_7}^{k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_3 k_4 k_8 k_9 k_{10} k_{11}}$$

Diagram 109:

$$\text{PO3.109} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{15}_{k_{10} k_5 k_6 k_7 k_8 k_2} \Omega^{04}_{k_{10} k_9 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_5 k_6 k_7 k_8}^{k_{10}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{15}_{k_{10} k_5 k_6 k_7 k_8 k_2} \Omega^{04}_{k_{10} k_9 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_5 k_6 k_7 k_8 k_3 k_4 k_9} \ \epsilon_{k_3 k_4 k_9 k_{10}}} \tag{222}$$

$$\to \quad \text{T1:}$$
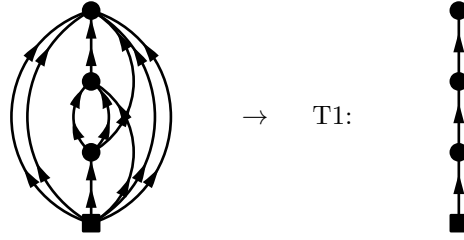
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{223}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_5 k_6 k_7 k_8}^{k_{10}}$$
$$a_3 = \epsilon_{k_3 k_4 k_9 k_{10}}$$

Diagram 110:

$$\text{PO3.110} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{13}_{k_{10} k_7 k_8 k_2} \Omega^{06}_{k_{10} k_9 k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_7 k_8}^{k_{10}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{13}_{k_{10} k_7 k_8 k_2} \Omega^{06}_{k_{10} k_9 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_7 k_8 k_3 k_4 k_5 k_6 k_9} \ \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}} \tag{224}$$

$\rightarrow$ T1:

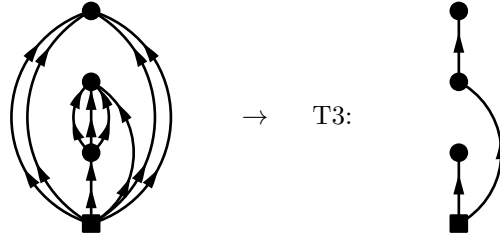$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{225}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_7 k_8}^{k_{10}}$$
$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}$$

Diagram 111:

$$\text{PO3.111} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_7 k_8 k_9 k_2}^{04} \Omega_{k_3 k_4 k_5 k_6}^{04} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_7 k_8 k_9 k_2}^{04} \Omega_{k_3 k_4 k_5 k_6}^{04}}{\epsilon_{k_1}^{k_7 k_8 k_9} \epsilon_{k_2 k_7 k_8 k_9 k_3 k_4 k_5 k_6} \epsilon_{k_3 k_4 k_5 k_6}} \tag{226}$$

$\rightarrow$ T3:

$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{227}$$

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$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6}$$

Diagram 112:

$$\text{PO3.112} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{24}_{k_{10} k_{11} k_7 k_8 k_9 k_2} \Omega^{06}_{k_{10} k_{11} k_3 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_7 k_8 k_9}^{k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{24}_{k_{10} k_{11} k_7 k_8 k_9 k_2} \Omega^{06}_{k_{10} k_{11} k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_7 k_8 k_9 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_5 k_6 k_{10} k_{11}}} \tag{228}$$

$$\to \quad \text{T1:}$$

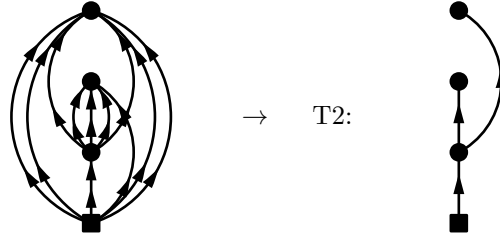$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{229}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_7 k_8 k_9}^{k_{10} k_{11}}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_{10} k_{11}}$$

Diagram 113:

$$\text{PO3.113} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{04}_{k_7 k_8 k_9 k_2} \Omega^{06}_{k_{10} k_{11} k_3 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_2 \epsilon_{k_2 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{04}_{k_7 k_8 k_9 k_2} \Omega^{06}_{k_{10} k_{11} k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_7 k_8 k_9} \; \epsilon_{k_3 k_4 k_5 k_6 k_{10} k_{11}}} \tag{230}$$

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$$\rightarrow \quad \text{T2:}$$

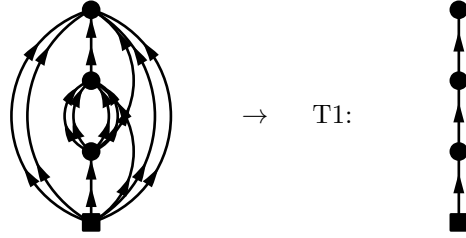$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{231}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}$$
$$a_2 = \epsilon_{k_2 k_7 k_8 k_9}$$
$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_{10} k_{11}}$$

Diagram 114:

$$\text{PO3.114} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(4!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{15}_{k_{12} k_7 k_8 k_9 k_{10} k_2} \Omega^{06}_{k_{12} k_{11} k_3 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_2 \epsilon_{k_2 k_7 k_8 k_9 k_{10}}^{k_{12}}} e^{-\tau_3 \epsilon}$$

$$= \frac{-(-1)^3}{(4!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{15}_{k_{12} k_7 k_8 k_9 k_{10} k_2} \Omega^{06}_{k_{12} k_{11} k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_7 k_8 k_9 k_{10} k_3 k_4 k_5 k_6 k_{11}} \ \epsilon_{k_3 k_4 k_5 k_6 k_{11} k_{12}}} \tag{232}$$
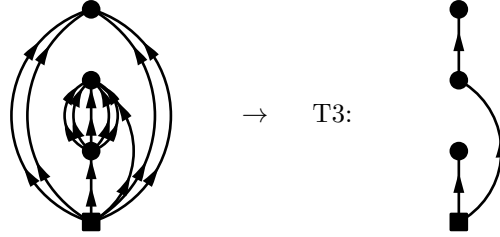

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{233}$$

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$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}$$

$$a_2 = \epsilon_{k_2 k_7 k_8 k_9 k_{10}}^{k_{12}}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_{11} k_{12}}$$

Diagram 115:

$$\text{PO3.115} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_{11} k_1}^{51} \Omega_{k_7 k_8 k_9 k_{10} k_{11} k_2}^{06} \Omega_{k_3 k_4 k_5 k_6}^{04} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_2 \epsilon_{k_2 k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_{11} k_1}^{51} \Omega_{k_7 k_8 k_9 k_{10} k_{11} k_2}^{06} \Omega_{k_3 k_4 k_5 k_6}^{04}}{\epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}} \ \epsilon_{k_2 k_7 k_8 k_9 k_{10} k_{11} k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_5 k_6}} \tag{234}$$
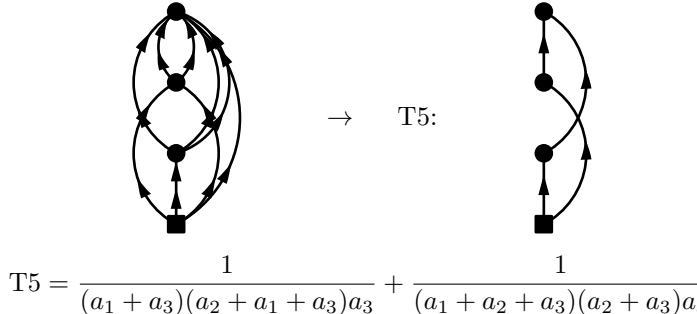

$$\to \quad \text{T3:}$$

$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{235}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}$$

$$a_2 = \epsilon_{k_2 k_7 k_8 k_9 k_{10} k_{11}}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6}$$

Diagram 116:

$$\text{PO3.116} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1}^{31} \Omega_{k_8 k_9 k_2 k_3}^{22} \Omega_{k_8 k_9 k_5 k_6 k_7 k_4}^{06} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1}^{31} \Omega_{k_8 k_9 k_2 k_3}^{22} \Omega_{k_8 k_9 k_5 k_6 k_7 k_4}^{06} \left[\frac{1}{\epsilon_{k_1 k_4 k_8 k_9} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \right] \tag{236}$$

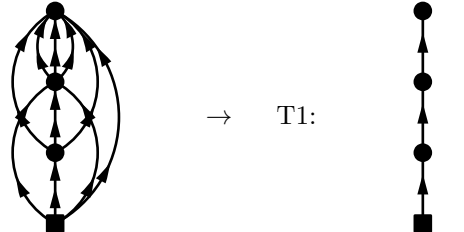$$T5 = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{237}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_3}^{k_8 k_9}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 117:

$$\text{PO3.117} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_5 k_2 k_3} \Omega^{06}_{k_8 k_9 k_{10} k_6 k_7 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_5}^{k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_5 k_2 k_3} \Omega^{06}_{k_8 k_9 k_{10} k_6 k_7 k_4}}{\epsilon_{k_1 k_2 k_3 k_4}\ \epsilon_{k_2 k_3 k_5 k_4 k_6 k_7}\ \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}} \tag{238}$$
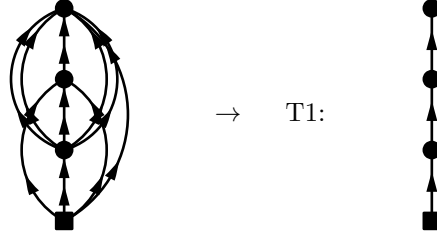

$$T1 = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{239}$$

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$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_5}^{k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 118:

$$\text{PO3.118} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{13}_{k_{10} k_5 k_2 k_3} \Omega^{06}_{k_{10} k_6 k_7 k_8 k_9 k_4} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_5}^{k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{13}_{k_{10} k_5 k_2 k_3} \Omega^{06}_{k_{10} k_6 k_7 k_8 k_9 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_5 k_4 k_6 k_7 k_8 k_9} \ \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}} \tag{240}$$

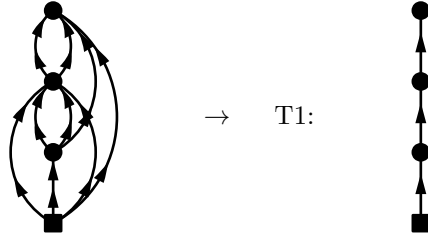$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{241}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_3 k_5}^{k_{10}}$$
$$a_3 = \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 119:

$$\text{PO3.119} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{24}_{k_8 k_9 k_5 k_6 k_2 k_3} \Omega^{04}_{k_8 k_9 k_7 k_4} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_5 k_6}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^3} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{24}_{k_8 k_9 k_5 k_6 k_2 k_3} \Omega^{04}_{k_8 k_9 k_7 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_5 k_6 k_4 k_7} \ \epsilon_{k_4 k_7 k_8 k_9}} \tag{242}$$
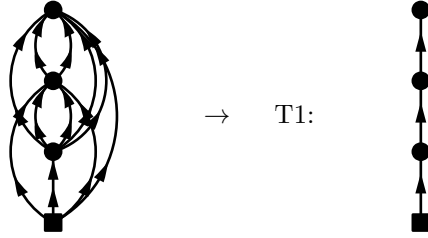
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$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{243}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_5 k_6}^{k_8 k_9}$$
$$a_3 = \epsilon_{k_4 k_7 k_8 k_9}$$

Diagram 120:

$$\text{PO3.120} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3 (3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_{11} k_5 k_6 k_2 k_3}^{24} \Omega_{k_{10} k_{11} k_7 k_8 k_9 k_4}^{06} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_5 k_6}^{k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_4 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3 (3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_{11} k_5 k_6 k_2 k_3}^{24} \Omega_{k_{10} k_{11} k_7 k_8 k_9 k_4}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_5 k_6 k_4 k_7 k_8 k_9} \ \epsilon_{k_4 k_7 k_8 k_9 k_{10} k_{11}}} \tag{244}$$
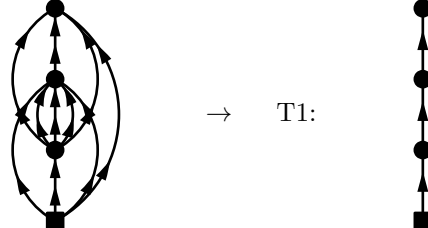

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{245}$$

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$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_3 k_5 k_6}^{k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_4 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 121:

$$\text{PO3.121} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_5 k_6 k_7 k_2 k_3}^{15} \Omega_{k_{10} k_8 k_9 k_4}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_5 k_6 k_7}^{k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_5 k_6 k_7 k_2 k_3}^{15} \Omega_{k_{10} k_8 k_9 k_4}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_2 k_3 k_5 k_6 k_7 k_4 k_8 k_9} \; \epsilon_{k_4 k_8 k_9 k_{10}}} \tag{246}$$

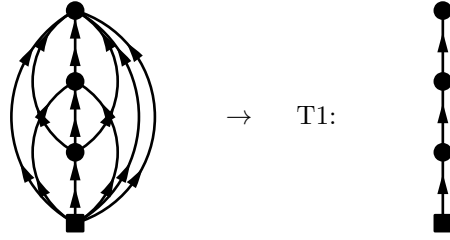$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{247}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_3 k_5 k_6 k_7}^{k_{10}}$$
$$a_3 = \epsilon_{k_4 k_8 k_9 k_{10}}$$

Diagram 122:

$$\text{PO3.122} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_{10} k_7 k_2 k_3}^{13} \Omega_{k_{10} k_8 k_9 k_4 k_5 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_7}^{k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_{10} k_7 k_2 k_3}^{13} \Omega_{k_{10} k_8 k_9 k_4 k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_7 k_4 k_5 k_6 k_8 k_9} \; \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}} \tag{248}$$

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$$\rightarrow \quad \text{T1:}$$

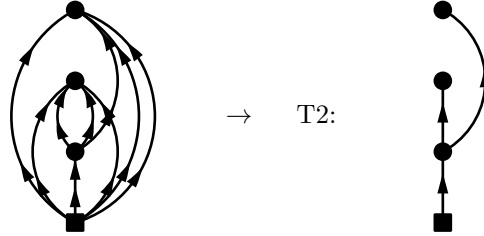$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{249}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_3 k_7}^{k_{10}}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}$$

Diagram 123:

$$\text{PO3.123} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{04}_{k_7 k_8 k_2 k_3} \Omega^{04}_{k_9 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_7 k_8}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{04}_{k_7 k_8 k_2 k_3} \Omega^{04}_{k_9 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_7 k_8} \; \epsilon_{k_4 k_5 k_6 k_9}} \tag{250}$$

$$\rightarrow \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{251}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_3 k_7 k_8}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_9}$$

Diagram 124:

$$\text{PO3.124} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{24}_{k_{10} k_{11} k_7 k_8 k_2 k_3} \Omega^{06}_{k_{10} k_{11} k_9 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_7 k_8}^{k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{24}_{k_{10} k_{11} k_7 k_8 k_2 k_3} \Omega^{06}_{k_{10} k_{11} k_9 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_7 k_8 k_4 k_5 k_6 k_9} \; \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}} \tag{252}$$

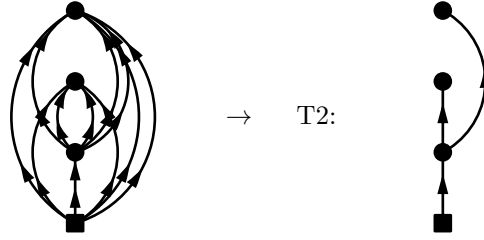$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{253}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_3 k_7 k_8}^{k_{10} k_{11}}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}$$

Diagram 125:

$$\text{PO3.125} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{04}_{k_7 k_8 k_2 k_3} \Omega^{06}_{k_9 k_{10} k_{11} k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_2 \epsilon_{k_2 k_3 k_7 k_8}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{04}_{k_7 k_8 k_2 k_3} \Omega^{06}_{k_9 k_{10} k_{11} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_7 k_8} \; \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}} \tag{254}$$

$$\to \quad \text{T2:}$$

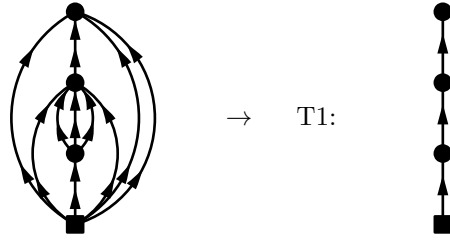$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{255}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}$$
$$a_2 = \epsilon_{k_2 k_3 k_7 k_8}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}$$

Diagram 126:

$$\text{PO3.126} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{15}_{k_{10} k_7 k_8 k_9 k_2 k_3} \Omega^{04}_{k_{10} k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_7 k_8 k_9}^{k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{15}_{k_{10} k_7 k_8 k_9 k_2 k_3} \Omega^{04}_{k_{10} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_7 k_8 k_9 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_6 k_{10}}} \tag{256}$$

$$\to \quad \text{T1:}$$
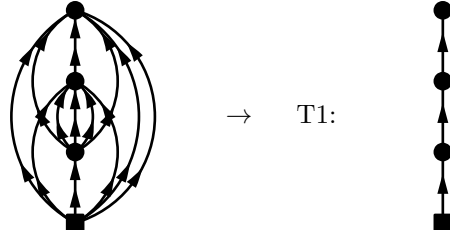
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{257}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_3 k_7 k_8 k_9}^{k_{10}}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_{10}}$$

Diagram 127:

$$\mathrm{PO3.127} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{15}_{k_{12} k_7 k_8 k_9 k_2 k_3} \Omega^{06}_{k_{12} k_{10} k_{11} k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_2 \epsilon_{k_2 k_3 k_7 k_8 k_9}^{k_{12}}} e^{-\tau_3}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{15}_{k_{12} k_7 k_8 k_9 k_2 k_3} \Omega^{06}_{k_{12} k_{10} k_{11} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_7 k_8 k_9 k_4 k_5 k_6 k_{10} k_{11}} \; \epsilon_{k_4 k_5 k_6 k_{10} k_{11} k_{12}}} \tag{258}$$

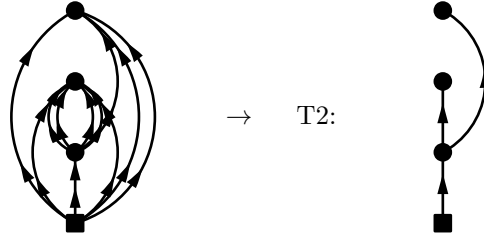$$\to \quad \mathrm{T1:}$$

$$\mathrm{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{259}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}$$

$$a_2 = \epsilon_{k_2 k_3 k_7 k_8 k_9}^{k_{12}}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_{10} k_{11} k_{12}}$$

Diagram 128:

$$\mathrm{PO3.128} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_2 k_3} \Omega^{04}_{k_{11} k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_2 \epsilon_{k_2 k_3 k_7 k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_{11}}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_2 k_3} \Omega^{04}_{k_{11} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_7 k_8 k_9 k_{10}} \; \epsilon_{k_4 k_5 k_6 k_{11}}} \tag{260}$$

$$\to \quad \text{T2:}$$

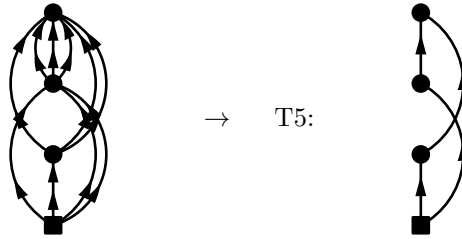$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{261}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}$$
$$a_2 = \epsilon_{k_2 k_3 k_7 k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_{11}}$$

Diagram 129:

$$\text{PO3.129} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)^3} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_2 k_3 k_4} \Omega^{06}_{k_8 k_9 k_{10} k_5 k_6 k_7} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(3!)^3} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_2 k_3 k_4} \Omega^{06}_{k_8 k_9 k_{10} k_5 k_6 k_7} \left[\frac{1}{\epsilon_{k_1 k_8 k_9 k_{10}} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \right] \tag{262}$$

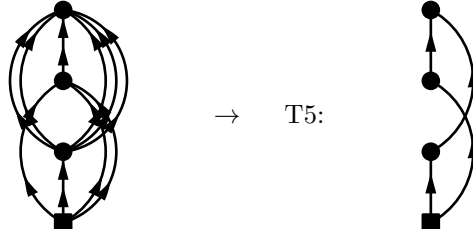$$\to \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{263}$$

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$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$

$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_8 k_9 k_{10}}$$
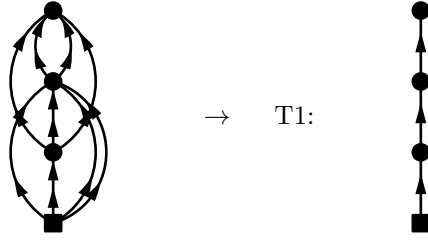
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 130:

$$\text{PO3.130} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)(5!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_2 k_3 k_4}^{13} \Omega_{k_{10} k_5 k_6 k_7 k_8 k_9}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_{10}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(3!)(5!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_2 k_3 k_4}^{13} \Omega_{k_{10} k_5 k_6 k_7 k_8 k_9}^{06} \left[\frac{1}{\epsilon_{k_1 k_{10}} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7 k_8 k_9} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \right]$$

$$(264)$$

$$\to \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{265}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_{10}}$$

$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 131:

$$\text{PO3.131} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1}^{31} \Omega_{k_8 k_9 k_5 k_2 k_3 k_4}^{24} \Omega_{k_8 k_9 k_6 k_7}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1}^{31} \Omega_{k_8 k_9 k_5 k_2 k_3 k_4}^{24} \Omega_{k_8 k_9 k_6 k_7}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_6 k_7 k_8 k_9}} \tag{266}$$

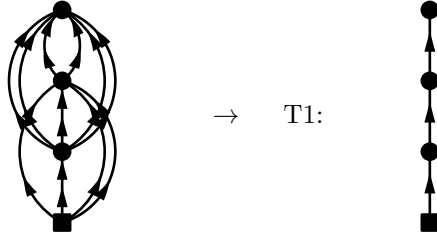$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{267}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5}^{k_8 k_9}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 132:

$$\text{PO3.132} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_{11} k_5 k_2 k_3 k_4}^{24} \Omega_{k_{10} k_{11} k_6 k_7 k_8 k_9}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5}^{k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_{11} k_5 k_2 k_3 k_4}^{24} \Omega_{k_{10} k_{11} k_6 k_7 k_8 k_9}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7 k_8 k_9} \ \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}} \tag{268}$$

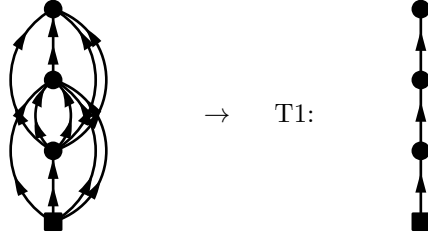$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{269}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5}^{k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 133:

$$\text{PO3.133} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_5 k_6 k_2 k_3 k_4}^{15} \Omega_{k_{10} k_7 k_8 k_9}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_{10}}} e^{-\tau_3 \epsilon_{k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_{10} k_5 k_6 k_2 k_3 k_4}^{15} \Omega_{k_{10} k_7 k_8 k_9}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7 k_8 k_9} \; \epsilon_{k_7 k_8 k_9 k_{10}}} \tag{270}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{271}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_{10}}$$
$$a_3 = \epsilon_{k_7 k_8 k_9 k_{10}}$$

Diagram 134:

$$\text{PO3.134} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_{10} k_2 k_3 k_4}^{13} \Omega_{k_{10} k_7 k_8 k_9 k_5 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_{10}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_{10} k_2 k_3 k_4}^{13} \Omega_{k_{10} k_7 k_8 k_9 k_5 k_6}^{06} \left[\frac{1}{\epsilon_{k_1 k_5 k_6 k_{10}} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7 k_8 k_9} \; \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \right]$$

$$\tag{272}$$

$$\rightarrow \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{273}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_{10}}$$

$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$
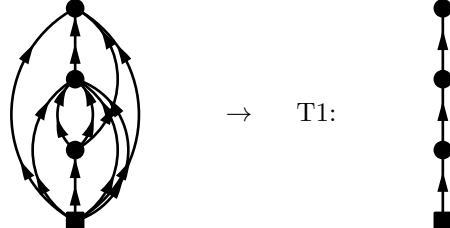
Diagram 135:

$$\text{PO3.135} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_{10} k_{11} k_7 k_2 k_3 k_4}^{24} \Omega_{k_{10} k_{11} k_8 k_9 k_5 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_7}^{k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_{10} k_{11} k_7 k_2 k_3 k_4}^{24} \Omega_{k_{10} k_{11} k_8 k_9 k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_7 k_5 k_6 k_8 k_9} \ \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}} \tag{274}$$

$$\rightarrow \quad \text{T1:}$$
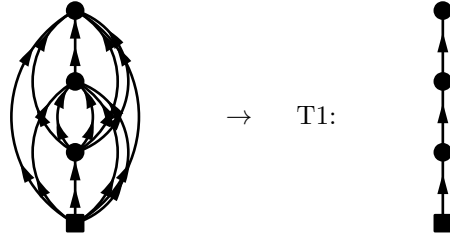
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{275}$$

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$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_7}^{k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}$$

Diagram 136:

$$\text{PO3.136} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_{10} k_7 k_8 k_2 k_3 k_4}^{15} \Omega_{k_{10} k_9 k_5 k_6}^{04} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_7 k_8}^{k_{10}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_{10} k_7 k_8 k_2 k_3 k_4}^{15} \Omega_{k_{10} k_9 k_5 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_4 k_7 k_8 k_5 k_6 k_9} \; \epsilon_{k_5 k_6 k_9 k_{10}}} \tag{276}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{277}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_7 k_8}^{k_{10}}$$
$$a_3 = \epsilon_{k_5 k_6 k_9 k_{10}}$$

Diagram 137:

$$\text{PO3.137} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_{11} k_1}^{51} \Omega_{k_{12} k_7 k_8 k_2 k_3 k_4}^{15} \Omega_{k_{12} k_9 k_{10} k_{11} k_5 k_6}^{06} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_7 k_8}^{k_{12}}} e^{-\tau_3}$$

$$= \frac{-(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_{11} k_1}^{51} \Omega_{k_{12} k_7 k_8 k_2 k_3 k_4}^{15} \Omega_{k_{12} k_9 k_{10} k_{11} k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_4 k_7 k_8 k_5 k_6 k_9 k_{10} k_{11}} \; \epsilon_{k_5 k_6 k_9 k_{10} k_{11} k_{12}}} \tag{278}$$

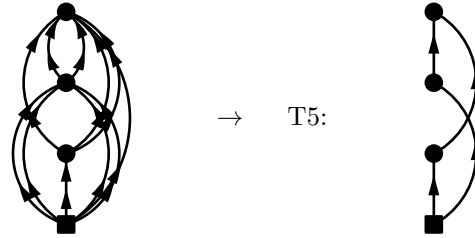$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{279}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_7 k_8}^{k_{12}}$$
$$a_3 = \epsilon_{k_5 k_6 k_9 k_{10} k_{11} k_{12}}$$

Diagram 138:

$$\text{PO3.138} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_{10} k_{11} k_2 k_3 k_4 k_5}^{24} \Omega_{k_{10} k_{11} k_7 k_8 k_9 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5}^{k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1}^{31} \Omega_{k_{10} k_{11} k_2 k_3 k_4 k_5}^{24} \Omega_{k_{10} k_{11} k_7 k_8 k_9 k_6}^{06} \left[\frac{1}{\epsilon_{k_1 k_6 k_{10} k_{11}} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7 k_8 k_9} \; \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_1}} \right.$$
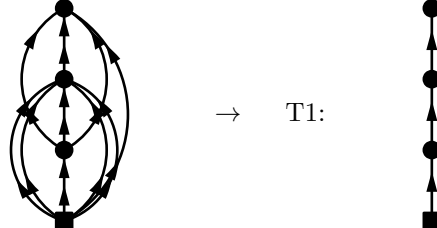
$$\tag{280}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{281}$$

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$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5}^{k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 139:

$$\text{PO3.139} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{15}_{k_{10} k_7 k_2 k_3 k_4 k_5} \Omega^{04}_{k_{10} k_8 k_9 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5 k_7}^{k_{10}}} e^{-\tau_3 \epsilon_{k_6 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{15}_{k_{10} k_7 k_2 k_3 k_4 k_5} \Omega^{04}_{k_{10} k_8 k_9 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6}\ \epsilon_{k_2 k_3 k_4 k_5 k_7 k_6 k_8 k_9}\ \epsilon_{k_6 k_8 k_9 k_{10}}} \tag{282}$$
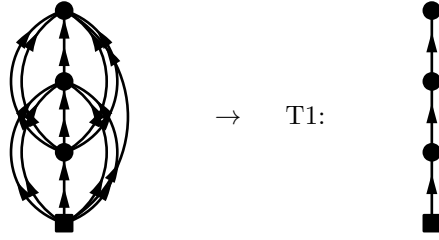

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{283}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5 k_7}^{k_{10}}$$
$$a_3 = \epsilon_{k_6 k_8 k_9 k_{10}}$$

Diagram 140:

$$\text{PO3.140} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{15}_{k_{12} k_7 k_2 k_3 k_4 k_5} \Omega^{06}_{k_{12} k_8 k_9 k_{10} k_{11} k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5 k_7}^{k_{12}}} e^{-\tau_3 \epsilon_{k_6 k}}$$

$$= \frac{(-1)^3}{(4!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{15}_{k_{12} k_7 k_2 k_3 k_4 k_5} \Omega^{06}_{k_{12} k_8 k_9 k_{10} k_{11} k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6}\ \epsilon_{k_2 k_3 k_4 k_5 k_7 k_6 k_8 k_9 k_{10} k_{11}}\ \epsilon_{k_6 k_8 k_9 k_{10} k_{11} k_{12}}} \tag{284}$$

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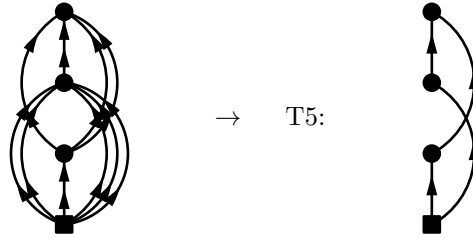$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{285}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5 k_7}^{k_{12}}$$
$$a_3 = \epsilon_{k_6 k_8 k_9 k_{10} k_{11} k_{12}}$$

Diagram 141:

$$\text{PO3.141} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{15}_{k_{10} k_2 k_3 k_4 k_5 k_6} \Omega^{04}_{k_{10} k_7 k_8 k_9} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_{10}}} e^{-\tau_3 \epsilon_{k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(3!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{15}_{k_{10} k_2 k_3 k_4 k_5 k_6} \Omega^{04}_{k_{10} k_7 k_8 k_9} \left[\frac{1}{\epsilon_{k_1 k_{10}} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8 k_9 k_{10}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7 k_8 k_9} \; \epsilon_{k_7 k_8 k_9 k_{10}}} \right] \tag{286}$$

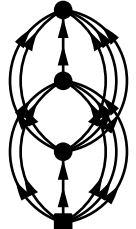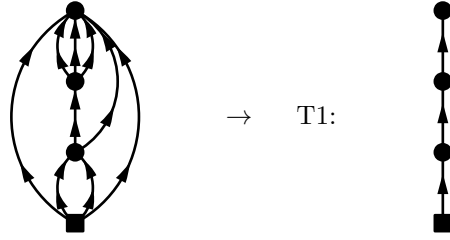$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{287}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_{10}}$$

$$a_3 = \epsilon_{k_7 k_8 k_9 k_{10}}$$

Diagram 142:

$$\text{PO3.142} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(5!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{15}_{k_{12} k_2 k_3 k_4 k_5 k_6} \Omega^{06}_{k_{12} k_7 k_8 k_9 k_{10} k_{11}} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_{12}}} e^{-\tau_3 \epsilon_{k_7 k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{-(-1)^3}{(5!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_1} \Omega^{15}_{k_{12} k_2 k_3 k_4 k_5 k_6} \Omega^{06}_{k_{12} k_7 k_8 k_9 k_{10} k_{11}} \left[\frac{1}{\epsilon_{k_1 k_{12}} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8 k_9 k_{10} k_{11} k_{12}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7 k_8 k_9 k_{10} k_{11}} \; \epsilon_{k_7 k_8 k_9 k_{10}} } \right.$$

(288)

$$\to \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3}$$

(289)

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9 k_{10} k_{11}}$$

$$a_2 = \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_{12}}$$

$$a_3 = \epsilon_{k_7 k_8 k_9 k_{10} k_{11} k_{12}}$$

Diagram 143:

$$\text{PO3.143} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{31}_{k_7 k_8 k_9 k_5} \Omega^{06}_{k_7 k_8 k_9 k_6 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_5}^{k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{31}_{k_7 k_8 k_9 k_5} \Omega^{06}_{k_7 k_8 k_9 k_6 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_3 k_4 k_6} \; \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}}$$
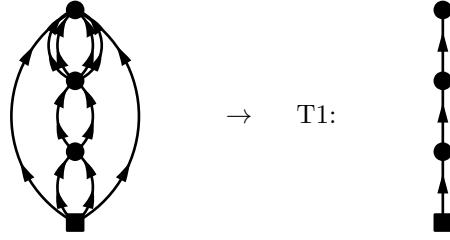
(290)

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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{291}$$

$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_7 k_8 k_9}_{k_5}$$
$$a_3 = \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}$$

Diagram 144:

$$\text{PO3.144} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_5 k_6} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9 k_{10}}_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_5 k_6} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_3 k_4} \ \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}} \tag{292}$$
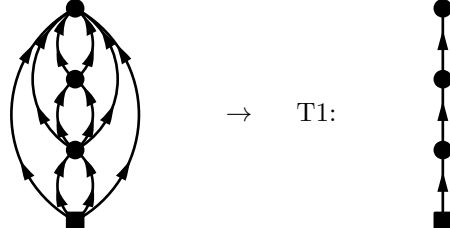

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{293}$$

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$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2}$$

$$a_2 = \epsilon^{k_7 k_8 k_9 k_{10}}_{k_5 k_6}$$

$$a_3 = \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}$$

Diagram 145:

$$\text{PO3.145} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^5} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{22}_{k_9 k_{10} k_5 k_6} \Omega^{06}_{k_9 k_{10} k_7 k_8 k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^5} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{22}_{k_9 k_{10} k_5 k_6} \Omega^{06}_{k_9 k_{10} k_7 k_8 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_3 k_4 k_7 k_8} \ \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}} \tag{294}$$
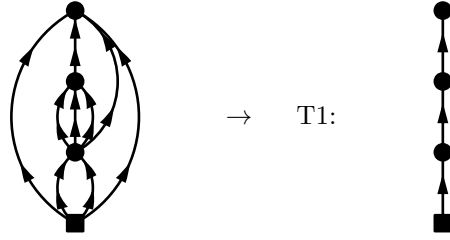

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{295}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2}$$

$$a_2 = \epsilon^{k_9 k_{10}}_{k_5 k_6}$$

$$a_3 = \epsilon_{k_3 k_4 k_7 k_8 k_9 k_{10}}$$

Diagram 146:

$$\text{PO3.146} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{13}_{k_9 k_5 k_6 k_7} \Omega^{04}_{k_9 k_8 k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_9}_{k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_3 k_4 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{13}_{k_9 k_5 k_6 k_7} \Omega^{04}_{k_9 k_8 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_3 k_4 k_8} \ \epsilon_{k_3 k_4 k_8 k_9}} \tag{296}$$

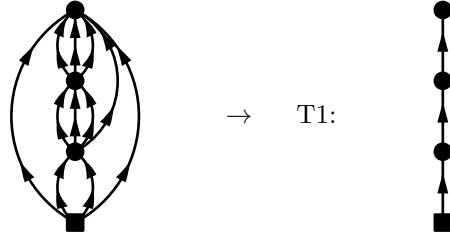$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \qquad (297)$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon_{k_5 k_6 k_7}^{k_9}$$
$$a_3 = \epsilon_{k_3 k_4 k_8 k_9}$$

Diagram 147:

$$\text{PO3.147} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_9 k_{10} k_{11} k_5 k_6 k_7}^{33} \Omega_{k_9 k_{10} k_{11} k_8 k_3 k_4}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_5 k_6 k_7}^{k_9 k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_8 k_9 k_{10}}^{}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_9 k_{10} k_{11} k_5 k_6 k_7}^{33} \Omega_{k_9 k_{10} k_{11} k_8 k_3 k_4}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_3 k_4 k_8} \ \epsilon_{k_3 k_4 k_8 k_9 k_{10} k_{11}}} \qquad (298)$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \qquad (299)$$

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$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_5 k_6 k_7}^{k_9 k_{10} k_{11}}$$

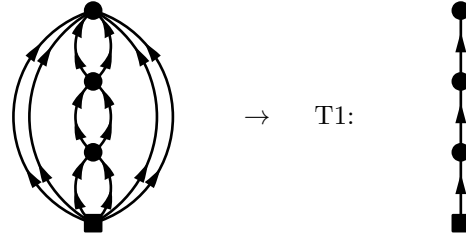$$a_3 = \epsilon_{k_3 k_4 k_8 k_9 k_{10} k_{11}}$$

Diagram 148:

$$\text{PO3.148} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{24}_{k_9 k_{10} k_5 k_6 k_7 k_8} \Omega^{04}_{k_9 k_{10} k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_5 k_6 k_7 k_8}^{k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{24}_{k_9 k_{10} k_5 k_6 k_7 k_8} \Omega^{04}_{k_9 k_{10} k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_6 k_7 k_8 k_3 k_4} \; \epsilon_{k_3 k_4 k_9 k_{10}}} \tag{300}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{301}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_5 k_6 k_7 k_8}^{k_9 k_{10}}$$

$$a_3 = \epsilon_{k_3 k_4 k_9 k_{10}}$$

Diagram 149:

$$\text{PO3.149} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{22}_{k_9 k_{10} k_7 k_8} \Omega^{06}_{k_9 k_{10} k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_7 k_8}^{k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{22}_{k_9 k_{10} k_7 k_8} \Omega^{06}_{k_9 k_{10} k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}} \tag{302}$$

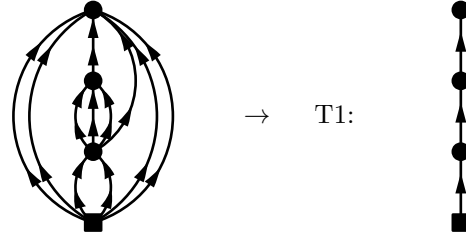$$T1 = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{303}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$
$$a_2 = \epsilon_{k_7 k_8}^{k_9 k_{10}}$$
$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}$$

Diagram 150:

$$\text{PO3.150} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_7 k_8 k_9}^{13} \Omega_{k_{11} k_{10} k_3 k_4 k_5 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_7 k_8 k_9}^{k_{11}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_7 k_8 k_9}^{13} \Omega_{k_{11} k_{10} k_3 k_4 k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_8 k_9 k_3 k_4 k_5 k_6 k_{10}} \ \epsilon_{k_3 k_4 k_5 k_6 k_{10} k_{11}}} \tag{304}$$

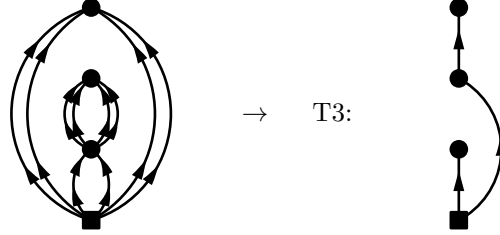$$T1 = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{305}$$

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$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_7 k_8 k_9}^{k_{11}}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_{10} k_{11}}$$

Diagram 151:

$$\text{PO3.151} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{04}_{k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_7 k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{04}_{k_7 k_8 k_9 k_{10}} \Omega^{04}_{k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}} \; \epsilon_{k_7 k_8 k_9 k_{10}} \; \epsilon_{k_7 k_8 k_9 k_{10} k_3 k_4 k_5 k_6}} \tag{306}$$


$$\rightarrow \quad \text{T3:}$$

$$\text{T3} = \frac{1}{a_1 (a_2 + a_3) a_3} \tag{307}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_3 k_4 k_5 k_6}$$

$$a_3 = \epsilon_{k_7 k_8 k_9 k_{10}}$$

Diagram 152:

$$\text{PO3.152} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (4!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{24}_{k_{11} k_{12} k_7 k_8 k_9 k_{10}} \Omega^{06}_{k_{11} k_{12} k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_7 k_8 k_9 k_{10}}^{k_{11} k_{12}}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_{11} k_{12}}}$$

$$= \frac{(-1)^3}{(2!)^2 (4!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{24}_{k_{11} k_{12} k_7 k_8 k_9 k_{10}} \Omega^{06}_{k_{11} k_{12} k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8 k_9 k_{10} k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_5 k_6 k_{11} k_{12}}} \tag{308}$$
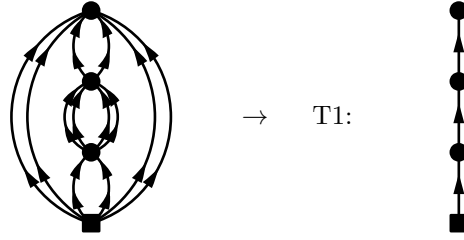
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{309}$$
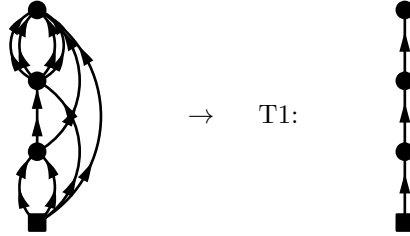
$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_7 k_8 k_9 k_{10}}^{k_{11} k_{12}}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_{11} k_{12}}$$

Diagram 153:

$$\text{PO3.153} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_8 k_9 k_{10} k_5 k_3}^{42} \Omega_{k_7 k_8 k_9 k_{10} k_6 k_4}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_3 k_5}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_8 k_9 k_{10} k_5 k_3}^{42} \Omega_{k_7 k_8 k_9 k_{10} k_6 k_4}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_5 k_4 k_6} \ \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}} \tag{310}$$
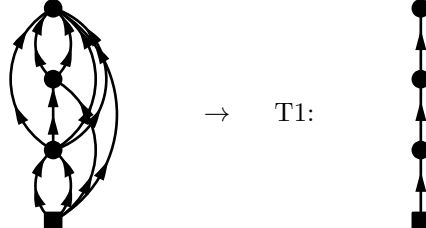

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{311}$$

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$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6}$$

$$a_2 = \epsilon_{k_3 k_5}^{k_7 k_8 k_9 k_{10}}$$

$$a_3 = \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 154:

$$
\text{PO3.154} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{22}_{k_9 k_{10} k_5 k_3} \Omega^{06}_{k_9 k_{10} k_6 k_7 k_8 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_5}^{k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}}
$$

$$
= \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{22}_{k_9 k_{10} k_5 k_3} \Omega^{06}_{k_9 k_{10} k_6 k_7 k_8 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_3 k_5 k_4 k_6 k_7 k_8} \; \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}} \tag{312}
$$

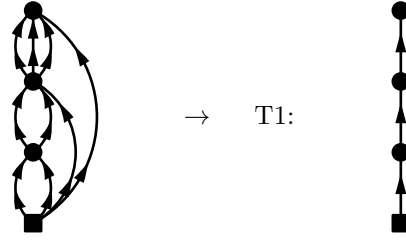$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{313}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_5}^{k_9 k_{10}}$$

$$a_3 = \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 155:

$$
\text{PO3.155} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{33}_{k_7 k_8 k_9 k_5 k_6 k_3} \Omega^{04}_{k_7 k_8 k_9 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_3 k_5 k_6}^{k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_7 k_8 k_9}}
$$

$$
= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{33}_{k_7 k_8 k_9 k_5 k_6 k_3} \Omega^{04}_{k_7 k_8 k_9 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_3 k_5 k_6 k_4} \; \epsilon_{k_4 k_7 k_8 k_9}} \tag{314}
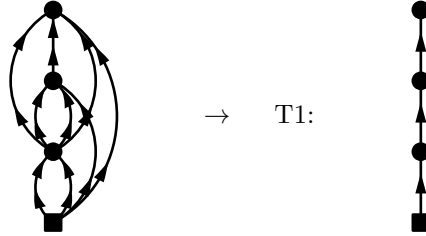$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{315}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6}$$
$$a_2 = \epsilon_{k_3 k_5 k_6}^{k_7 k_8 k_9}$$
$$a_3 = \epsilon_{k_4 k_7 k_8 k_9}$$

Diagram 156:

$$\text{PO3.156} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_9 k_5 k_6 k_3}^{13} \Omega_{k_9 k_7 k_8 k_4}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_5 k_6}^{k_9}} e^{-\tau_3 \epsilon_{k_4 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^3} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_9 k_5 k_6 k_3}^{13} \Omega_{k_9 k_7 k_8 k_4}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_5 k_6 k_4 k_7 k_8} \ \epsilon_{k_4 k_7 k_8 k_9}} \tag{316}$$
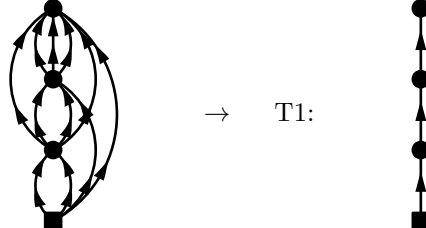

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{317}$$

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$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_5 k_6}^{k_9}$$

$$a_3 = \epsilon_{k_4 k_7 k_8 k_9}$$

Diagram 157:

$$\text{PO3.157} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_9 k_{10} k_{11} k_5 k_6 k_3}^{33} \Omega_{k_9 k_{10} k_{11} k_7 k_8 k_4}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_5 k_6}^{k_9 k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_4 k_7 k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_9 k_{10} k_{11} k_5 k_6 k_3}^{33} \Omega_{k_9 k_{10} k_{11} k_7 k_8 k_4}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_5 k_6 k_4 k_7 k_8} \ \epsilon_{k_4 k_7 k_8 k_9 k_{10} k_{11}}} \tag{318}$$
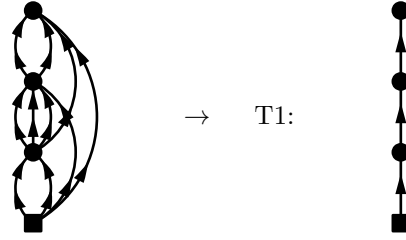

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{319}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_5 k_6}^{k_9 k_{10} k_{11}}$$

$$a_3 = \epsilon_{k_4 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 158:

$$\text{PO3.158} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_9 k_{10} k_5 k_6 k_7 k_3}^{24} \Omega_{k_9 k_{10} k_8 k_4}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_5 k_6 k_7}^{k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_9 k_{10} k_5 k_6 k_7 k_3}^{24} \Omega_{k_9 k_{10} k_8 k_4}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_5 k_6 k_7 k_4 k_8} \ \epsilon_{k_4 k_8 k_9 k_{10}}} \tag{320}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{321}$$
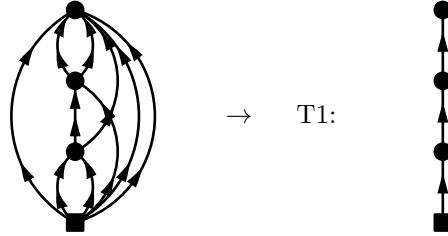
$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon_{k_3 k_5 k_6 k_7}^{k_9 k_{10}}$$
$$a_3 = \epsilon_{k_4 k_8 k_9 k_{10}}$$

Diagram 159:

$$\text{PO3.159} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{22}_{k_9 k_{10} k_7 k_3} \Omega^{06}_{k_9 k_{10} k_8 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_7}^{k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{22}_{k_9 k_{10} k_7 k_3} \Omega^{06}_{k_9 k_{10} k_8 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_7 k_4 k_5 k_6 k_8} \; \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}} \tag{322}$$

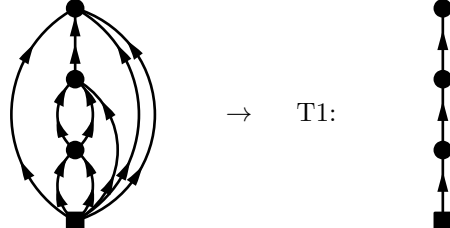$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{323}$$

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$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2}$$

$$a_2 = \epsilon^{k_9 k_{10}}_{k_3 k_7}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}$$

Diagram 160:

$$\text{PO3.160} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{13}_{k_9 k_7 k_8 k_3} \Omega^{04}_{k_9 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_9}_{k_3 k_7 k_8}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{13}_{k_9 k_7 k_8 k_3} \Omega^{04}_{k_9 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_7 k_8 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_6 k_9}} \tag{324}$$

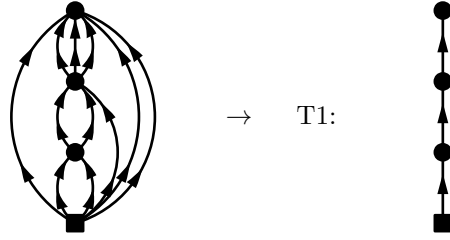$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{325}$$

$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2}$$

$$a_2 = \epsilon^{k_9}_{k_3 k_7 k_8}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_9}$$

Diagram 161:

$$\text{PO3.161} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{33}_{k_9 k_{10} k_{11} k_7 k_8 k_3} \Omega^{06}_{k_9 k_{10} k_{11} k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_9 k_{10} k_{11}}_{k_3 k_7 k_8}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{33}_{k_9 k_{10} k_{11} k_7 k_8 k_3} \Omega^{06}_{k_9 k_{10} k_{11} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_7 k_8 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}} \tag{326}$$

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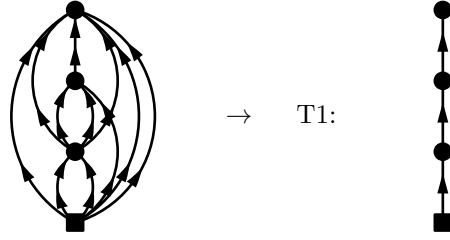$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{327}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$
$$a_2 = \epsilon_{k_3 k_7 k_8}^{k_9 k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}$$

Diagram 162:

$$\text{PO3.162} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_7 k_8 k_3}^{13} \Omega_{k_{11} k_9 k_{10} k_4 k_5 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_3 k_7 k_8}^{k_{11}}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_7 k_8 k_3}^{13} \Omega_{k_{11} k_9 k_{10} k_4 k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \, \epsilon_{k_3 k_7 k_8 k_4 k_5 k_6 k_9 k_{10}} \, \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}} \tag{328}$$

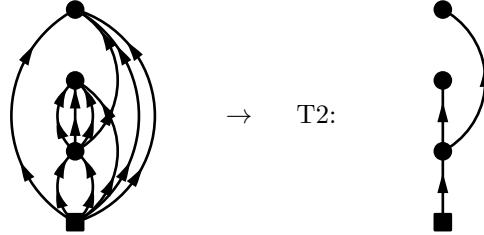$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{329}$$

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$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}$$

$$a_2 = \epsilon^{k_{11}}_{k_3 k_7 k_8}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}$$

Diagram 163:

$$\text{PO3.163} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{04}_{k_7 k_8 k_9 k_3} \Omega^{04}_{k_{10} k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}} e^{-\tau_2 \epsilon_{k_3 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{04}_{k_7 k_8 k_9 k_3} \Omega^{04}_{k_{10} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_7 k_8 k_9} \; \epsilon_{k_4 k_5 k_6 k_{10}}} \tag{330}$$


$$\to \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3) a_2 a_3} \tag{331}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}$$

$$a_2 = \epsilon_{k_3 k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_{10}}$$

Diagram 164:

$$\text{PO3.164} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{24}_{k_{11} k_{12} k_7 k_8 k_9 k_3} \Omega^{06}_{k_{11} k_{12} k_{10} k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_{11} k_{12}}_{k_3 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_5}}$$

$$= \frac{-(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{24}_{k_{11} k_{12} k_7 k_8 k_9 k_3} \Omega^{06}_{k_{11} k_{12} k_{10} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_7 k_8 k_9 k_4 k_5 k_6 k_{10}} \; \epsilon_{k_4 k_5 k_6 k_{10} k_{11} k_{12}}} \tag{332}$$

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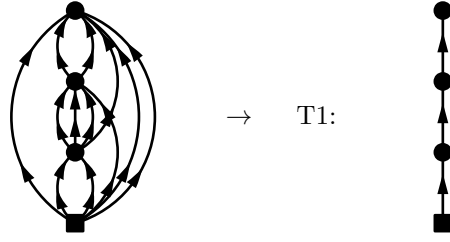
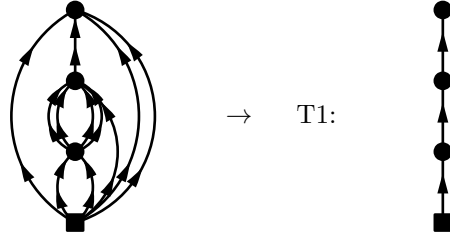$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{333}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}$$
$$a_2 = \epsilon_{k_3 k_7 k_8 k_9}^{k_{11} k_{12}}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_{10} k_{11} k_{12}}$$

Diagram 165:

$$\text{PO3.165} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_7 k_8 k_9 k_{10} k_3}^{15} \Omega_{k_{11} k_4 k_5 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_3 k_7 k_8 k_9 k_{10}}^{k_{11}}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_{11}}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_7 k_8 k_9 k_{10} k_3}^{15} \Omega_{k_{11} k_4 k_5 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_7 k_8 k_9 k_{10} k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_6 k_{11}}} \tag{334}$$
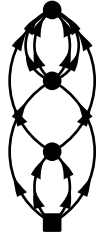

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{335}$$

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$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_3 k_7 k_8 k_9 k_{10}}^{k_{11}}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_{11}}$$

Diagram 166:

$$\text{PO3.166} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3 (4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_8 k_9 k_{10} k_3 k_4}^{42} \Omega_{k_7 k_8 k_9 k_{10} k_5 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_3 k_4}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3 (4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_8 k_9 k_{10} k_3 k_4}^{42} \Omega_{k_7 k_8 k_9 k_{10} k_5 k_6}^{06} \left[\frac{1}{\epsilon_{k_1 k_2 k_7 k_8 k_9 k_{10}} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \right]$$
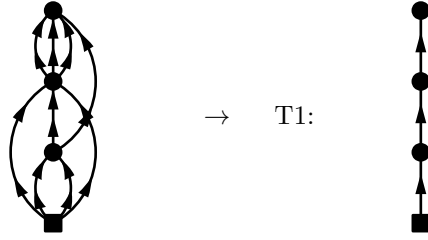
(336)

$$\to \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3) a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3) a_3}$$

(337)

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6}$$

$$a_2 = \epsilon_{k_3 k_4}^{k_7 k_8 k_9 k_{10}}$$

$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 167:

$$\text{PO3.167} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_8 k_9 k_5 k_3 k_4}^{33} \Omega_{k_7 k_8 k_9 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5}^{k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_1 k_2}^{22} \Omega_{k_7 k_8 k_9 k_5 k_3 k_4}^{33} \Omega_{k_7 k_8 k_9 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7 k_8 k_9}}$$

(338)

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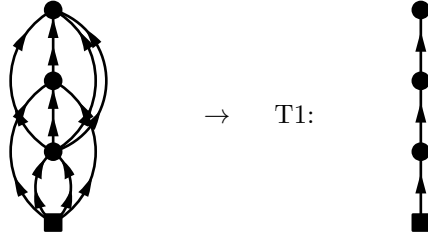$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{339}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6}$$

$$a_2 = \epsilon_{k_3 k_4 k_5}^{k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 168:

$$\text{PO3.168} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_9 k_5 k_3 k_4}^{13} \Omega_{k_9 k_6 k_7 k_8}^{04} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5}^{k_9}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_9 k_5 k_3 k_4}^{13} \Omega_{k_9 k_6 k_7 k_8}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_6 k_7 k_8 k_9}} \tag{340}$$
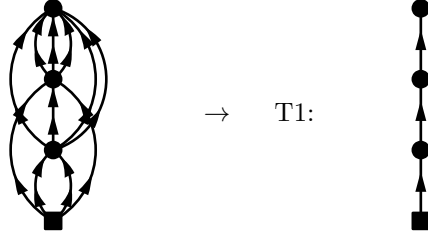

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{341}$$

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$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon_{k_3 k_4 k_5}^{k_9}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 169:

$$\text{PO3.169} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{33}_{k_9 k_{10} k_{11} k_5 k_3 k_4} \Omega^{06}_{k_9 k_{10} k_{11} k_6 k_7 k_8} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5}^{k_9 k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{33}_{k_9 k_{10} k_{11} k_5 k_3 k_4} \Omega^{06}_{k_9 k_{10} k_{11} k_6 k_7 k_8}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}} \tag{342}$$
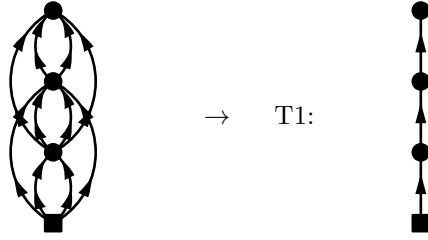

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{343}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon_{k_3 k_4 k_5}^{k_9 k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 170:

$$\text{PO3.170} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^5} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{24}_{k_9 k_{10} k_5 k_6 k_3 k_4} \Omega^{04}_{k_9 k_{10} k_7 k_8} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5 k_6}^{k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^5} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{24}_{k_9 k_{10} k_5 k_6 k_3 k_4} \Omega^{04}_{k_9 k_{10} k_7 k_8}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_7 k_8 k_9 k_{10}}} \tag{344}$$

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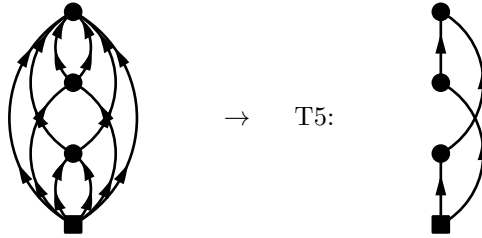$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{345}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon_{k_3 k_4 k_5 k_6}^{k_9 k_{10}}$$
$$a_3 = \epsilon_{k_7 k_8 k_9 k_{10}}$$

Diagram 171:

$$\text{PO3.171} = \lim_{\tau \to \infty} \frac{(-1)^3}{2(2!)^5} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{22}_{k_9 k_{10} k_3 k_4} \Omega^{06}_{k_9 k_{10} k_7 k_8 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4}^{k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{2(2!)^5} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{22}_{k_9 k_{10} k_3 k_4} \Omega^{06}_{k_9 k_{10} k_7 k_8 k_5 k_6} \left[\frac{1}{\epsilon_{k_1 k_2 k_5 k_6 k_9 k_{10}} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \right] \tag{346}$$
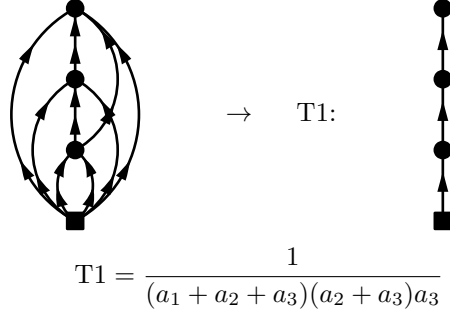

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{347}$$

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$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_4}^{k_9 k_{10}}$$

$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 172:

$$\text{PO3.172} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{13}_{k_9 k_7 k_3 k_4} \Omega^{04}_{k_9 k_8 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4 k_7}^{k_9}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^3} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{13}_{k_9 k_7 k_3 k_4} \Omega^{04}_{k_9 k_8 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_7 k_5 k_6 k_8} \; \epsilon_{k_5 k_6 k_8 k_9}} \tag{348}$$
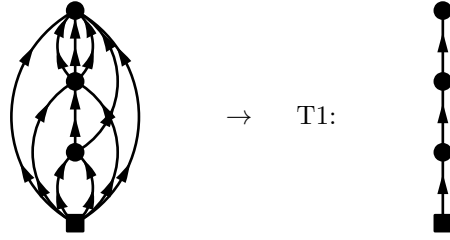

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3) a_3} \tag{349}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_4 k_7}^{k_9}$$

$$a_3 = \epsilon_{k_5 k_6 k_8 k_9}$$

Diagram 173:

$$\text{PO3.173} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3 (3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{33}_{k_9 k_{10} k_{11} k_7 k_3 k_4} \Omega^{06}_{k_9 k_{10} k_{11} k_8 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4 k_7}^{k_9 k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^3 (3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{33}_{k_9 k_{10} k_{11} k_7 k_3 k_4} \Omega^{06}_{k_9 k_{10} k_{11} k_8 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_7 k_5 k_6 k_8} \; \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}} \tag{350}$$

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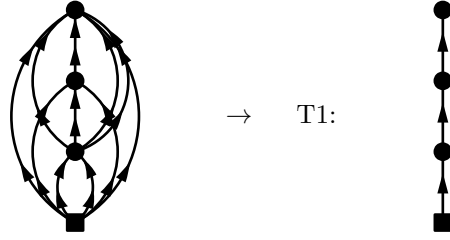$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{351}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$
$$a_2 = \epsilon_{k_3 k_4 k_7}^{k_9 k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}$$

Diagram 174:

$$\text{PO3.174} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_7 k_3 k_4}^{13} \Omega_{k_{11} k_8 k_9 k_{10} k_5 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_3 k_4 k_7}^{k_{11}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_7 k_3 k_4}^{13} \Omega_{k_{11} k_8 k_9 k_{10} k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_7 k_5 k_6 k_8 k_9 k_{10}} \; \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}} \tag{352}$$

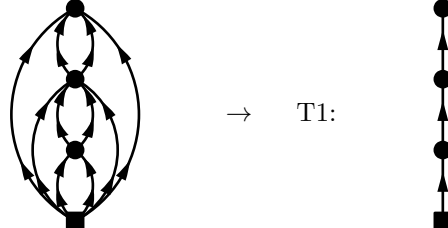$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{353}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_3 k_4 k_7}^{k_{11}}$$

$$a_3 = \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}$$

Diagram 175:

$$\text{PO3.175} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^5} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2}^{22} \Omega_{k_9 k_{10} k_7 k_8 k_3 k_4}^{24} \Omega_{k_9 k_{10} k_5 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4 k_7 k_8}^{k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^5} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2}^{22} \Omega_{k_9 k_{10} k_7 k_8 k_3 k_4}^{24} \Omega_{k_9 k_{10} k_5 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_7 k_8 k_5 k_6} \; \epsilon_{k_5 k_6 k_9 k_{10}}} \tag{354}$$
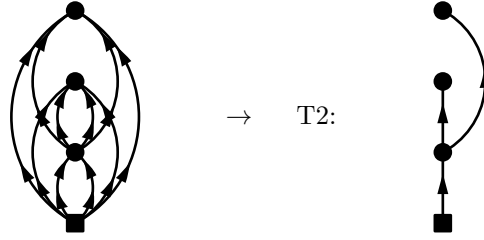

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{355}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_4 k_7 k_8}^{k_9 k_{10}}$$

$$a_3 = \epsilon_{k_5 k_6 k_9 k_{10}}$$

Diagram 176:

$$\text{PO3.176} = \lim_{\tau \to \infty} \frac{(-1)^3}{2(2!)^5} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_7 k_8 k_3 k_4}^{04} \Omega_{k_9 k_{10} k_5 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_3 k_4 k_7 k_8}} e^{-\tau_3 \epsilon_{k_5 k_6 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{2(2!)^5} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_7 k_8 k_3 k_4}^{04} \Omega_{k_9 k_{10} k_5 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_7 k_8} \; \epsilon_{k_5 k_6 k_9 k_{10}}} \tag{356}$$

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$$\text{T2:}$$

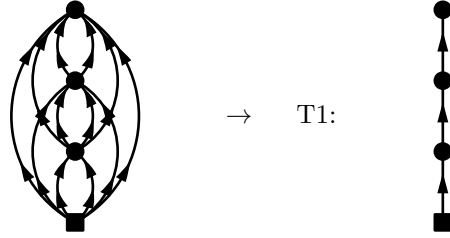$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{357}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_3 k_4 k_7 k_8}$$

$$a_3 = \epsilon_{k_5 k_6 k_9 k_{10}}$$

Diagram 177:

$$\text{PO3.177} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^6} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_{12} k_7 k_8 k_3 k_4}^{24} \Omega_{k_{11} k_{12} k_9 k_{10} k_5 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_3 k_4 k_7 k_8}^{k_{11} k_{12}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^6} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_{12} k_7 k_8 k_3 k_4}^{24} \Omega_{k_{11} k_{12} k_9 k_{10} k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_7 k_8 k_5 k_6 k_9 k_{10}} \; \epsilon_{k_5 k_6 k_9 k_{10} k_{11} k_{12}}} \tag{358}$$

$$\text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{359}$$

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$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_{11} k_{12}}_{k_3 k_4 k_7 k_8}$$
$$a_3 = \epsilon_{k_5 k_6 k_9 k_{10} k_{11} k_{12}}$$

Diagram 178:

$$\text{PO3.178} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{15}_{k_{11} k_7 k_8 k_9 k_3 k_4} \Omega^{04}_{k_{11} k_{10} k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_{11}}_{k_3 k_4 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_5 k_6 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{15}_{k_{11} k_7 k_8 k_9 k_3 k_4} \Omega^{04}_{k_{11} k_{10} k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_7 k_8 k_9 k_5 k_6 k_{10}} \ \epsilon_{k_5 k_6 k_{10} k_{11}}} \tag{360}$$

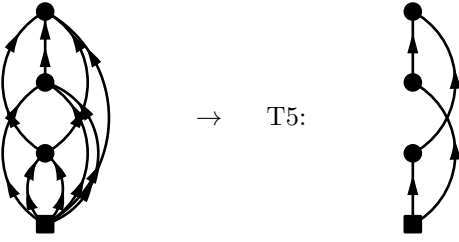$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{361}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_{11}}_{k_3 k_4 k_7 k_8 k_9}$$
$$a_3 = \epsilon_{k_5 k_6 k_{10} k_{11}}$$

Diagram 179:

$$\text{PO3.179} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{13}_{k_9 k_3 k_4 k_5} \Omega^{04}_{k_9 k_7 k_8 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_9}_{k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{13}_{k_9 k_3 k_4 k_5} \Omega^{04}_{k_9 k_7 k_8 k_6} \left[\frac{1}{\epsilon_{k_1 k_2 k_6 k_9} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7 k_8 k_9}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_6 k_7 k_8 k_9}} \right] \tag{362}$$

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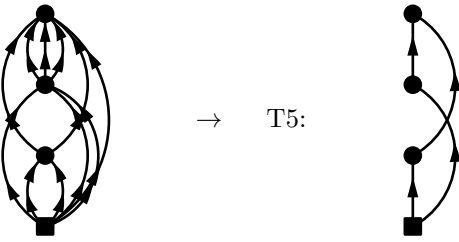$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{363}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$
$$a_2 = \epsilon_{k_3 k_4 k_5}^{k_9}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 180:

$$\text{PO3.180} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{33}_{k_9 k_{10} k_{11} k_3 k_4 k_5} \Omega^{06}_{k_9 k_{10} k_{11} k_7 k_8 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_9 k_{10} k_{11}}_{k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{33}_{k_9 k_{10} k_{11} k_3 k_4 k_5} \Omega^{06}_{k_9 k_{10} k_{11} k_7 k_8 k_6} \left[\frac{1}{\epsilon_{k_1 k_2 k_6 k_9 k_{10} k_{11}} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}} \right.$$
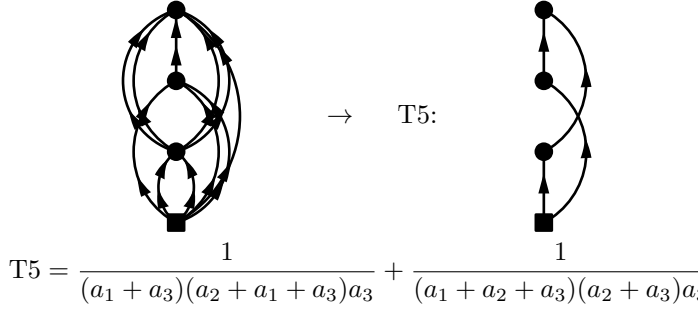
$$\tag{364}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{365}$$

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$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_4 k_5}^{k_9 k_{10} k_{11}}$$

$$a_3 = \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 181:

$$\text{PO3.181} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_3 k_4 k_5}^{13} \Omega_{k_{11} k_7 k_8 k_9 k_{10} k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5}^{k_{11}}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_3 k_4 k_5}^{13} \Omega_{k_{11} k_7 k_8 k_9 k_{10} k_6}^{06} \left[\frac{1}{\epsilon_{k_1 k_2 k_6 k_{11}} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8 k_9 k_{10}} \ \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_1}} \right.$$

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$\rightarrow$ T5:
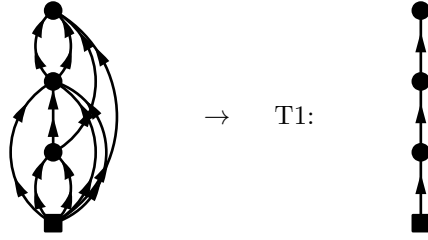
$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3}$$

(367)

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_3 k_4 k_5}^{k_{11}}$$

$$a_3 = \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 182:

$$\text{PO3.182} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2 (3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2}^{22} \Omega_{k_9 k_{10} k_7 k_3 k_4 k_5}^{24} \Omega_{k_9 k_{10} k_8 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5 k_7}^{k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_6 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)^2 (3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2}^{22} \Omega_{k_9 k_{10} k_7 k_3 k_4 k_5}^{24} \Omega_{k_9 k_{10} k_8 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_5 k_7 k_6 k_8} \ \epsilon_{k_6 k_8 k_9 k_{10}}}$$

(368)

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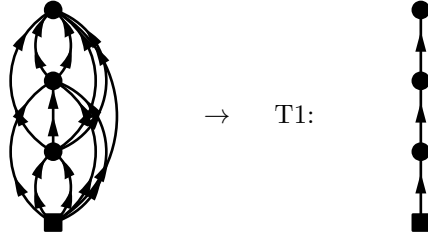$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{369}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$
$$a_2 = \epsilon_{k_3 k_4 k_5 k_7}^{k_9 k_{10}}$$
$$a_3 = \epsilon_{k_6 k_8 k_9 k_{10}}$$

Diagram 183:

$$\text{PO3.183} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{24}_{k_{11} k_{12} k_7 k_3 k_4 k_5} \Omega^{06}_{k_{11} k_{12} k_8 k_9 k_{10} k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5 k_7}^{k_{11} k_{12}}} e^{-\tau_3 \epsilon_{k_6 k_8}}$$

$$= \frac{-(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{24}_{k_{11} k_{12} k_7 k_3 k_4 k_5} \Omega^{06}_{k_{11} k_{12} k_8 k_9 k_{10} k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_5 k_7 k_6 k_8 k_9 k_{10}} \; \epsilon_{k_6 k_8 k_9 k_{10} k_{11} k_{12}}} \tag{370}$$
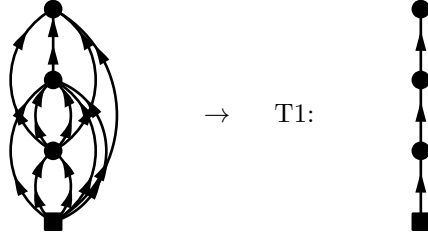

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{371}$$

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$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}$$
$$a_2 = \epsilon_{k_3 k_4 k_5 k_7}^{k_{11} k_{12}}$$
$$a_3 = \epsilon_{k_6 k_8 k_9 k_{10} k_{11} k_{12}}$$

Diagram 184:

$$\text{PO3.184} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_7 k_8 k_3 k_4 k_5}^{15} \Omega_{k_{11} k_9 k_{10} k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5 k_7 k_8}^{k_{11}}} e^{-\tau_3 \epsilon_{k_6 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_{11} k_7 k_8 k_3 k_4 k_5}^{15} \Omega_{k_{11} k_9 k_{10} k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_5 k_7 k_8 k_6 k_9 k_{10}} \; \epsilon_{k_6 k_9 k_{10} k_{11}}} \tag{372}$$
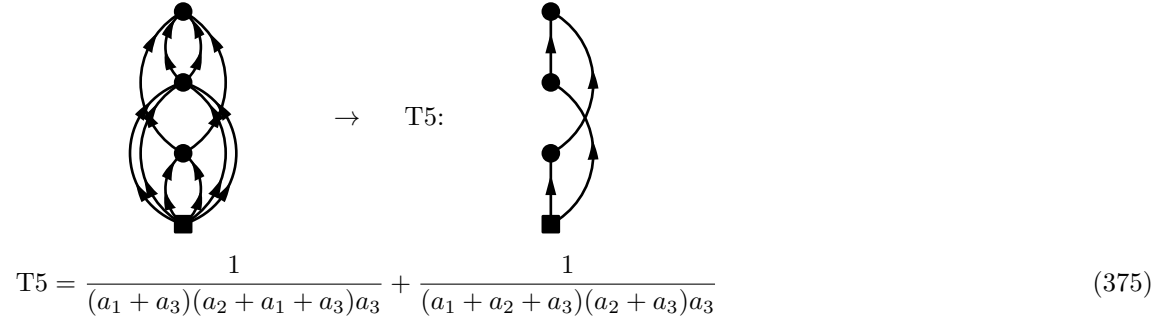

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{373}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}$$
$$a_2 = \epsilon_{k_3 k_4 k_5 k_7 k_8}^{k_{11}}$$
$$a_3 = \epsilon_{k_6 k_9 k_{10} k_{11}}$$

Diagram 185:

$$\text{PO3.185} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2}^{22} \Omega_{k_9 k_{10} k_3 k_4 k_5 k_6}^{24} \Omega_{k_9 k_{10} k_7 k_8}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5 k_6}^{k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2}^{22} \Omega_{k_9 k_{10} k_3 k_4 k_5 k_6}^{24} \Omega_{k_9 k_{10} k_7 k_8}^{04} \left[\frac{1}{\epsilon_{k_1 k_2 k_9 k_{10}} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8 k_9 k_{10}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8} \; \epsilon_{k_7 k_8 k_9 k_{10}}} \right] \tag{374}$$
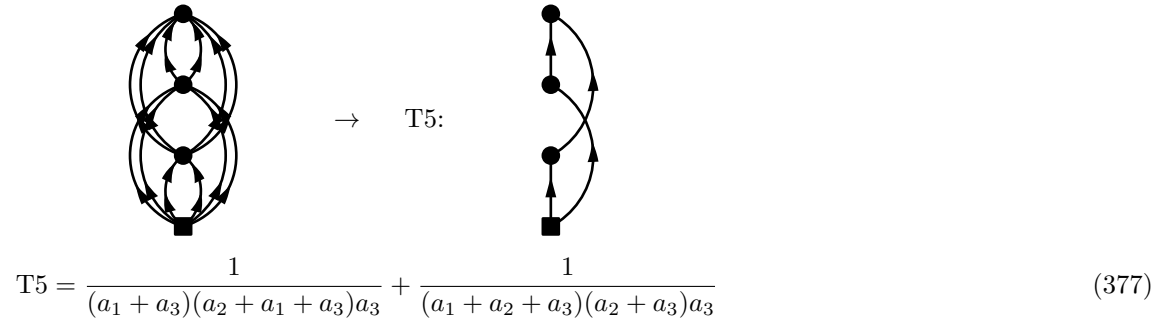
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$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{375}$$

$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_9 k_{10}}_{k_3 k_4 k_5 k_6}$$
$$a_3 = \epsilon_{k_7 k_8 k_9 k_{10}}$$

Diagram 186:

$$\text{PO3.186} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{24}_{k_{11} k_{12} k_3 k_4 k_5 k_6} \Omega^{06}_{k_{11} k_{12} k_7 k_8 k_9 k_{10}} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_{11} k_{12}}_{k_3 k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_7 k_8 k_9 k_{10} k_{11} k_{12}}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{24}_{k_{11} k_{12} k_3 k_4 k_5 k_6} \Omega^{06}_{k_{11} k_{12} k_7 k_8 k_9 k_{10}} \left[\frac{1}{\epsilon_{k_1 k_2 k_{11} k_{12}} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8 k_9 k_{10} k_{11} k_{12}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8 k_9 k_{10}} \; \epsilon_{k_7 k_8 k_9 k}} \right. \tag{376}$$
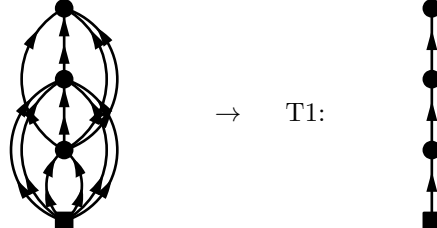

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{377}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}$$

$$a_2 = \epsilon^{k_{11} k_{12}}_{k_3 k_4 k_5 k_6}$$

$$a_3 = \epsilon_{k_7 k_8 k_9 k_{10} k_{11} k_{12}}$$

Diagram 187:

$$\text{PO3.187} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{15}_{k_{11} k_7 k_3 k_4 k_5 k_6} \Omega^{04}_{k_{11} k_8 k_9 k_{10}} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_{11}}_{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{15}_{k_{11} k_7 k_3 k_4 k_5 k_6} \Omega^{04}_{k_{11} k_8 k_9 k_{10}}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8 k_9 k_{10}} \ \epsilon_{k_8 k_9 k_{10} k_{11}}} \tag{378}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{379}$$

$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}$$

$$a_2 = \epsilon^{k_{11}}_{k_3 k_4 k_5 k_6 k_7}$$

$$a_3 = \epsilon_{k_8 k_9 k_{10} k_{11}}$$

Diagram 188:

$$\text{PO3.188} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(5!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{13}_{k_5 k_1 k_2 k_3} \Omega^{51}_{k_6 k_7 k_8 k_9 k_{10} k_5} \Omega^{06}_{k_6 k_7 k_8 k_9 k_{10} k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_6 k_7 k_8 k_9 k_{10}}_{k_5}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(3!)(5!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{13}_{k_5 k_1 k_2 k_3} \Omega^{51}_{k_6 k_7 k_8 k_9 k_{10} k_5} \Omega^{06}_{k_6 k_7 k_8 k_9 k_{10} k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_4} \ \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}} \tag{380}$$

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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{381}$$

$$a_1 = \epsilon^{k_5}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_6 k_7 k_8 k_9 k_{10}}_{k_5}$$
$$a_3 = \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 189:

$$\text{PO3.189} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{31}_{k_8 k_9 k_{10} k_5} \Omega^{06}_{k_8 k_9 k_{10} k_6 k_7 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10}}_{k_5}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{31}_{k_8 k_9 k_{10} k_5} \Omega^{06}_{k_8 k_9 k_{10} k_6 k_7 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_4 k_6 k_7} \ \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}} \tag{382}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{383}$$

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$$a_1 = \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_8 k_9 k_{10}}_{k_5}$$
$$a_3 = \epsilon_{k_4 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 190:

$$\text{PO3.190} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{22}_{k_8 k_9 k_5 k_6} \Omega^{04}_{k_8 k_9 k_7 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8 k_9}_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_4 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{22}_{k_8 k_9 k_5 k_6} \Omega^{04}_{k_8 k_9 k_7 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_4 k_7} \ \epsilon_{k_4 k_7 k_8 k_9}} \tag{384}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{385}$$

$$a_1 = \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_8 k_9}_{k_5 k_6}$$
$$a_3 = \epsilon_{k_4 k_7 k_8 k_9}$$

Diagram 191:

$$\text{PO3.191} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{42}_{k_8 k_9 k_{10} k_{11} k_5 k_6} \Omega^{06}_{k_8 k_9 k_{10} k_{11} k_7 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10} k_{11}}_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_4 k_7 k_8 k_9 k_1}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{42}_{k_8 k_9 k_{10} k_{11} k_5 k_6} \Omega^{06}_{k_8 k_9 k_{10} k_{11} k_7 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_4 k_7} \ \epsilon_{k_4 k_7 k_8 k_9 k_{10} k_{11}}} \tag{386}$$

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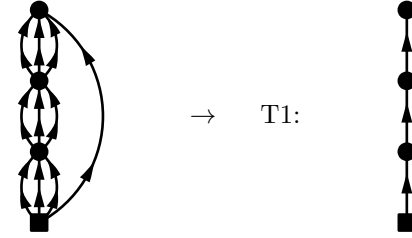$$\mathrm{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{387}$$

$$a_1 = \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_8 k_9 k_{10} k_{11}}_{k_5 k_6}$$
$$a_3 = \epsilon_{k_4 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 192:

$$\mathrm{PO3.192} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)^3} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{33}_{k_8 k_9 k_{10} k_5 k_6 k_7} \Omega^{04}_{k_8 k_9 k_{10} k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10}}_{k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_4 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(3!)^3} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{33}_{k_8 k_9 k_{10} k_5 k_6 k_7} \Omega^{04}_{k_8 k_9 k_{10} k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_4} \ \epsilon_{k_4 k_8 k_9 k_{10}}} \tag{388}$$

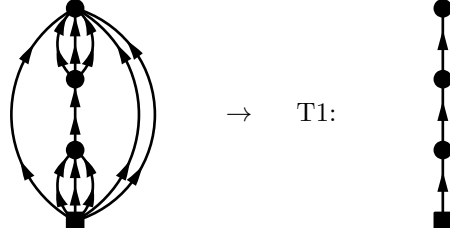$$\mathrm{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{389}$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_5 k_6 k_7}^{k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_4 k_8 k_9 k_{10}}$$

Diagram 193:

$$\text{PO3.193} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)^3} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1 k_2 k_3}^{13} \Omega_{k_8 k_9 k_{10} k_7}^{31} \Omega_{k_8 k_9 k_{10} k_4 k_5 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_7}} e^{-\tau_2 \epsilon_{k_7}^{k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(3!)^3} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1 k_2 k_3}^{13} \Omega_{k_8 k_9 k_{10} k_7}^{31} \Omega_{k_8 k_9 k_{10} k_4 k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}} \tag{390}$$


$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{391}$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_7}$$
$$a_2 = \epsilon_{k_7}^{k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}$$

Diagram 194:

$$\text{PO3.194} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_{11} k_7 k_8}^{22} \Omega_{k_{10} k_{11} k_9 k_4 k_5 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_7 k_8}^{k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_{11} k_7 k_8}^{22} \Omega_{k_{10} k_{11} k_9 k_4 k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_8 k_4 k_5 k_6 k_9} \ \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}} \tag{392}$$

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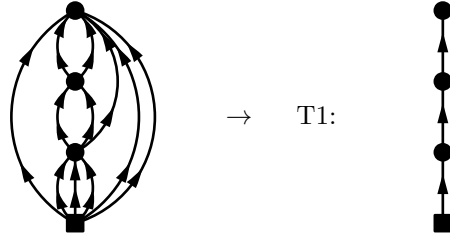
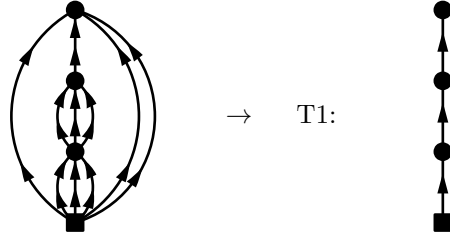$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{393}$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_7 k_8}^{k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_9 k_{10} k_{11}}$$

Diagram 195:

$$\text{PO3.195} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)^3} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{13}_{k_{10} k_7 k_8 k_9} \Omega^{04}_{k_{10} k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_7 k_8 k_9}^{k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_{10}}}$$

$$= \frac{(-1)^3}{(3!)^3} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{13}_{k_{10} k_7 k_8 k_9} \Omega^{04}_{k_{10} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8 k_9 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_6 k_{10}}} \tag{394}$$

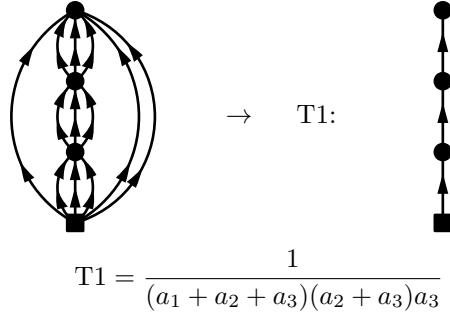$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{395}$$

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$$a_1 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$

$$a_2 = \epsilon^{k_{10}}_{k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_{10}}$$

Diagram 196:

$$\text{PO3.196} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)^4} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{33}_{k_{10} k_{11} k_{12} k_7 k_8 k_9} \Omega^{06}_{k_{10} k_{11} k_{12} k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_{10} k_{11} k_{12}}_{k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_{10} k_{11} k_{12}}}$$

$$= \frac{(-1)^3}{(3!)^4} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{33}_{k_{10} k_{11} k_{12} k_7 k_8 k_9} \Omega^{06}_{k_{10} k_{11} k_{12} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_8 k_9 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_6 k_{10} k_{11} k_{12}}} \tag{396}$$
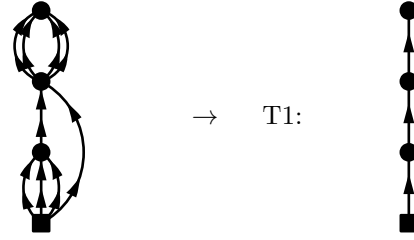

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{397}$$

$$a_1 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$

$$a_2 = \epsilon^{k_{10} k_{11} k_{12}}_{k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_{10} k_{11} k_{12}}$$

Diagram 197:

$$\text{PO3.197} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{13}_{k_5 k_1 k_2 k_3} \Omega^{42}_{k_6 k_7 k_8 k_9 k_5 k_4} \Omega^{04}_{k_6 k_7 k_8 k_9} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_6 k_7 k_8 k_9}_{k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{13}_{k_5 k_1 k_2 k_3} \Omega^{42}_{k_6 k_7 k_8 k_9 k_5 k_4} \Omega^{04}_{k_6 k_7 k_8 k_9}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5} \ \epsilon_{k_6 k_7 k_8 k_9}} \tag{398}$$

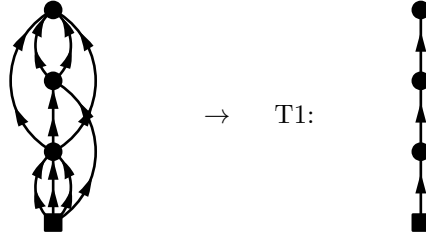$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{399}$$

$$a_1 = \epsilon^{k_5}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_6 k_7 k_8 k_9}_{k_4 k_5}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 198:

$$\text{PO3.198} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{22}_{k_8 k_9 k_5 k_4} \Omega^{04}_{k_8 k_9 k_6 k_7} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8 k_9}_{k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{22}_{k_8 k_9 k_5 k_4} \Omega^{04}_{k_8 k_9 k_6 k_7}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5 k_6 k_7} \ \epsilon_{k_6 k_7 k_8 k_9}} \tag{400}$$
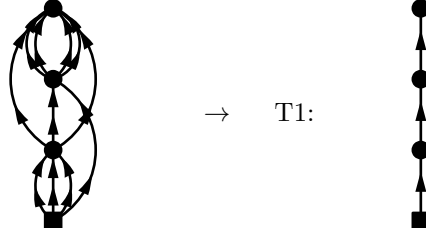

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{401}$$

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$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_4 k_5}^{k_8 k_9}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 199:

$$\text{PO3.199} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1 k_2 k_3}^{33} \Omega_{k_8 k_9 k_{10} k_{11} k_5 k_4}^{42} \Omega_{k_8 k_9 k_{10} k_{11} k_6 k_7}^{06} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_4 k_5}^{k_8 k_9 k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9 k_1}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1 k_2 k_3}^{33} \Omega_{k_8 k_9 k_{10} k_{11} k_5 k_4}^{42} \Omega_{k_8 k_9 k_{10} k_{11} k_6 k_7}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5 k_6 k_7} \ \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}} \tag{402}$$
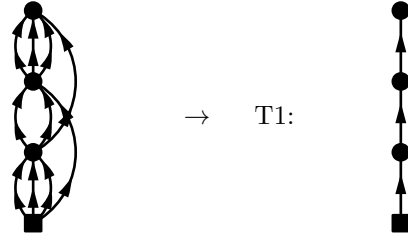

$$\to \qquad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{403}$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_4 k_5}^{k_8 k_9 k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 200:

$$\text{PO3.200} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1 k_2 k_3}^{33} \Omega_{k_8 k_9 k_{10} k_5 k_6 k_4}^{33} \Omega_{k_8 k_9 k_{10} k_7}^{04} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_4 k_5 k_6}^{k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1 k_2 k_3}^{33} \Omega_{k_8 k_9 k_{10} k_5 k_6 k_4}^{33} \Omega_{k_8 k_9 k_{10} k_7}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5 k_6 k_7} \ \epsilon_{k_7 k_8 k_9 k_{10}}} \tag{404}$$
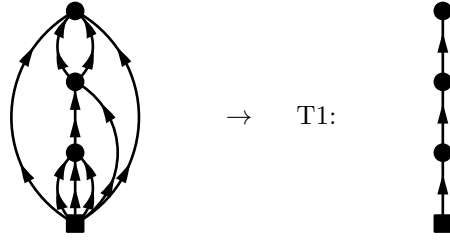
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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{405}$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_4 k_5 k_6}^{k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_7 k_8 k_9 k_{10}}$$

Diagram 201:

$$\text{PO3.201} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1 k_2 k_3}^{13} \Omega_{k_8 k_9 k_7 k_4}^{22} \Omega_{k_8 k_9 k_5 k_6}^{04} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_7}} e^{-\tau_2 \epsilon_{k_4 k_7}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1 k_2 k_3}^{13} \Omega_{k_8 k_9 k_7 k_4}^{22} \Omega_{k_8 k_9 k_5 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_7 k_5 k_6} \ \epsilon_{k_5 k_6 k_8 k_9}} \tag{406}$$

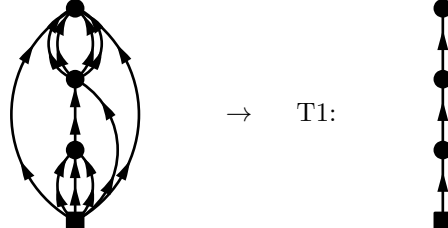$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{407}$$

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$$a_1 = \epsilon^{k_7}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_8 k_9}_{k_4 k_7}$$
$$a_3 = \epsilon_{k_5 k_6 k_8 k_9}$$

Diagram 202:

$$\text{PO3.202} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{42}_{k_8 k_9 k_{10} k_{11} k_7 k_4} \Omega^{06}_{k_8 k_9 k_{10} k_{11} k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10} k_{11}}_{k_4 k_7}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{42}_{k_8 k_9 k_{10} k_{11} k_7 k_4} \Omega^{06}_{k_8 k_9 k_{10} k_{11} k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_7 k_5 k_6} \ \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}} \tag{408}$$
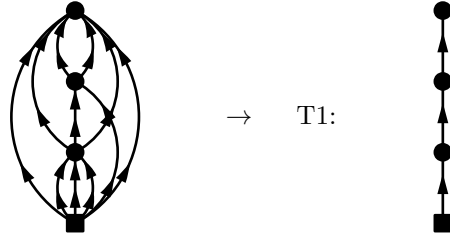

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{409}$$

$$a_1 = \epsilon^{k_7}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_8 k_9 k_{10} k_{11}}_{k_4 k_7}$$
$$a_3 = \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}$$

Diagram 203:

$$\text{PO3.203} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{22}_{k_{10} k_{11} k_7 k_4} \Omega^{06}_{k_{10} k_{11} k_8 k_9 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_{10} k_{11}}_{k_4 k_7}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{22}_{k_{10} k_{11} k_7 k_4} \Omega^{06}_{k_{10} k_{11} k_8 k_9 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_7 k_5 k_6 k_8 k_9} \ \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}} \tag{410}$$

$$\rightarrow \quad \text{T1:}$$

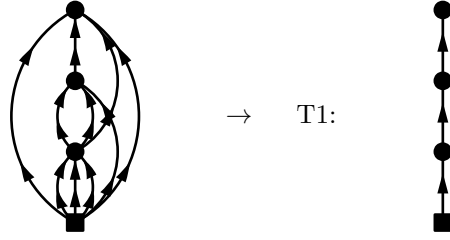$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{411}$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_4 k_7}^{k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}$$

Diagram 204:
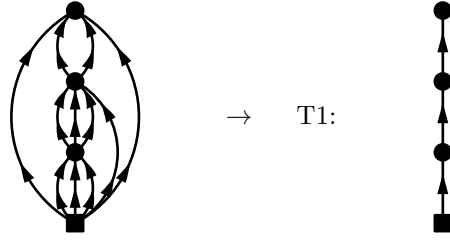
$$\text{PO3.204} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_7 k_8 k_4}^{13} \Omega_{k_{10} k_9 k_5 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_4 k_7 k_8}^{k_{10}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_7 k_8 k_4}^{13} \Omega_{k_{10} k_9 k_5 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_7 k_8 k_5 k_6 k_9} \ \epsilon_{k_5 k_6 k_9 k_{10}}} \tag{412}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{413}$$

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$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_4 k_7 k_8}^{k_{10}}$$
$$a_3 = \epsilon_{k_5 k_6 k_9 k_{10}}$$

Diagram 205:

$$\text{PO3.205} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_{11} k_{12} k_7 k_8 k_4}^{33} \Omega_{k_{10} k_{11} k_{12} k_9 k_5 k_6}^{06} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_4 k_7 k_8}^{k_{10} k_{11} k_{12}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_9}}$$

$$= \frac{-(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_{11} k_{12} k_7 k_8 k_4}^{33} \Omega_{k_{10} k_{11} k_{12} k_9 k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_7 k_8 k_5 k_6 k_9} \ \epsilon_{k_5 k_6 k_9 k_{10} k_{11} k_{12}}} \tag{414}$$

$$\to \quad \text{T1:}$$

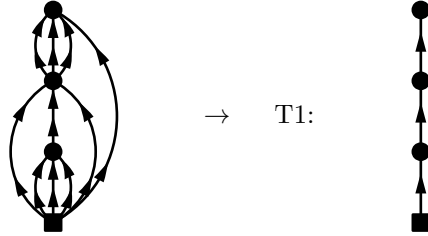$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{415}$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_4 k_7 k_8}^{k_{10} k_{11} k_{12}}$$
$$a_3 = \epsilon_{k_5 k_6 k_9 k_{10} k_{11} k_{12}}$$

Diagram 206:

$$\text{PO3.206} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_{11} k_7 k_8 k_9 k_4}^{24} \Omega_{k_{10} k_{11} k_5 k_6}^{04} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_4 k_7 k_8 k_9}^{k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_{11} k_7 k_8 k_9 k_4}^{24} \Omega_{k_{10} k_{11} k_5 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_7 k_8 k_9 k_5 k_6} \ \epsilon_{k_5 k_6 k_{10} k_{11}}} \tag{416}$$

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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{417}$$

$$a_1 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_{10} k_{11}}_{k_4 k_7 k_8 k_9}$$
$$a_3 = \epsilon_{k_5 k_6 k_{10} k_{11}}$$

Diagram 207:

$$\text{PO3.207} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{33}_{k_8 k_9 k_{10} k_7 k_4 k_5} \Omega^{04}_{k_8 k_9 k_{10} k_6} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10}}_{k_4 k_5 k_7}} e^{-\tau_3 \epsilon_{k_6 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{33}_{k_8 k_9 k_{10} k_7 k_4 k_5} \Omega^{04}_{k_8 k_9 k_{10} k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_7 k_6} \ \epsilon_{k_6 k_8 k_9 k_{10}}} \tag{418}$$

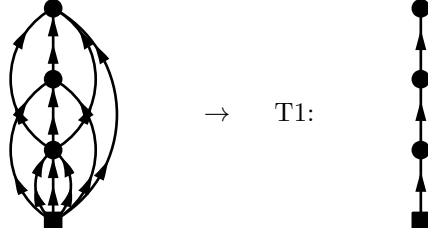$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{419}$$

$$a_1 = \epsilon^{k_7}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_8 k_9 k_{10}}_{k_4 k_5 k_7}$$
$$a_3 = \epsilon_{k_6 k_8 k_9 k_{10}}$$

Diagram 208:

$$\text{PO3.208} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{13}_{k_{10} k_7 k_4 k_5} \Omega^{04}_{k_{10} k_8 k_9 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_{10}}_{k_4 k_5 k_7}} e^{-\tau_3 \epsilon_{k_6 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{13}_{k_{10} k_7 k_4 k_5} \Omega^{04}_{k_{10} k_8 k_9 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_7 k_6 k_8 k_9} \; \epsilon_{k_6 k_8 k_9 k_{10}}} \tag{420}$$


$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{421}$$

$$a_1 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_{10}}_{k_4 k_5 k_7}$$
$$a_3 = \epsilon_{k_6 k_8 k_9 k_{10}}$$

Diagram 209:

$$\text{PO3.209} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{33}_{k_{10} k_{11} k_{12} k_7 k_4 k_5} \Omega^{06}_{k_{10} k_{11} k_{12} k_8 k_9 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_{10} k_{11} k_{12}}_{k_4 k_5 k_7}} e^{-\tau_3 \epsilon_{k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{33}_{k_{10} k_{11} k_{12} k_7 k_4 k_5} \Omega^{06}_{k_{10} k_{11} k_{12} k_8 k_9 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_7 k_6 k_8 k_9} \; \epsilon_{k_6 k_8 k_9 k_{10} k_{11} k_{12}}} \tag{422}$$

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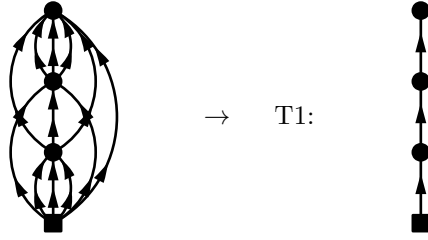
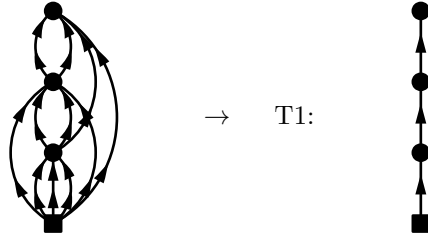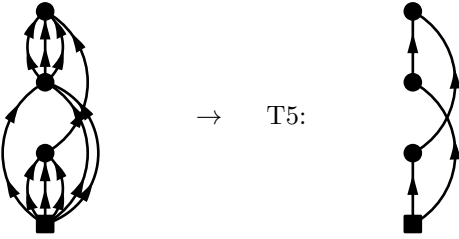$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{423}$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_4 k_5 k_7}^{k_{10} k_{11} k_{12}}$$
$$a_3 = \epsilon_{k_6 k_8 k_9 k_{10} k_{11} k_{12}}$$

Diagram 210:

$$\text{PO3.210} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_{11} k_7 k_8 k_4 k_5}^{24} \Omega_{k_{10} k_{11} k_9 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_4 k_5 k_7 k_8}^{k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_6 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^3(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_{11} k_7 k_8 k_4 k_5}^{24} \Omega_{k_{10} k_{11} k_9 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_7 k_8 k_6 k_9} \ \epsilon_{k_6 k_9 k_{10} k_{11}}} \tag{424}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{425}$$

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$$a_1 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$

$$a_2 = \epsilon^{k_{10} k_{11}}_{k_4 k_5 k_7 k_8}$$

$$a_3 = \epsilon_{k_6 k_9 k_{10} k_{11}}$$

Diagram 211:

$$\text{PO3.211} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)^3} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{33}_{k_8 k_9 k_{10} k_4 k_5 k_6} \Omega^{04}_{k_8 k_9 k_{10} k_7} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10}}_{k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(3!)^3} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{33}_{k_8 k_9 k_{10} k_4 k_5 k_6} \Omega^{04}_{k_8 k_9 k_{10} k_7} \left[\frac{1}{\epsilon_{k_1 k_2 k_3 k_8 k_9 k_{10}} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_8 k_9 k_{10}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_6 k_7} \ \epsilon_{k_7 k_8 k_9 k_{10}}} \right]$$
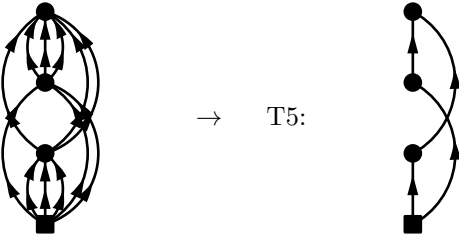
$$(426)$$

$$\rightarrow \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{427}$$

$$a_1 = \epsilon^{k_7}_{k_1 k_2 k_3}$$

$$a_2 = \epsilon^{k_8 k_9 k_{10}}_{k_4 k_5 k_6}$$

$$a_3 = \epsilon_{k_7 k_8 k_9 k_{10}}$$

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Diagram 212:

$$\text{PO3.212} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2(3!)^4} \sum_{k_i} O^{60}_{k_1k_2k_3k_4k_5k_6} \Omega^{33}_{k_7k_8k_9k_1k_2k_3} \Omega^{33}_{k_{10}k_{11}k_{12}k_4k_5k_6} \Omega^{06}_{k_{10}k_{11}k_{12}k_7k_8k_9} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7k_8k_9}_{k_1k_2k_3}} e^{-\tau_2 \epsilon^{k_{10}k_{11}k_{12}}_{k_4k_5k_6}} e^{-\tau_3 \epsilon_{k_7k_8k_9k_{10}k_{11}k_{12}}}$$

$$= \frac{-(-1)^3}{2(3!)^4} \sum_{k_i} O^{60}_{k_1k_2k_3k_4k_5k_6} \Omega^{33}_{k_7k_8k_9k_1k_2k_3} \Omega^{33}_{k_{10}k_{11}k_{12}k_4k_5k_6} \Omega^{06}_{k_{10}k_{11}k_{12}k_7k_8k_9} \left[\frac{1}{\epsilon_{k_1k_2k_3k_{10}k_{11}k_{12}} \ \epsilon_{k_1k_2k_3k_4k_5k_6} \ \epsilon_{k_7k_8k_9k_{10}k_{11}k_{12}}} + \frac{1}{\epsilon_{k_1k_2k_3k_4k_5k_6} \ \epsilon_{k_4k_5k_6k_7k_8k_9} \ \epsilon_{k_7k_8k_9k_{10}}} \right.$$

$$\tag{428}$$

$$\to \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{429}$$

$$a_1 = \epsilon^{k_7k_8k_9}_{k_1k_2k_3}$$
$$a_2 = \epsilon^{k_{10}k_{11}k_{12}}_{k_4k_5k_6}$$
$$a_3 = \epsilon_{k_7k_8k_9k_{10}k_{11}k_{12}}$$

Diagram 213:

$$\text{PO3.213} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} O^{60}_{k_1k_2k_3k_4k_5k_6} \Omega^{33}_{k_7k_8k_9k_1k_2k_3} \Omega^{24}_{k_{10}k_{11}k_7k_4k_5k_6} \Omega^{04}_{k_{10}k_{11}k_8k_9} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7k_8k_9}_{k_1k_2k_3}} e^{-\tau_2 \epsilon^{k_{10}k_{11}}_{k_4k_5k_6k_7}} e^{-\tau_3 \epsilon_{k_8k_9k_{10}k_{11}}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1k_2k_3k_4k_5k_6} \Omega^{33}_{k_7k_8k_9k_1k_2k_3} \Omega^{24}_{k_{10}k_{11}k_7k_4k_5k_6} \Omega^{04}_{k_{10}k_{11}k_8k_9}}{\epsilon_{k_1k_2k_3k_4k_5k_6} \ \epsilon_{k_4k_5k_6k_7k_8k_9} \ \epsilon_{k_8k_9k_{10}k_{11}}} \tag{430}$$

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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{431}$$

$$a_1 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_{10} k_{11}}_{k_4 k_5 k_6 k_7}$$
$$a_3 = \epsilon_{k_8 k_9 k_{10} k_{11}}$$

Diagram 214:

$$\text{PO3.214} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{24}_{k_5 k_6 k_1 k_2 k_3 k_4} \Omega^{31}_{k_7 k_8 k_9 k_5} \Omega^{04}_{k_7 k_8 k_9 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9}_{k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(3!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{24}_{k_5 k_6 k_1 k_2 k_3 k_4} \Omega^{31}_{k_7 k_8 k_9 k_5} \Omega^{04}_{k_7 k_8 k_9 k_6}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6} \ \epsilon_{k_6 k_7 k_8 k_9}} \tag{432}$$
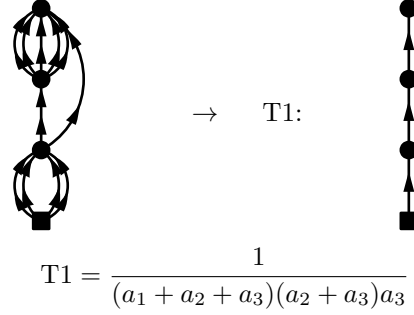

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{433}$$

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$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2 k_3 k_4}$$
$$a_2 = \epsilon^{k_7 k_8 k_9}_{k_5}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 215:

$$\text{PO3.215} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{24}_{k_5 k_6 k_1 k_2 k_3 k_4} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_5} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_{11} k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9 k_{10} k_{11}}_{k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9 k_1}}$$

$$= \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{24}_{k_5 k_6 k_1 k_2 k_3 k_4} \Omega^{51}_{k_7 k_8 k_9 k_{10} k_{11} k_5} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_{11} k_6}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6} \ \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}} \tag{434}$$
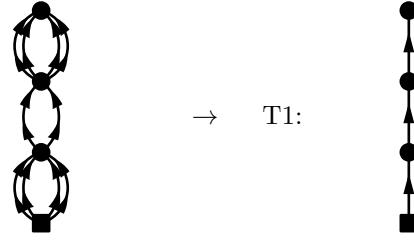

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{435}$$

$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2 k_3 k_4}$$
$$a_2 = \epsilon^{k_7 k_8 k_9 k_{10} k_{11}}_{k_5}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9 k_{10} k_{11}}$$

Diagram 216:

$$\text{PO3.216} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{24}_{k_5 k_6 k_1 k_2 k_3 k_4} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_5 k_6} \Omega^{04}_{k_7 k_8 k_9 k_{10}} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9 k_{10}}_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(4!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{24}_{k_5 k_6 k_1 k_2 k_3 k_4} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_5 k_6} \Omega^{04}_{k_7 k_8 k_9 k_{10}}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6} \ \epsilon_{k_7 k_8 k_9 k_{10}}} \tag{436}$$
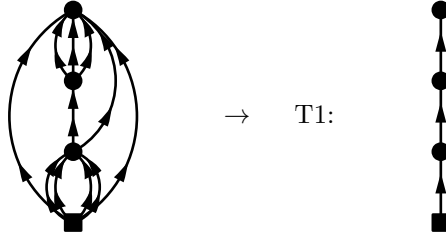
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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{437}$$

$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2 k_3 k_4}$$
$$a_2 = \epsilon^{k_7 k_8 k_9 k_{10}}_{k_5 k_6}$$
$$a_3 = \epsilon_{k_7 k_8 k_9 k_{10}}$$

Diagram 217:

$$\text{PO3.217} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{31}_{k_9 k_{10} k_{11} k_7} \Omega^{06}_{k_9 k_{10} k_{11} k_8 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_9 k_{10} k_{11}}_{k_7}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9 k_1}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{31}_{k_9 k_{10} k_{11} k_7} \Omega^{06}_{k_9 k_{10} k_{11} k_8 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_5 k_6 k_8} \; \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}} \tag{438}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{439}$$

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$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$
$$a_2 = \epsilon^{k_9 k_{10} k_{11}}_{k_7}$$
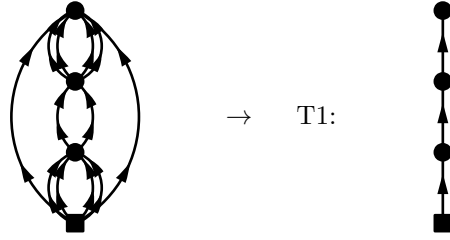$$a_3 = \epsilon_{k_5 k_6 k_8 k_9 k_{10} k_{11}}$$

Diagram 218:

$$\text{PO3.218} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3 (4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{22}_{k_9 k_{10} k_7 k_8} \Omega^{04}_{k_9 k_{10} k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_7 k_8}} e^{-\tau_3 \epsilon_{k_5 k_6 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3 (4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{22}_{k_9 k_{10} k_7 k_8} \Omega^{04}_{k_9 k_{10} k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8 k_5 k_6} \; \epsilon_{k_5 k_6 k_9 k_{10}}} \tag{440}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3) a_3} \tag{441}$$

$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$
$$a_2 = \epsilon^{k_9 k_{10}}_{k_7 k_8}$$
$$a_3 = \epsilon_{k_5 k_6 k_9 k_{10}}$$

Diagram 219:

$$\text{PO3.219} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (4!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{42}_{k_9 k_{10} k_{11} k_{12} k_7 k_8} \Omega^{06}_{k_9 k_{10} k_{11} k_{12} k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_9 k_{10} k_{11} k_{12}}_{k_7 k_8}} e^{-\tau_3 \epsilon_{k_5 k_6 k_9 k_{10} k_{11} k_1}}$$

$$= \frac{(-1)^3}{(2!)^2 (4!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{42}_{k_9 k_{10} k_{11} k_{12} k_7 k_8} \Omega^{06}_{k_9 k_{10} k_{11} k_{12} k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8 k_5 k_6} \; \epsilon_{k_5 k_6 k_9 k_{10} k_{11} k_{12}}} \tag{442}$$

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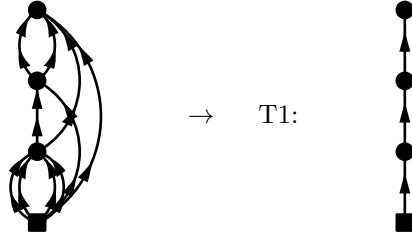$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{443}$$

$$a_1 = \epsilon_{k_1 k_2 k_3 k_4}^{k_7 k_8}$$
$$a_2 = \epsilon_{k_7 k_8}^{k_9 k_{10} k_{11} k_{12}}$$
$$a_3 = \epsilon_{k_5 k_6 k_9 k_{10} k_{11} k_{12}}$$

Diagram 220:

$$\text{PO3.220} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2 k_3 k_4}^{24} \Omega_{k_9 k_{10} k_7 k_5}^{22} \Omega_{k_9 k_{10} k_8 k_6}^{04} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3 k_4}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_5 k_7}^{k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_6 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2 k_3 k_4}^{24} \Omega_{k_9 k_{10} k_7 k_5}^{22} \Omega_{k_9 k_{10} k_8 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_7 k_6 k_8} \; \epsilon_{k_6 k_8 k_9 k_{10}}} \tag{444}$$

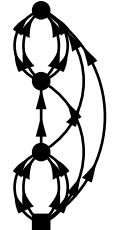$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{445}$$

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$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$
$$a_2 = \epsilon^{k_9 k_{10}}_{k_5 k_7}$$
$$a_3 = \epsilon_{k_6 k_8 k_9 k_{10}}$$

Diagram 221:

$$\text{PO3.221} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(4!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{42}_{k_9 k_{10} k_{11} k_{12} k_7 k_5} \Omega^{06}_{k_9 k_{10} k_{11} k_{12} k_8 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_9 k_{10} k_{11} k_{12}}_{k_5 k_7}} e^{-\tau_3 \epsilon_{k_6 k_8}}$$

$$= \frac{-(-1)^3}{(4!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{42}_{k_9 k_{10} k_{11} k_{12} k_7 k_5} \Omega^{06}_{k_9 k_{10} k_{11} k_{12} k_8 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_7 k_6 k_8} \; \epsilon_{k_6 k_8 k_9 k_{10} k_{11} k_{12}}} \tag{446}$$

$\rightarrow$ T1:
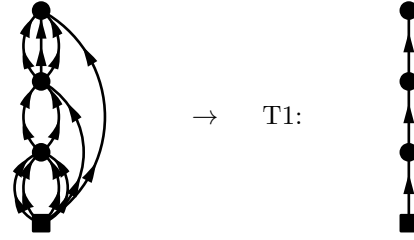
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{447}$$

$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$
$$a_2 = \epsilon^{k_9 k_{10} k_{11} k_{12}}_{k_5 k_7}$$
$$a_3 = \epsilon_{k_6 k_8 k_9 k_{10} k_{11} k_{12}}$$

Diagram 222:

$$\text{PO3.222} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{33}_{k_9 k_{10} k_{11} k_7 k_8 k_5} \Omega^{04}_{k_9 k_{10} k_{11} k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_9 k_{10} k_{11}}_{k_5 k_7 k_8}} e^{-\tau_3 \epsilon_{k_6 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{33}_{k_9 k_{10} k_{11} k_7 k_8 k_5} \Omega^{04}_{k_9 k_{10} k_{11} k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_7 k_8 k_6} \; \epsilon_{k_6 k_9 k_{10} k_{11}}} \tag{448}$$

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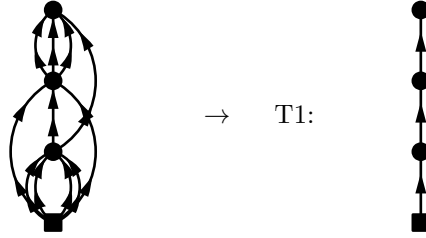$$T1 = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{449}$$

$$a_1 = \epsilon_{k_1 k_2 k_3 k_4}^{k_7 k_8}$$
$$a_2 = \epsilon_{k_5 k_7 k_8}^{k_9 k_{10} k_{11}}$$
$$a_3 = \epsilon_{k_6 k_9 k_{10} k_{11}}$$

Diagram 223:

$$\text{PO3.223} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2 k_3 k_4}^{24} \Omega_{k_9 k_{10} k_{11} k_7 k_5 k_6}^{33} \Omega_{k_9 k_{10} k_{11} k_8}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3 k_4}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_5 k_6 k_7}^{k_9 k_{10} k_{11}}} e^{-\tau_3 \epsilon_{k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(2!)(3!)(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2 k_3 k_4}^{24} \Omega_{k_9 k_{10} k_{11} k_7 k_5 k_6}^{33} \Omega_{k_9 k_{10} k_{11} k_8}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_5 k_6 k_7 k_8} \ \epsilon_{k_8 k_9 k_{10} k_{11}}} \tag{450}$$

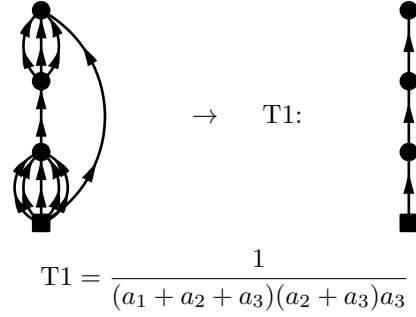$$T1 = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{451}$$

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$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$
$$a_2 = \epsilon^{k_9 k_{10} k_{11}}_{k_5 k_6 k_7}$$
$$a_3 = \epsilon_{k_8 k_9 k_{10} k_{11}}$$

Diagram 224:

$$\text{PO3.224} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_1 k_2 k_3 k_4 k_5} \Omega^{31}_{k_8 k_9 k_{10} k_7} \Omega^{04}_{k_8 k_9 k_{10} k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10}}_{k_7}} e^{-\tau_3 \epsilon_{k_6 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(3!)(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_1 k_2 k_3 k_4 k_5} \Omega^{31}_{k_8 k_9 k_{10} k_7} \Omega^{04}_{k_8 k_9 k_{10} k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_6} \; \epsilon_{k_6 k_8 k_9 k_{10}}} \tag{452}$$

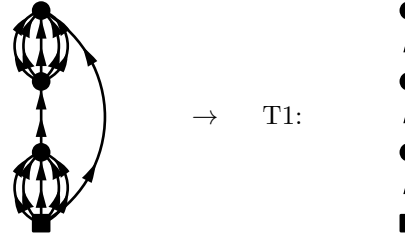$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{453}$$

$$a_1 = \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}$$
$$a_2 = \epsilon^{k_8 k_9 k_{10}}_{k_7}$$
$$a_3 = \epsilon_{k_6 k_8 k_9 k_{10}}$$

Diagram 225:

$$\text{PO3.225} = \lim_{\tau \to \infty} \frac{(-1)^3}{(5!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_1 k_2 k_3 k_4 k_5} \Omega^{51}_{k_8 k_9 k_{10} k_{11} k_{12} k_7} \Omega^{06}_{k_8 k_9 k_{10} k_{11} k_{12} k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10} k_{11} k_{12}}_{k_7}} e^{-\tau_3 \epsilon_{k_6 k_8 k_9 k_{10} k_{11} k_1}}$$

$$= \frac{(-1)^3}{(5!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_1 k_2 k_3 k_4 k_5} \Omega^{51}_{k_8 k_9 k_{10} k_{11} k_{12} k_7} \Omega^{06}_{k_8 k_9 k_{10} k_{11} k_{12} k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_6} \; \epsilon_{k_6 k_8 k_9 k_{10} k_{11} k_{12}}} \tag{454}$$

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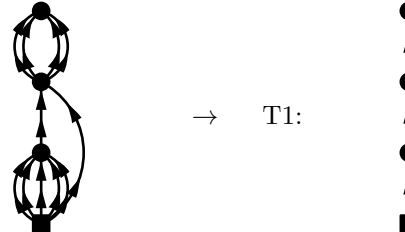$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{455}$$

$$a_1 = \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}$$
$$a_2 = \epsilon^{k_8 k_9 k_{10} k_{11} k_{12}}_{k_7}$$
$$a_3 = \epsilon_{k_6 k_8 k_9 k_{10} k_{11} k_{12}}$$

Diagram 226:

$$\text{PO3.226} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_1 k_2 k_3 k_4 k_5} \Omega^{42}_{k_8 k_9 k_{10} k_{11} k_7 k_6} \Omega^{04}_{k_8 k_9 k_{10} k_{11}} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10} k_{11}}_{k_6 k_7}} e^{-\tau_3 \epsilon_{k_8 k_9 k_{10} k_{11}}}$$

$$= \frac{(-1)^3}{(4!)(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_1 k_2 k_3 k_4 k_5} \Omega^{42}_{k_8 k_9 k_{10} k_{11} k_7 k_6} \Omega^{04}_{k_8 k_9 k_{10} k_{11}}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7} \ \epsilon_{k_8 k_9 k_{10} k_{11}}} \tag{456}$$
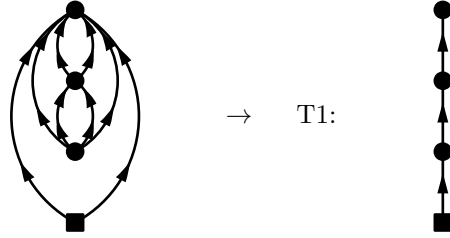

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{457}$$

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$$a_1 = \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}$$

$$a_2 = \epsilon^{k_8 k_9 k_{10} k_{11}}_{k_6 k_7}$$

$$a_3 = \epsilon_{k_8 k_9 k_{10} k_{11}}$$

3.2 Three-body canonical diagrams for a generic operator only

Diagram 227:

$$\text{PO3.227} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^4} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_3 k_4} \Omega^{06}_{k_7 k_8 k_5 k_6 k_1 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_1 k_2 k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^4} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_3 k_4} \Omega^{06}_{k_7 k_8 k_5 k_6 k_1 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_1 k_2 k_5 k_6} \ \epsilon_{k_1 k_2 k_5 k_6 k_7 k_8}} \tag{458}$$
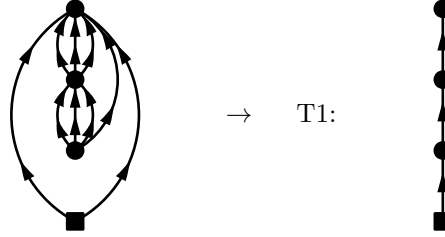

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{459}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon^{k_7 k_8}_{k_3 k_4}$$

$$a_3 = \epsilon_{k_1 k_2 k_5 k_6 k_7 k_8}$$

Diagram 228:

$$\text{PO3.228} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_3 k_4 k_5} \Omega^{06}_{k_7 k_8 k_9 k_6 k_1 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9}_{k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_1 k_2 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_3 k_4 k_5} \Omega^{06}_{k_7 k_8 k_9 k_6 k_1 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_1 k_2 k_6} \; \epsilon_{k_1 k_2 k_6 k_7 k_8 k_9}} \tag{460}$$
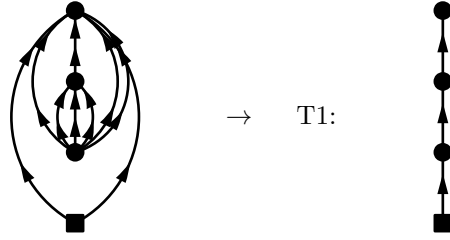

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{461}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon^{k_7 k_8 k_9}_{k_3 k_4 k_5}$$

$$a_3 = \epsilon_{k_1 k_2 k_6 k_7 k_8 k_9}$$

Diagram 229:

$$\text{PO3.229} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_3 k_4 k_5} \Omega^{06}_{k_9 k_6 k_7 k_8 k_1 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_1 k_2 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_3 k_4 k_5} \Omega^{06}_{k_9 k_6 k_7 k_8 k_1 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_1 k_2 k_6 k_7 k_8} \; \epsilon_{k_1 k_2 k_6 k_7 k_8 k_9}} \tag{462}$$

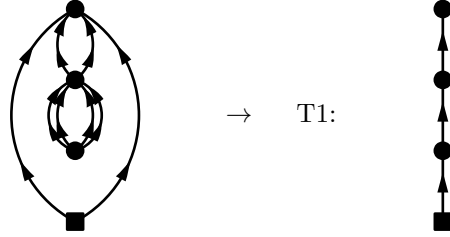$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{463}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon^{k_9}_{k_3 k_4 k_5}$$
$$a_3 = \epsilon_{k_1 k_2 k_6 k_7 k_8 k_9}$$

Diagram 230:

$$\text{PO3.230} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_3 k_4 k_5 k_6} \Omega^{04}_{k_7 k_8 k_1 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_3 k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_1 k_2 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_3 k_4 k_5 k_6} \Omega^{04}_{k_7 k_8 k_1 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_5 k_6 k_1 k_2} \ \epsilon_{k_1 k_2 k_7 k_8}} \tag{464}$$
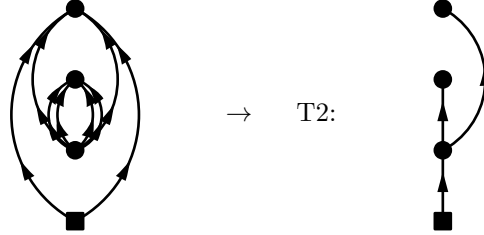

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{465}$$

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$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$
$$a_2 = \epsilon^{k_7 k_8}_{k_3 k_4 k_5 k_6}$$
$$a_3 = \epsilon_{k_1 k_2 k_7 k_8}$$

Diagram 231:

$$\text{PO3.231} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{04}_{k_3 k_4 k_5 k_6} \Omega^{04}_{k_7 k_8 k_1 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_1 k_2 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{04}_{k_3 k_4 k_5 k_6} \Omega^{04}_{k_7 k_8 k_1 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6} \; \epsilon_{k_1 k_2 k_7 k_8}} \tag{466}$$
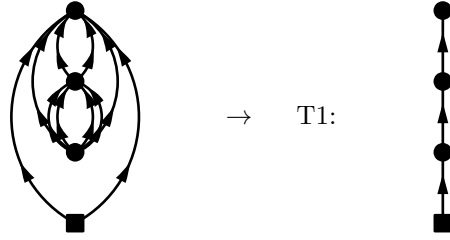

$$\rightarrow \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{467}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon_{k_3 k_4 k_5 k_6}$$
$$a_3 = \epsilon_{k_1 k_2 k_7 k_8}$$

Diagram 232:

$$\text{PO3.232} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_3 k_4 k_5 k_6} \Omega^{06}_{k_9 k_{10} k_7 k_8 k_1 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_3 k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_1 k_2 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_3 k_4 k_5 k_6} \Omega^{06}_{k_9 k_{10} k_7 k_8 k_1 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6 k_1 k_2 k_7 k_8} \; \epsilon_{k_1 k_2 k_7 k_8 k_9 k_{10}}} \tag{468}$$

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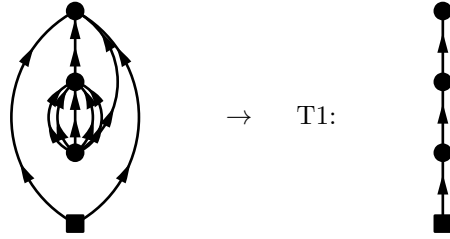$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{469}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon^{k_9 k_{10}}_{k_3 k_4 k_5 k_6}$$
$$a_3 = \epsilon_{k_1 k_2 k_7 k_8 k_9 k_{10}}$$

Diagram 233:

$$\text{PO3.233} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_3 k_4 k_5 k_6 k_7} \Omega^{04}_{k_9 k_8 k_1 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_1 k_2 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_3 k_4 k_5 k_6 k_7} \Omega^{04}_{k_9 k_8 k_1 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6 k_7 k_1 k_2 k_8} \; \epsilon_{k_1 k_2 k_8 k_9}} \tag{470}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{471}$$

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$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_3 k_4 k_5 k_6 k_7}$$

$$a_3 = \epsilon_{k_1 k_2 k_8 k_9}$$

Diagram 234:

$$\text{PO3.234} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_3 k_1} \Omega^{06}_{k_7 k_8 k_4 k_5 k_6 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_1 k_3}} e^{-\tau_3 \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_3 k_1} \Omega^{06}_{k_7 k_8 k_4 k_5 k_6 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_3 k_2 k_4 k_5 k_6} \; \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}} \tag{472}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{473}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon^{k_7 k_8}_{k_1 k_3}$$

$$a_3 = \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}$$

Diagram 235:

$$\text{PO3.235} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_3 k_4 k_1} \Omega^{06}_{k_7 k_8 k_9 k_5 k_6 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9}_{k_1 k_3 k_4}} e^{-\tau_3 \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_3 k_4 k_1} \Omega^{06}_{k_7 k_8 k_9 k_5 k_6 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_3 k_4 k_2 k_5 k_6} \; \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}} \tag{474}$$

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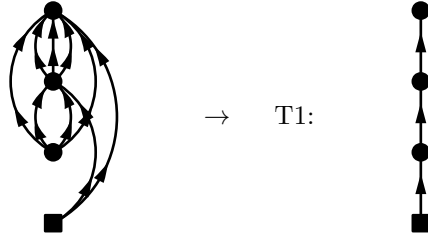
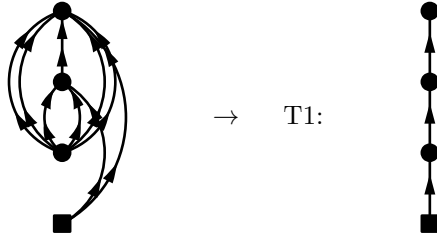$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{475}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$
$$a_2 = \epsilon^{k_7 k_8 k_9}_{k_1 k_3 k_4}$$
$$a_3 = \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}$$

Diagram 236:

$$\text{PO3.236} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_3 k_4 k_1} \Omega^{06}_{k_9 k_5 k_6 k_7 k_8 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_3 k_4}} e^{-\tau_3 \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_3 k_4 k_1} \Omega^{06}_{k_9 k_5 k_6 k_7 k_8 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_3 k_4 k_2 k_5 k_6 k_7 k_8} \ \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}} \tag{476}$$
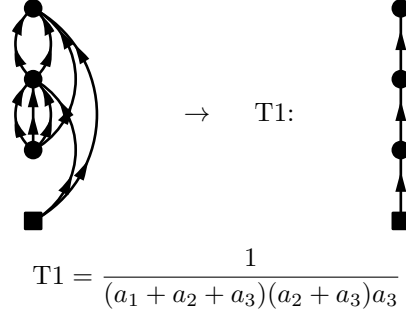

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{477}$$

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$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_3 k_4}$$

$$a_3 = \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}$$

Diagram 237:

$$\text{PO3.237} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_3 k_4 k_5 k_1} \Omega^{04}_{k_7 k_8 k_6 k_2} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_1 k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_2 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_3 k_4 k_5 k_1} \Omega^{04}_{k_7 k_8 k_6 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_3 k_4 k_5 k_2 k_6} \ \epsilon_{k_2 k_6 k_7 k_8}} \tag{478}$$
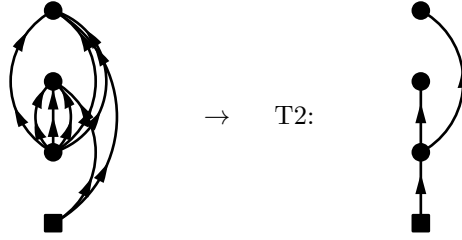

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{479}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon^{k_7 k_8}_{k_1 k_3 k_4 k_5}$$

$$a_3 = \epsilon_{k_2 k_6 k_7 k_8}$$

Diagram 238:

$$\text{PO3.238} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2(3!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{04}_{k_3 k_4 k_5 k_1} \Omega^{04}_{k_6 k_7 k_8 k_2} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_1 k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_2 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{2(3!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{04}_{k_3 k_4 k_5 k_1} \Omega^{04}_{k_6 k_7 k_8 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_3 k_4 k_5} \ \epsilon_{k_2 k_6 k_7 k_8}} \tag{480}$$

$$\rightarrow \quad \text{T2:}$$

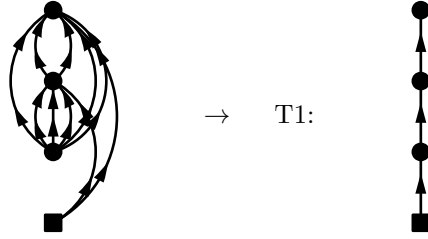$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{481}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon_{k_1 k_3 k_4 k_5}$$
$$a_3 = \epsilon_{k_2 k_6 k_7 k_8}$$

Diagram 239:

$$\text{PO3.239} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_3 k_4 k_5 k_1} \Omega^{06}_{k_9 k_{10} k_6 k_7 k_8 k_2} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_1 k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_2 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_3 k_4 k_5 k_1} \Omega^{06}_{k_9 k_{10} k_6 k_7 k_8 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_3 k_4 k_5 k_2 k_6 k_7 k_8} \; \epsilon_{k_2 k_6 k_7 k_8 k_9 k_{10}}} \tag{482}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{483}$$

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$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9 k_{10}}_{k_1 k_3 k_4 k_5}$$
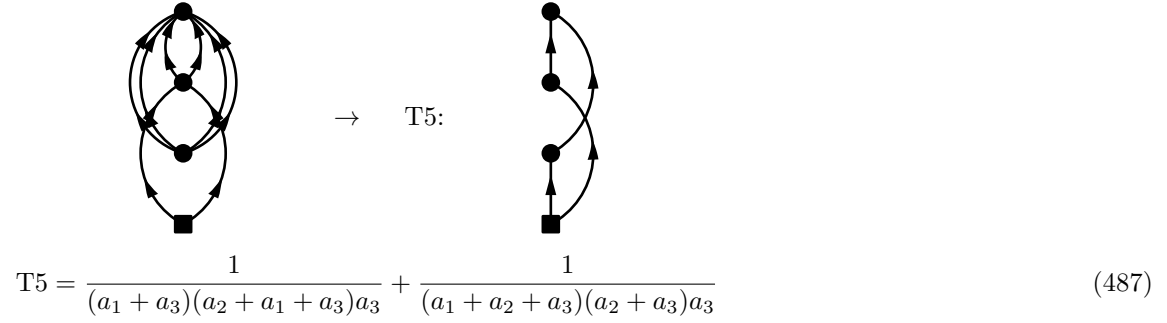
$$a_3 = \epsilon_{k_2 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 240:

$$\text{PO3.240} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_3 k_4 k_5 k_6 k_1} \Omega^{04}_{k_9 k_7 k_8 k_2} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_3 k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_2 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_3 k_4 k_5 k_6 k_1} \Omega^{04}_{k_9 k_7 k_8 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_3 k_4 k_5 k_6 k_2 k_7 k_8} \; \epsilon_{k_2 k_7 k_8 k_9}} \tag{484}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{485}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_3 k_4 k_5 k_6}$$

$$a_3 = \epsilon_{k_2 k_7 k_8 k_9}$$

Diagram 241:

$$\text{PO3.241} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{06}_{k_7 k_8 k_3 k_4 k_5 k_6} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_1 k_2}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2 (4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{06}_{k_7 k_8 k_3 k_4 k_5 k_6} \left[\frac{1}{\epsilon_{k_7 k_8} \; \epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} \right] \tag{486}$$

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$$\rightarrow \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{487}$$
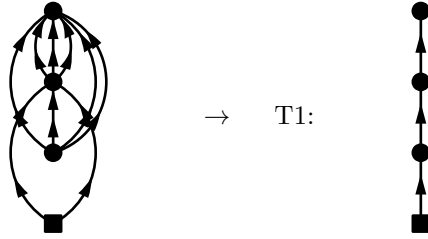
$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$
$$a_2 = \epsilon^{k_7 k_8}_{k_1 k_2}$$
$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}$$

Diagram 242:

$$\text{PO3.242} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_3 k_1 k_2} \Omega^{06}_{k_7 k_8 k_9 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_3 k_1 k_2} \Omega^{06}_{k_7 k_8 k_9 k_4 k_5 k_6}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \tag{488}$$
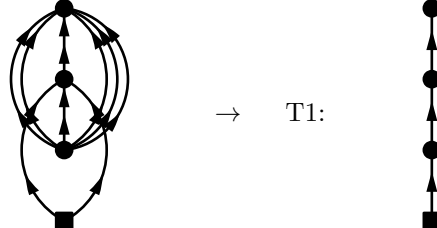

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{489}$$

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$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 243:

$$\text{PO3.243} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_3 k_1 k_2} \Omega^{06}_{k_9 k_4 k_5 k_6 k_7 k_8} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{13}_{k_9 k_3 k_1 k_2} \Omega^{06}_{k_9 k_4 k_5 k_6 k_7 k_8}}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8} \; \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \tag{490}$$

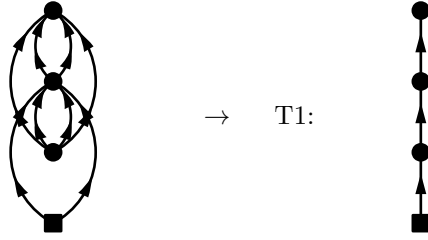$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{491}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_3}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 244:

$$\text{PO3.244} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^4} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_3 k_4 k_1 k_2} \Omega^{04}_{k_7 k_8 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^4} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_3 k_4 k_1 k_2} \Omega^{04}_{k_7 k_8 k_5 k_6}}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_6 k_7 k_8}} \tag{492}$$

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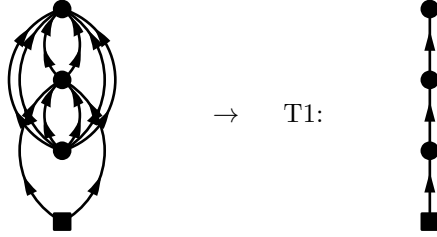$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{493}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$
$$a_2 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8}$$

Diagram 245:

$$\text{PO3.245} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_3 k_4 k_1 k_2} \Omega^{06}_{k_9 k_{10} k_5 k_6 k_7 k_8} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_1 k_2 k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{24}_{k_9 k_{10} k_3 k_4 k_1 k_2} \Omega^{06}_{k_9 k_{10} k_5 k_6 k_7 k_8}}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8} \; \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \tag{494}$$
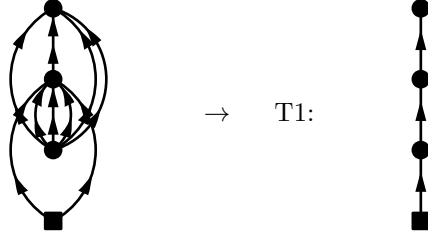

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{495}$$

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$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9 k_{10}}_{k_1 k_2 k_3 k_4}$$

$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 246:

$$\text{PO3.246} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_3 k_4 k_5 k_1 k_2} \Omega^{04}_{k_9 k_6 k_7 k_8} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{15}_{k_9 k_3 k_4 k_5 k_1 k_2} \Omega^{04}_{k_9 k_6 k_7 k_8}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_6 k_7 k_8 k_9}} \tag{496}$$
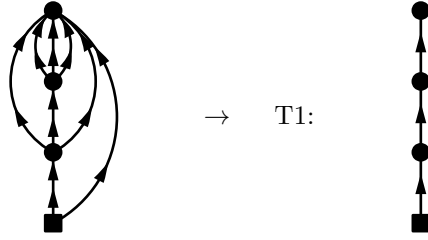

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{497}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_3 k_4 k_5}$$

$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 247:

$$\text{PO3.247} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{31}_{k_6 k_7 k_8 k_3} \Omega^{06}_{k_6 k_7 k_8 k_4 k_5 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5}_{k_1}} e^{-\tau_2 \epsilon^{k_6 k_7 k_8}_{k_3}} e^{-\tau_3 \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{31}_{k_6 k_7 k_8 k_3} \Omega^{06}_{k_6 k_7 k_8 k_4 k_5 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_2 k_4 k_5} \ \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}} \tag{498}$$
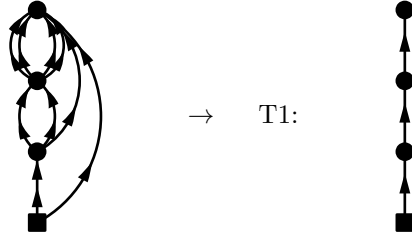
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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{499}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$
$$a_2 = \epsilon_{k_3}^{k_6 k_7 k_8}$$
$$a_3 = \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}$$

Diagram 248:

$$\text{PO3.248} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{42}_{k_6 k_7 k_8 k_9 k_3 k_4} \Omega^{06}_{k_6 k_7 k_8 k_9 k_5 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5}} e^{-\tau_2 \epsilon_{k_3 k_4}^{k_6 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{42}_{k_6 k_7 k_8 k_9 k_3 k_4} \Omega^{06}_{k_6 k_7 k_8 k_9 k_5 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_2 k_5} \; \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}} \tag{500}$$
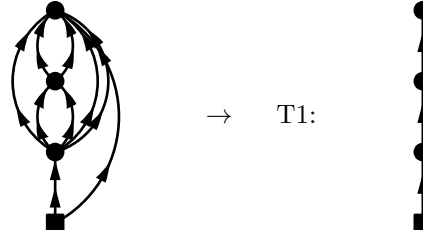

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{501}$$

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$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$
$$a_2 = \epsilon_{k_3 k_4}^{k_6 k_7 k_8 k_9}$$
$$a_3 = \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}$$

Diagram 249:

$$\text{PO3.249} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{51}_{k_3 k_4 k_5 k_6 k_7 k_1} \Omega^{22}_{k_8 k_9 k_3 k_4} \Omega^{06}_{k_8 k_9 k_5 k_6 k_7 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_3 k_4}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{51}_{k_3 k_4 k_5 k_6 k_7 k_1} \Omega^{22}_{k_8 k_9 k_3 k_4} \Omega^{06}_{k_8 k_9 k_5 k_6 k_7 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_2 k_5 k_6 k_7} \; \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}} \tag{502}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{503}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_3 k_4}^{k_8 k_9}$$
$$a_3 = \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}$$

Diagram 250:

$$\text{PO3.250} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{33}_{k_6 k_7 k_8 k_3 k_4 k_5} \Omega^{04}_{k_6 k_7 k_8 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5}^{k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_2 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(3!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{33}_{k_6 k_7 k_8 k_3 k_4 k_5} \Omega^{04}_{k_6 k_7 k_8 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_2} \; \epsilon_{k_2 k_6 k_7 k_8}} \tag{504}$$

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$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{505}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$
$$a_2 = \epsilon_{k_3 k_4 k_5}^{k_6 k_7 k_8}$$
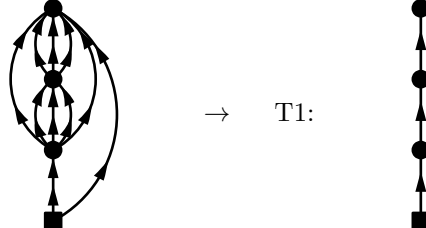$$a_3 = \epsilon_{k_2 k_6 k_7 k_8}$$

Diagram 251:

$$\text{PO3.251} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_3 k_4 k_5}^{13} \Omega_{k_8 k_6 k_7 k_2}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5}^{k_8}} e^{-\tau_3 \epsilon_{k_2 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_3 k_4 k_5}^{13} \Omega_{k_8 k_6 k_7 k_2}^{04}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_5 k_2 k_6 k_7} \ \epsilon_{k_2 k_6 k_7 k_8}} \tag{506}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{507}$$

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$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7}_{k_1}$$
$$a_2 = \epsilon^{k_8}_{k_3 k_4 k_5}$$
$$a_3 = \epsilon_{k_2 k_6 k_7 k_8}$$

Diagram 252:

$$\text{PO3.252} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{51}_{k_3 k_4 k_5 k_6 k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_3 k_4 k_5} \Omega^{06}_{k_8 k_9 k_{10} k_6 k_7 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7}_{k_1}} e^{-\tau_2 \epsilon^{k_8 k_9 k_{10}}_{k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_2 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{51}_{k_3 k_4 k_5 k_6 k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_3 k_4 k_5} \Omega^{06}_{k_8 k_9 k_{10} k_6 k_7 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_2 k_6 k_7} \; \epsilon_{k_2 k_6 k_7 k_8 k_9 k_{10}}} \tag{508}$$
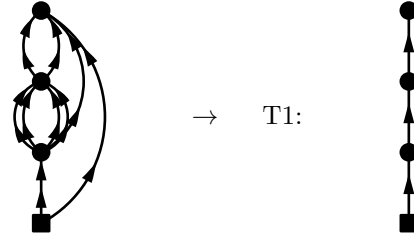

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{509}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7}_{k_1}$$
$$a_2 = \epsilon^{k_8 k_9 k_{10}}_{k_3 k_4 k_5}$$
$$a_3 = \epsilon_{k_2 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 253:

$$\text{PO3.253} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{51}_{k_3 k_4 k_5 k_6 k_7 k_1} \Omega^{24}_{k_8 k_9 k_3 k_4 k_5 k_6} \Omega^{04}_{k_8 k_9 k_7 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7}_{k_1}} e^{-\tau_2 \epsilon^{k_8 k_9}_{k_3 k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_2 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{51}_{k_3 k_4 k_5 k_6 k_7 k_1} \Omega^{24}_{k_8 k_9 k_3 k_4 k_5 k_6} \Omega^{04}_{k_8 k_9 k_7 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6 k_2 k_7} \; \epsilon_{k_2 k_7 k_8 k_9}} \tag{510}$$

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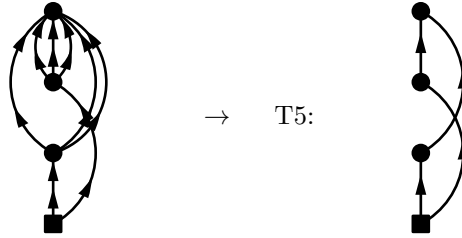$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{511}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_3 k_4 k_5 k_6}^{k_8 k_9}$$
$$a_3 = \epsilon_{k_2 k_7 k_8 k_9}$$

Diagram 254:

$$\text{PO3.254} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2(3!)^2} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_1}^{31} \Omega_{k_6 k_7 k_8 k_2}^{31} \Omega_{k_6 k_7 k_8 k_3 k_4 k_5}^{06} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5}} e^{-\tau_2 \epsilon_{k_2}^{k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{2(3!)^2} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_1}^{31} \Omega_{k_6 k_7 k_8 k_2}^{31} \Omega_{k_6 k_7 k_8 k_3 k_4 k_5}^{06} \left[\frac{1}{\epsilon_{k_1 k_6 k_7 k_8} \ \epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2} \ \epsilon_{k_2 k_3 k_4 k_5} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} \right] \tag{512}$$

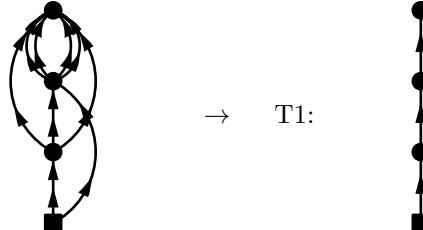$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{513}$$

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$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$

$$a_2 = \epsilon_{k_2}^{k_6 k_7 k_8}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}$$

Diagram 255:

$$\text{PO3.255} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{42}_{k_6 k_7 k_8 k_9 k_3 k_2} \Omega^{06}_{k_6 k_7 k_8 k_9 k_4 k_5} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5}} e^{-\tau_2 \epsilon_{k_2 k_3}^{k_6 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{42}_{k_6 k_7 k_8 k_9 k_3 k_2} \Omega^{06}_{k_6 k_7 k_8 k_9 k_4 k_5}}{\epsilon_{k_1 k_2} \; \epsilon_{k_2 k_3 k_4 k_5} \; \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \tag{514}$$

$$\to \quad \text{T1:}$$
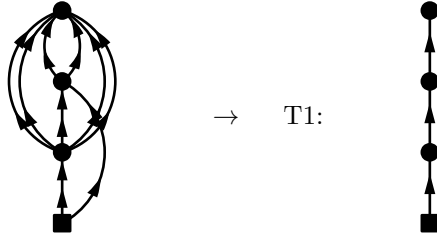
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{515}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$

$$a_2 = \epsilon_{k_2 k_3}^{k_6 k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 256:

$$\text{PO3.256} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{51}_{k_3 k_4 k_5 k_6 k_7 k_1} \Omega^{22}_{k_8 k_9 k_3 k_2} \Omega^{06}_{k_8 k_9 k_4 k_5 k_6 k_7} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{51}_{k_3 k_4 k_5 k_6 k_7 k_1} \Omega^{22}_{k_8 k_9 k_3 k_2} \Omega^{06}_{k_8 k_9 k_4 k_5 k_6 k_7}}{\epsilon_{k_1 k_2} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \; \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \tag{516}$$

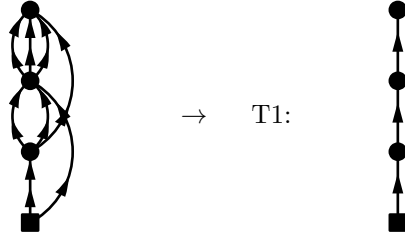$$T1 = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{517}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_3}^{k_8 k_9}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 257:

$$\text{PO3.257} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{33}_{k_6 k_7 k_8 k_3 k_4 k_2} \Omega^{04}_{k_6 k_7 k_8 k_5} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{31}_{k_3 k_4 k_5 k_1} \Omega^{33}_{k_6 k_7 k_8 k_3 k_4 k_2} \Omega^{04}_{k_6 k_7 k_8 k_5}}{\epsilon_{k_1 k_2} \ \epsilon_{k_2 k_3 k_4 k_5} \ \epsilon_{k_5 k_6 k_7 k_8}} \tag{518}$$
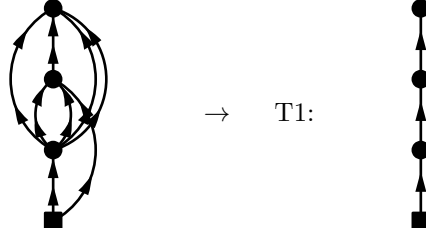

$$T1 = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{519}$$

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$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$
$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_6 k_7 k_8}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8}$$

Diagram 258:

$$\text{PO3.258} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_3 k_4 k_2}^{13} \Omega_{k_8 k_5 k_6 k_7}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_8}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_3 k_4 k_2}^{13} \Omega_{k_8 k_5 k_6 k_7}^{04}}{\epsilon_{k_1 k_2} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_5 k_6 k_7 k_8}} \tag{520}$$
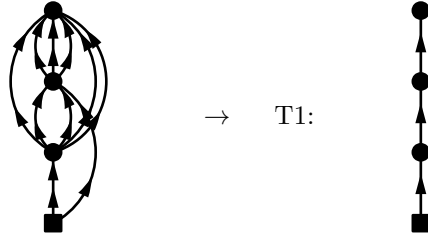

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{521}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_8}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8}$$

Diagram 259:

$$\text{PO3.259} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_9 k_{10} k_3 k_4 k_2}^{33} \Omega_{k_8 k_9 k_{10} k_5 k_6 k_7}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_9 k_{10} k_3 k_4 k_2}^{33} \Omega_{k_8 k_9 k_{10} k_5 k_6 k_7}^{06}}{\epsilon_{k_1 k_2} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \tag{522}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{523}$$
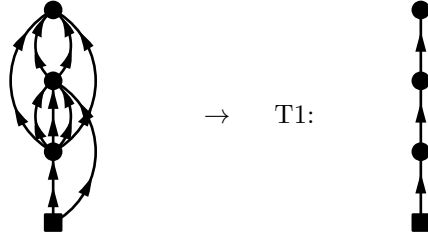
$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 260:

$$\text{PO3.260} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_9 k_3 k_4 k_5 k_2}^{24} \Omega_{k_8 k_9 k_6 k_7}^{04} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_9 k_3 k_4 k_5 k_2}^{24} \Omega_{k_8 k_9 k_6 k_7}^{04}}{\epsilon_{k_1 k_2} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_6 k_7 k_8 k_9}} \tag{524}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{525}$$

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$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}$$

$$a_2 = \epsilon_{k_2 k_3 k_4 k_5}^{k_8 k_9}$$

$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 261:

$$\text{PO3.261} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{22}_{k_3 k_4 k_1 k_2} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_3} \Omega^{06}_{k_5 k_6 k_7 k_8 k_9 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_3 k_4}} e^{-\tau_2 \epsilon_{k_3}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{22}_{k_3 k_4 k_1 k_2} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_3} \Omega^{06}_{k_5 k_6 k_7 k_8 k_9 k_4}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4} \; \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \tag{526}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{527}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_3 k_4}$$

$$a_2 = \epsilon_{k_3}^{k_5 k_6 k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 262:

$$\text{PO3.262} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{31}_{k_7 k_8 k_9 k_3} \Omega^{06}_{k_7 k_8 k_9 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon_{k_3}^{k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{31}_{k_7 k_8 k_9 k_3} \Omega^{06}_{k_7 k_8 k_9 k_4 k_5 k_6}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \tag{528}$$
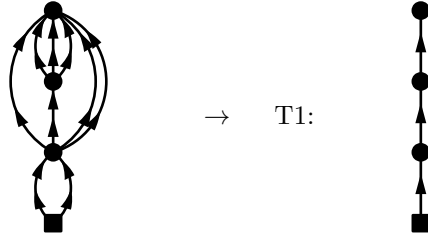
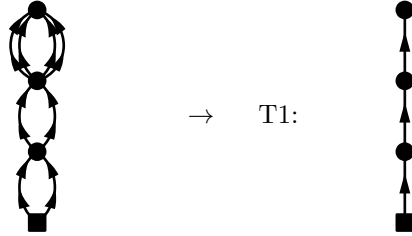$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{529}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_3 k_4 k_5 k_6}$$
$$a_2 = \epsilon_{k_3}^{k_7 k_8 k_9}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 263:

$$\text{PO3.263} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{22}_{k_3 k_4 k_1 k_2} \Omega^{42}_{k_5 k_6 k_7 k_8 k_3 k_4} \Omega^{04}_{k_5 k_6 k_7 k_8} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_3 k_4}} e^{-\tau_2 \epsilon_{k_3 k_4}^{k_5 k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{22}_{k_3 k_4 k_1 k_2} \Omega^{42}_{k_5 k_6 k_7 k_8 k_3 k_4} \Omega^{04}_{k_5 k_6 k_7 k_8}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4} \; \epsilon_{k_5 k_6 k_7 k_8}} \tag{530}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{531}$$

$$a_1 = \epsilon^{k_3 k_4}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_5 k_6 k_7 k_8}_{k_3 k_4}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8}$$

Diagram 264:

$$\text{PO3.264} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^4} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{22}_{k_7 k_8 k_3 k_4} \Omega^{04}_{k_7 k_8 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^4} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{22}_{k_7 k_8 k_3 k_4} \Omega^{04}_{k_7 k_8 k_5 k_6}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_6 k_7 k_8}} \tag{532}$$

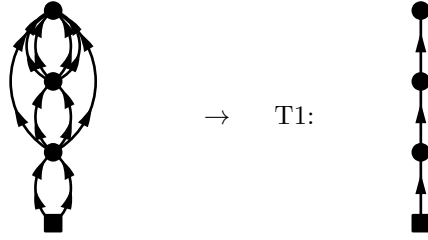$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{533}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_7 k_8}_{k_3 k_4}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8}$$

Diagram 265:

$$\text{PO3.265} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_3 k_4} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9 k_{10}}_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_3 k_4} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_5 k_6}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \tag{534}$$

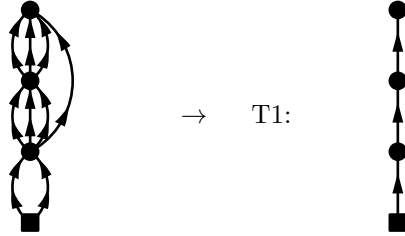$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{535}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_7 k_8 k_9 k_{10}}_{k_3 k_4}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 266:

$$\text{PO3.266} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{33}_{k_7 k_8 k_9 k_3 k_4 k_5} \Omega^{04}_{k_7 k_8 k_9 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9}_{k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{33}_{k_7 k_8 k_9 k_3 k_4 k_5} \Omega^{04}_{k_7 k_8 k_9 k_6}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7 k_8 k_9}} \tag{536}$$

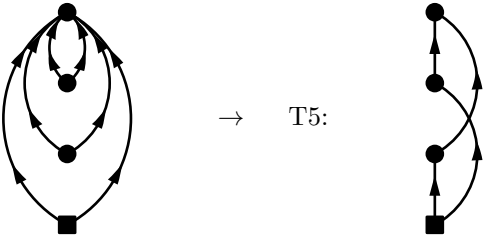$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{537}$$

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$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}_{k_1 k_2}$$

$$a_2 = \epsilon^{k_7 k_8 k_9}_{k_3 k_4 k_5}$$

$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

3.3 Three-body non-canonical diagrams

Diagram 267:

$$\text{PO3.267} = \lim_{\tau \to \infty} \frac{(-1)^3}{2(2!)^3} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{06}_{k_5 k_6 k_3 k_4 k_1 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6}} e^{-\tau_3 \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{2(2!)^3} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{06}_{k_5 k_6 k_3 k_4 k_1 k_2} \left[\frac{1}{\epsilon_{k_1 k_2 k_5 k_6} \ \epsilon_{k_1 k_2} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6}} + \frac{1}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6}} \right] \tag{538}$$

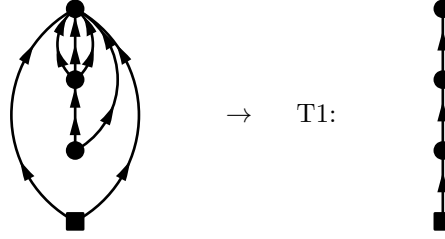

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{539}$$

$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon^{k_5 k_6}$$

$$a_3 = \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6}$$

Diagram 268:

$$\text{PO3.268} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_3} \Omega^{06}_{k_5 k_6 k_7 k_4 k_1 k_2} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6 k_7}_{k_3}} e^{-\tau_3 \epsilon_{k_1 k_2 k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_3} \Omega^{06}_{k_5 k_6 k_7 k_4 k_1 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_1 k_2 k_4} \ \epsilon_{k_1 k_2 k_4 k_5 k_6 k_7}} \tag{540}$$
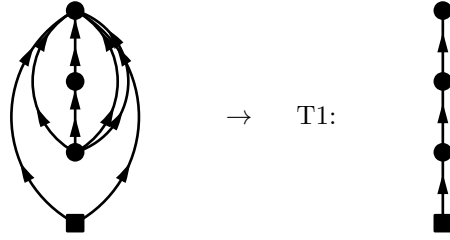

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{541}$$

$$a_1 = \epsilon^{k_3 k_4}$$
$$a_2 = \epsilon^{k_5 k_6 k_7}_{k_3}$$
$$a_3 = \epsilon_{k_1 k_2 k_4 k_5 k_6 k_7}$$

Diagram 269:

$$\text{PO3.269} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_3} \Omega^{06}_{k_7 k_4 k_5 k_6 k_1 k_2} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_3}} e^{-\tau_3 \epsilon_{k_1 k_2 k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_3} \Omega^{06}_{k_7 k_4 k_5 k_6 k_1 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_1 k_2 k_4 k_5 k_6} \ \epsilon_{k_1 k_2 k_4 k_5 k_6 k_7}} \tag{542}$$

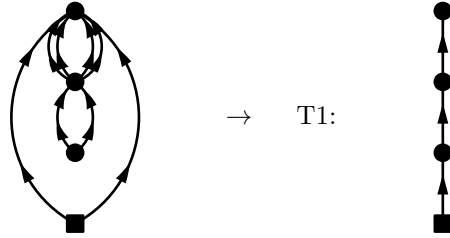$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{543}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$
$$a_2 = \epsilon^{k_7}_{k_3}$$
$$a_3 = \epsilon_{k_1 k_2 k_4 k_5 k_6 k_7}$$

Diagram 270:

$$\text{PO3.270} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_3 k_4} \Omega^{06}_{k_5 k_6 k_7 k_8 k_1 k_2} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6 k_7 k_8}_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_1 k_2 k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_3 k_4} \Omega^{06}_{k_5 k_6 k_7 k_8 k_1 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_1 k_2} \; \epsilon_{k_1 k_2 k_5 k_6 k_7 k_8}} \tag{544}$$
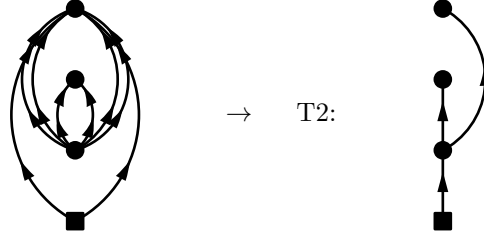

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{545}$$

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$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon^{k_5 k_6 k_7 k_8}_{k_3 k_4}$$

$$a_3 = \epsilon_{k_1 k_2 k_5 k_6 k_7 k_8}$$

Diagram 271:

$$\text{PO3.271} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{02}_{k_3 k_4} \Omega^{06}_{k_5 k_6 k_7 k_8 k_1 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_1 k_2 k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2 (4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{02}_{k_3 k_4} \Omega^{06}_{k_5 k_6 k_7 k_8 k_1 k_2}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4} \; \epsilon_{k_1 k_2 k_5 k_6 k_7 k_8}} \tag{546}$$
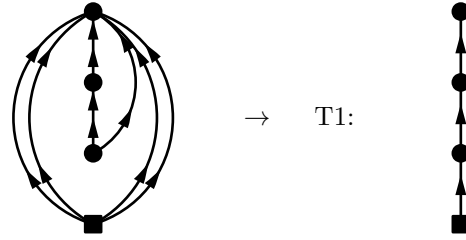

$$\to \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3) a_2 a_3} \tag{547}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_4}$$

$$a_3 = \epsilon_{k_1 k_2 k_5 k_6 k_7 k_8}$$

Diagram 272:

$$\text{PO3.272} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{11}_{k_7 k_5} \Omega^{06}_{k_7 k_6 k_1 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_5}} e^{-\tau_3 \epsilon_{k_1 k_2 k_3 k_4 k_6 k_7}}$$

$$= \frac{(-1)^3}{(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{11}_{k_7 k_5} \Omega^{06}_{k_7 k_6 k_1 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_1 k_2 k_3 k_4 k_6} \; \epsilon_{k_1 k_2 k_3 k_4 k_6 k_7}} \tag{548}$$

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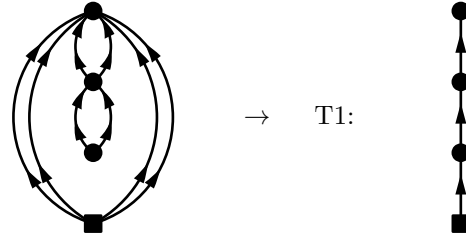$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{549}$$

$$a_1 = \epsilon^{k_5 k_6}$$
$$a_2 = \epsilon^{k_7}_{k_5}$$
$$a_3 = \epsilon_{k_1 k_2 k_3 k_4 k_6 k_7}$$

Diagram 273:

$$\text{PO3.273} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{22}_{k_7 k_8 k_5 k_6} \Omega^{06}_{k_7 k_8 k_1 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_1 k_2 k_3 k_4 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{22}_{k_7 k_8 k_5 k_6} \Omega^{06}_{k_7 k_8 k_1 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_3 k_4 k_7 k_8}} \tag{550}$$
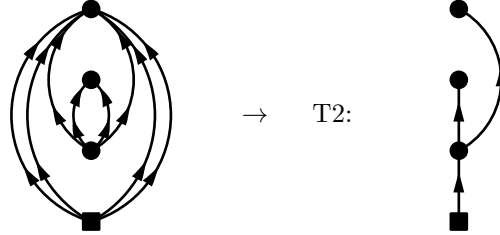

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{551}$$

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$$a_1 = \epsilon^{k_5 k_6}$$

$$a_2 = \epsilon^{k_7 k_8}_{k_5 k_6}$$

$$a_3 = \epsilon_{k_1 k_2 k_3 k_4 k_7 k_8}$$

Diagram 274:

$$\text{PO3.274} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{02}_{k_5 k_6} \Omega^{06}_{k_7 k_8 k_1 k_2 k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_1 k_2 k_3 k_4 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{02}_{k_5 k_6} \Omega^{06}_{k_7 k_8 k_1 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_5 k_6} \; \epsilon_{k_1 k_2 k_3 k_4 k_7 k_8}} \tag{552}$$

$$\rightarrow \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3) a_2 a_3} \tag{553}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_5 k_6}$$

$$a_3 = \epsilon_{k_1 k_2 k_3 k_4 k_7 k_8}$$

Diagram 275:

$$\text{PO3.275} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{06}_{k_5 k_6 k_7 k_3 k_4 k_2} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6 k_7}_{k_1}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{06}_{k_5 k_6 k_7 k_3 k_4 k_2} \left[\frac{1}{\epsilon_{k_2 k_5 k_6 k_7} \; \epsilon_{k_1 k_2} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}} + \frac{1}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}} \right] \tag{554}$$

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$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{555}$$

$$a_1 = \epsilon^{k_3 k_4}$$
$$a_2 = \epsilon^{k_5 k_6 k_7}_{k_1}$$
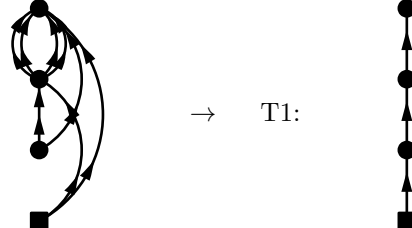$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}$$

Diagram 276:

$$\text{PO3.276} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{06}_{k_7 k_3 k_4 k_5 k_6 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_1}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{06}_{k_7 k_3 k_4 k_5 k_6 k_2} \left[\frac{1}{\epsilon_{k_2 k_7} \; \epsilon_{k_1 k_2} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}} + \frac{1}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}} \right] \tag{556}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{557}$$

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$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon^{k_7}_{k_1}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}$$

Diagram 277:

$$\text{PO3.277} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_3 k_1} \Omega^{06}_{k_5 k_6 k_7 k_8 k_4 k_2} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_3}} e^{-\tau_3 \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_3 k_1} \Omega^{06}_{k_5 k_6 k_7 k_8 k_4 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_3 k_2 k_4} \ \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}} \tag{558}$$

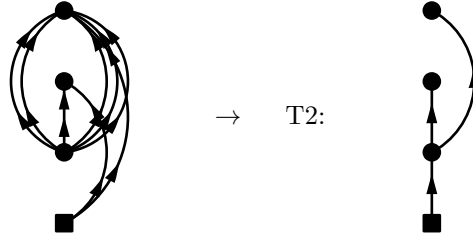$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{559}$$

$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_3}$$

$$a_3 = \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}$$

Diagram 278:

$$\text{PO3.278} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(5!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{02}_{k_3 k_1} \Omega^{06}_{k_4 k_5 k_6 k_7 k_8 k_2} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_1 k_3}} e^{-\tau_3 \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(5!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{60}_{k_3 k_4 k_5 k_6 k_7 k_8} \Omega^{02}_{k_3 k_1} \Omega^{06}_{k_4 k_5 k_6 k_7 k_8 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_3} \ \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}} \tag{560}$$

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$\rightarrow$ T2:

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{561}$$

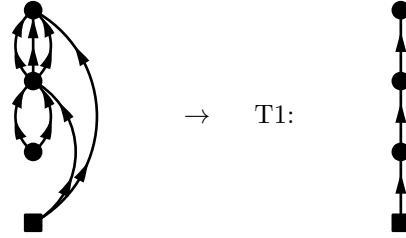$$a_1 = \epsilon^{k_3 k_4 k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon_{k_1 k_3}$$
$$a_3 = \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}$$

Diagram 279:

$$\text{PO3.279} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_3 k_4 k_1} \Omega^{04}_{k_5 k_6 k_7 k_2} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6 k_7}_{k_1 k_3 k_4}} e^{-\tau_3 \epsilon_{k_2 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_3 k_4 k_1} \Omega^{04}_{k_5 k_6 k_7 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_3 k_4 k_2} \ \epsilon_{k_2 k_5 k_6 k_7}} \tag{562}$$

$\rightarrow$ T1:

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{563}$$

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$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon^{k_5 k_6 k_7}_{k_1 k_3 k_4}$$

$$a_3 = \epsilon_{k_2 k_5 k_6 k_7}$$

Diagram 280:

$$\text{PO3.280} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_3 k_4 k_5 k_6 k_1} \Omega^{02}_{k_7 k_2} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_1 k_3 k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_2 k_7}}$$

$$= \frac{(-1)^3}{(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_3 k_4 k_5 k_6 k_1} \Omega^{02}_{k_7 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_3 k_4 k_5 k_6 k_2} \ \epsilon_{k_2 k_7}} \qquad (564)$$

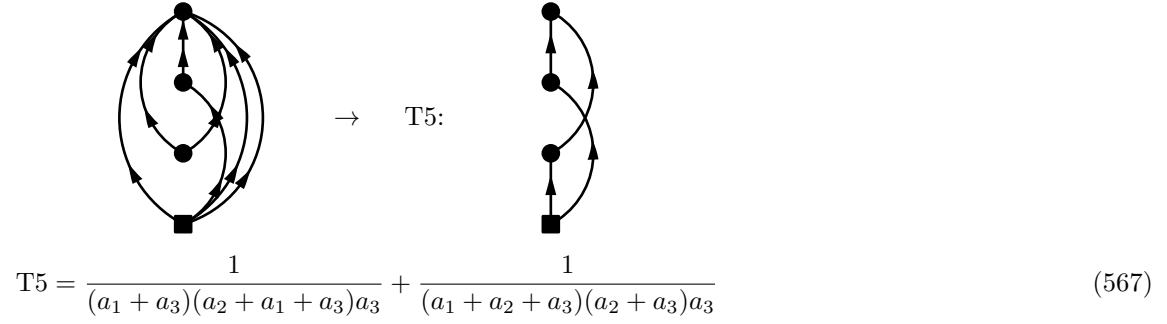$$\to \qquad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \qquad (565)$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon^{k_7}_{k_1 k_3 k_4 k_5 k_6}$$

$$a_3 = \epsilon_{k_2 k_7}$$

Diagram 281:

$$\text{PO3.281} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{06}_{k_7 k_5 k_6 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_1}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{06}_{k_7 k_5 k_6 k_2 k_3 k_4} \left[\frac{1}{\epsilon_{k_2 k_3 k_4 k_7} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}} \right]$$
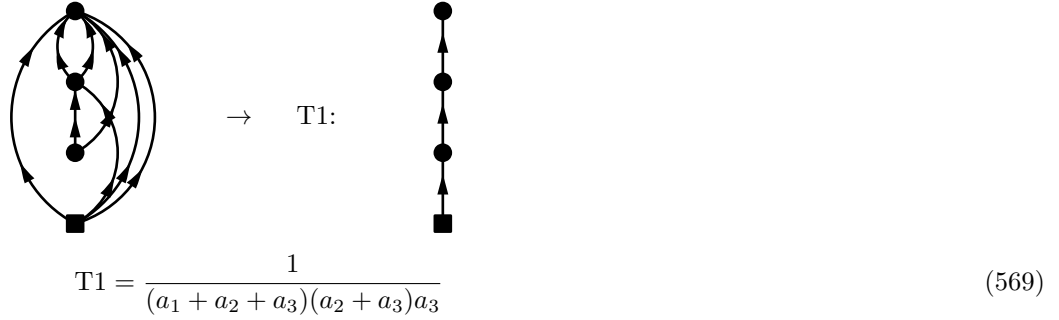
$$(566)$$

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$$T5 = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{567}$$

$$a_1 = \epsilon^{k_5 k_6}$$
$$a_2 = \epsilon^{k_7}_{k_1}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7}$$

Diagram 282:

$$\text{PO3.282} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{22}_{k_7 k_8 k_5 k_1} \Omega^{06}_{k_7 k_8 k_6 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_1 k_5}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{22}_{k_7 k_8 k_5 k_1} \Omega^{06}_{k_7 k_8 k_6 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_5 k_2 k_3 k_4 k_6} \; \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}} \tag{568}$$
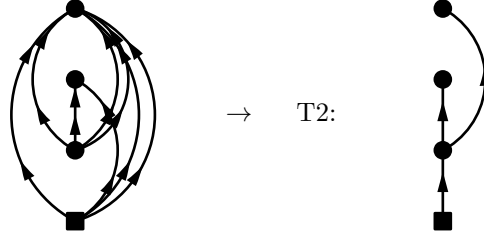

$$T1 = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{569}$$

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$$a_1 = \epsilon^{k_5 k_6}$$

$$a_2 = \epsilon^{k_7 k_8}_{k_1 k_5}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}$$

Diagram 283:

$$\text{PO3.283} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{02}_{k_5 k_1} \Omega^{06}_{k_6 k_7 k_8 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_1 k_5}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{02}_{k_5 k_1} \Omega^{06}_{k_6 k_7 k_8 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_5} \ \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}} \tag{570}$$

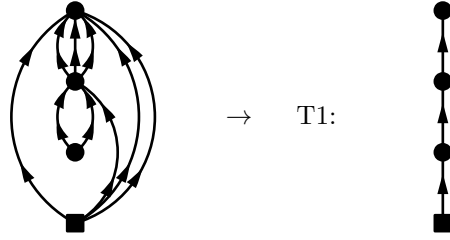$$\to \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3) a_2 a_3} \tag{571}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_1 k_5}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}$$

Diagram 284:

$$\text{PO3.284} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_5 k_6 k_1} \Omega^{06}_{k_7 k_8 k_9 k_2 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9}_{k_1 k_5 k_6}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_5 k_6 k_1} \Omega^{06}_{k_7 k_8 k_9 k_2 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_5 k_6 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}} \tag{572}$$

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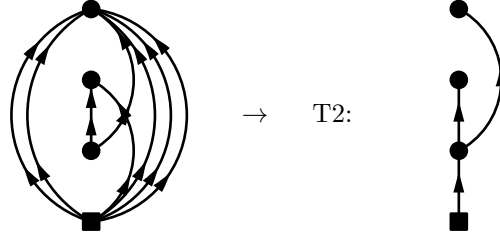$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{573}$$

$$a_1 = \epsilon^{k_5 k_6}$$
$$a_2 = \epsilon^{k_7 k_8 k_9}_{k_1 k_5 k_6}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}$$

Diagram 285:

$$\text{PO3.285} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{02}_{k_7 k_1} \Omega^{06}_{k_8 k_2 k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_1 k_7}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_8}}$$

$$= \frac{-(-1)^3}{(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{02}_{k_7 k_1} \Omega^{06}_{k_8 k_2 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_1 k_7} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_8}} \tag{574}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{575}$$

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$$a_1 = \epsilon^{k_7 k_8}$$

$$a_2 = \epsilon_{k_1 k_7}$$
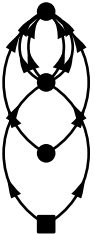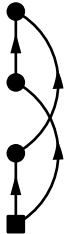
$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_8}$$

Diagram 286:

$$\text{PO3.286} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{13}_{k_9 k_7 k_8 k_1} \Omega^{06}_{k_9 k_2 k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_7 k_8}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_9}}$$

$$= \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{13}_{k_9 k_7 k_8 k_1} \Omega^{06}_{k_9 k_2 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_1 k_7 k_8 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_4 k_5 k_6 k_9}} \tag{576}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{577}$$

$$a_1 = \epsilon^{k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_7 k_8}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_9}$$

Diagram 287:

$$\text{PO3.287} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{06}_{k_5 k_6 k_7 k_8 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{06}_{k_5 k_6 k_7 k_8 k_3 k_4} \left[\frac{1}{\epsilon_{k_5 k_6 k_7 k_8} \; \epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} \right] \tag{578}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{579}$$

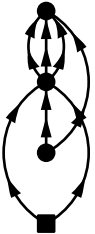$$a_1 = \epsilon^{k_3 k_4}$$
$$a_2 = \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2}$$
$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}$$

Diagram 288:

$$\text{PO3.288} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_3 k_1 k_2} \Omega^{04}_{k_5 k_6 k_7 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_3 k_1 k_2} \Omega^{04}_{k_5 k_6 k_7 k_4}}{\epsilon_{k_1 k_2} \; \epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_4 k_5 k_6 k_7}} \tag{580}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{581}$$

$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_7}$$

Diagram 289:

$$\text{PO3.289} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{24}_{k_5 k_6 k_3 k_4 k_1 k_2} \Omega^{02}_{k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4}} e^{-\tau_2 \epsilon^{k_5 k_6}_{k_1 k_2 k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)^3} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{20}_{k_3 k_4} \Omega^{24}_{k_5 k_6 k_3 k_4 k_1 k_2} \Omega^{02}_{k_5 k_6}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6}} \tag{582}$$

$$\rightarrow \qquad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{583}$$

$$a_1 = \epsilon^{k_3 k_4}$$

$$a_2 = \epsilon^{k_5 k_6}_{k_1 k_2 k_3 k_4}$$

$$a_3 = \epsilon_{k_5 k_6}$$

Diagram 290:

$$\text{PO3.290} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_3 k_4 k_5 k_1 k_2} \Omega^{02}_{k_7 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{40}_{k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_3 k_4 k_5 k_1 k_2} \Omega^{02}_{k_7 k_6}}{\epsilon_{k_1 k_2} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7}} \tag{584}$$

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$$\text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{585}$$
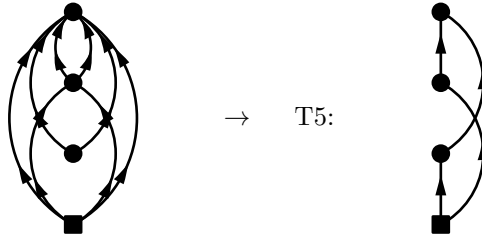
$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}$$
$$a_2 = \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}$$
$$a_3 = \epsilon_{k_6 k_7}$$

Diagram 291:

$$\text{PO3.291} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^4} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{06}_{k_7 k_8 k_5 k_6 k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_1 k_2}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^4} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{06}_{k_7 k_8 k_5 k_6 k_3 k_4} \left[\frac{1}{\epsilon_{k_3 k_4 k_7 k_8} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} \right] \tag{586}$$
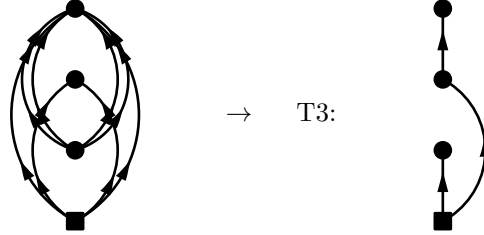

$$\text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{587}$$

$$a_1 = \epsilon^{k_5 k_6}$$

$$a_2 = \epsilon^{k_7 k_8}_{k_1 k_2}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}$$

Diagram 292:

$$\text{PO3.292} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{02}_{k_1 k_2} \Omega^{06}_{k_5 k_6 k_7 k_8 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_1 k_2}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{40}_{k_5 k_6 k_7 k_8} \Omega^{02}_{k_1 k_2} \Omega^{06}_{k_5 k_6 k_7 k_8 k_3 k_4}}{\epsilon^{k_5 k_6 k_7 k_8} \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8} \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} \tag{588}$$

$$\to \quad \text{T3:}$$
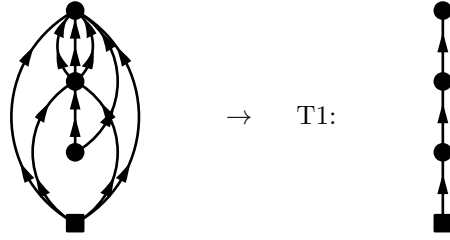
$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{589}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_1 k_2}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}$$

Diagram 293:

$$\text{PO3.293} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_5 k_1 k_2} \Omega^{06}_{k_7 k_8 k_9 k_6 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_5}} e^{-\tau_3 \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_5 k_1 k_2} \Omega^{06}_{k_7 k_8 k_9 k_6 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \epsilon_{k_1 k_2 k_5 k_3 k_4 k_6} \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}} \tag{590}$$

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$$\rightarrow \quad \text{T1:}$$

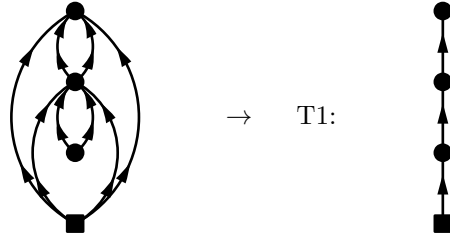$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{591}$$

$$a_1 = \epsilon^{k_5 k_6}$$
$$a_2 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_5}$$
$$a_3 = \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}$$

Diagram 294:

$$\text{PO3.294} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^4} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{24}_{k_7 k_8 k_5 k_6 k_1 k_2} \Omega^{04}_{k_7 k_8 k_3 k_4} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_1 k_2 k_5 k_6}} e^{-\tau_3 \epsilon_{k_3 k_4 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^4} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{24}_{k_7 k_8 k_5 k_6 k_1 k_2} \Omega^{04}_{k_7 k_8 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_5 k_6 k_3 k_4} \ \epsilon_{k_3 k_4 k_7 k_8}} \tag{592}$$
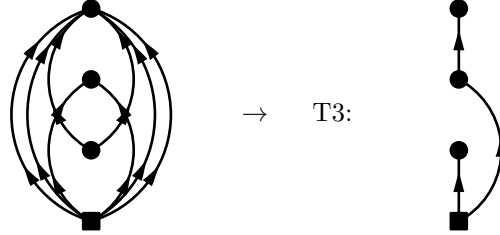

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{593}$$

$$a_1 = \epsilon^{k_5 k_6}$$

$$a_2 = \epsilon^{k_7 k_8}_{k_1 k_2 k_5 k_6}$$

$$a_3 = \epsilon_{k_3 k_4 k_7 k_8}$$

Diagram 295:

$$\text{PO3.295} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{02}_{k_1 k_2} \Omega^{06}_{k_7 k_8 k_3 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_1 k_2}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2 (4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{02}_{k_1 k_2} \Omega^{06}_{k_7 k_8 k_3 k_4 k_5 k_6}}{\epsilon^{k_7 k_8} \; \epsilon_{k_1 k_2} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8}} \tag{594}$$

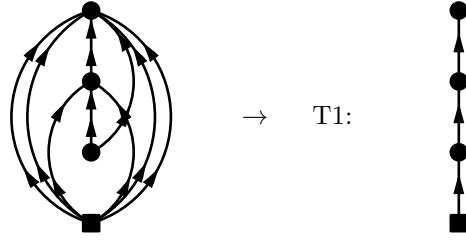$$\to \quad \text{T3:}$$

$$\text{T3} = \frac{1}{a_1 (a_2 + a_3) a_3} \tag{595}$$

$$a_1 = \epsilon^{k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}$$

$$a_3 = \epsilon_{k_1 k_2}$$

Diagram 296:

$$\text{PO3.296} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{13}_{k_9 k_7 k_1 k_2} \Omega^{06}_{k_9 k_8 k_3 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_7}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{13}_{k_9 k_7 k_1 k_2} \Omega^{06}_{k_9 k_8 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_1 k_2 k_7 k_3 k_4 k_5 k_6 k_8} \; \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}} \tag{596}$$

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$\rightarrow$ T1:

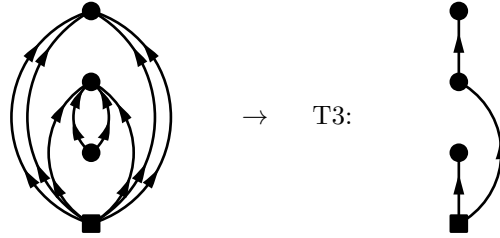$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{597}$$

$$a_1 = \epsilon^{k_7 k_8}$$
$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_7}$$
$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}$$

Diagram 297:

$$\text{PO3.297} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{04}_{k_7 k_8 k_1 k_2} \Omega^{04}_{k_3 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_1 k_2 k_7 k_8}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{04}_{k_7 k_8 k_1 k_2} \Omega^{04}_{k_3 k_4 k_5 k_6}}{\epsilon^{k_7 k_8} \, \epsilon_{k_1 k_2 k_7 k_8 k_3 k_4 k_5 k_6} \, \epsilon_{k_3 k_4 k_5 k_6}} \tag{598}$$
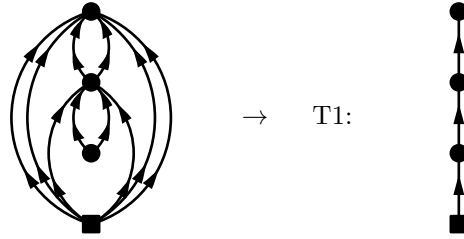

$\rightarrow$ T3:

$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{599}$$

$$a_1 = \epsilon^{k_7 k_8}$$

$$a_2 = \epsilon_{k_1 k_2 k_7 k_8}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6}$$

Diagram 298:

$$\text{PO3.298} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{24}_{k_9 k_{10} k_7 k_8 k_1 k_2} \Omega^{06}_{k_9 k_{10} k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_1 k_2 k_7 k_8}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{24}_{k_9 k_{10} k_7 k_8 k_1 k_2} \Omega^{06}_{k_9 k_{10} k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_1 k_2 k_7 k_8 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}} \tag{600}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{601}$$

$$a_1 = \epsilon^{k_7 k_8}$$

$$a_2 = \epsilon^{k_9 k_{10}}_{k_1 k_2 k_7 k_8}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}$$

Diagram 299:

$$\text{PO3.299} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{06}_{k_7 k_8 k_9 k_5 k_6 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{06}_{k_7 k_8 k_9 k_5 k_6 k_4} \left[\frac{1}{\epsilon_{k_4 k_7 k_8 k_9} \; \epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \right] \tag{602}$$

$$T5 = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{603}$$

$$a_1 = \epsilon^{k_5 k_6}$$
$$a_2 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$
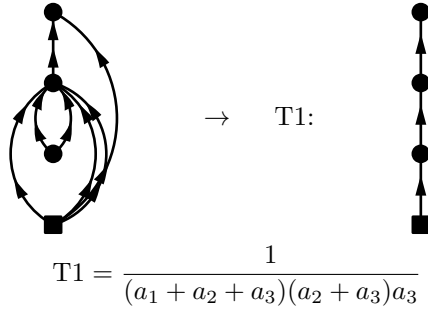$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 300:

$$\text{PO3.300} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{24}_{k_7 k_8 k_5 k_1 k_2 k_3} \Omega^{04}_{k_7 k_8 k_6 k_4} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_5}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{24}_{k_7 k_8 k_5 k_1 k_2 k_3} \Omega^{04}_{k_7 k_8 k_6 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_3 k_5 k_4 k_6} \ \epsilon_{k_4 k_6 k_7 k_8}} \tag{604}$$

$$T1 = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{605}$$

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$$a_1 = \epsilon^{k_5 k_6}$$

$$a_2 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_5}$$

$$a_3 = \epsilon_{k_4 k_6 k_7 k_8}$$

Diagram 301:

$$\text{PO3.301} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{15}_{k_7 k_5 k_6 k_1 k_2 k_3} \Omega^{02}_{k_7 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_1 k_2 k_3 k_5 k_6}} e^{-\tau_3 \epsilon_{k_4 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{15}_{k_7 k_5 k_6 k_1 k_2 k_3} \Omega^{02}_{k_7 k_4}}{\epsilon_{k_1 k_2 k_3 k_4}\ \epsilon_{k_1 k_2 k_3 k_5 k_6 k_4}\ \epsilon_{k_4 k_7}} \tag{606}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{607}$$

$$a_1 = \epsilon^{k_5 k_6}$$

$$a_2 = \epsilon^{k_7}_{k_1 k_2 k_3 k_5 k_6}$$

$$a_3 = \epsilon_{k_4 k_7}$$

Diagram 302:

$$\text{PO3.302} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{13}_{k_9 k_1 k_2 k_3} \Omega^{06}_{k_9 k_7 k_8 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{13}_{k_9 k_1 k_2 k_3} \Omega^{06}_{k_9 k_7 k_8 k_4 k_5 k_6} \left[\frac{1}{\epsilon_{k_4 k_5 k_6 k_9}\ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6}\ \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6}\ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8}\ \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \right] \tag{608}$$
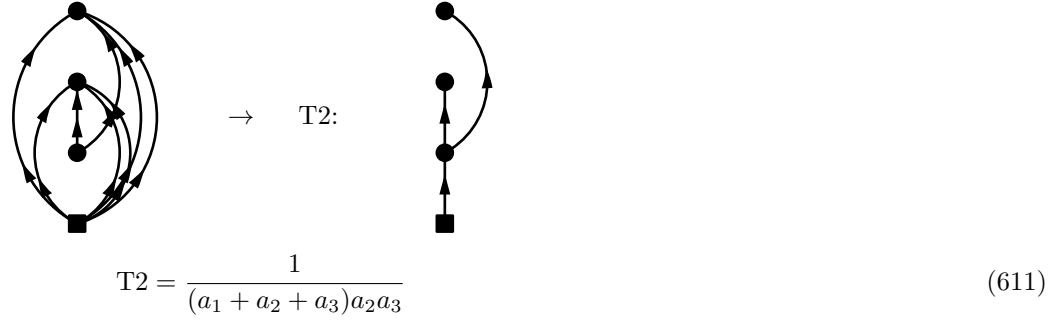
$\rightarrow$ T5:

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{609}$$

$$a_1 = \epsilon^{k_7 k_8}$$
$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_3}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 303:

$$\text{PO3.303} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{04}_{k_7 k_1 k_2 k_3} \Omega^{04}_{k_8 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_1 k_2 k_3 k_7}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8}}$$

$$= \frac{-(-1)^3}{2(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{04}_{k_7 k_1 k_2 k_3} \Omega^{04}_{k_8 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_1 k_2 k_3 k_7} \; \epsilon_{k_4 k_5 k_6 k_8}} \tag{610}$$
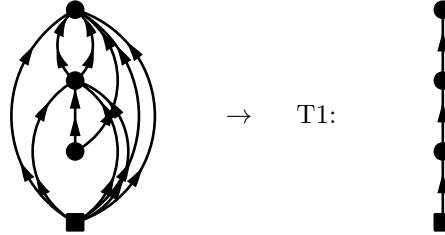

$\rightarrow$ T2:

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{611}$$

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$$a_1 = \epsilon^{k_7 k_8}$$

$$a_2 = \epsilon_{k_1 k_2 k_3 k_7}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_8}$$

Diagram 304:

$$\text{PO3.304} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{24}_{k_9 k_{10} k_7 k_1 k_2 k_3} \Omega^{06}_{k_9 k_{10} k_8 k_4 k_5 k_6} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_1 k_2 k_3 k_7}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{24}_{k_9 k_{10} k_7 k_1 k_2 k_3} \Omega^{06}_{k_9 k_{10} k_8 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_1 k_2 k_3 k_7 k_4 k_5 k_6 k_8} \ \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}} \tag{612}$$

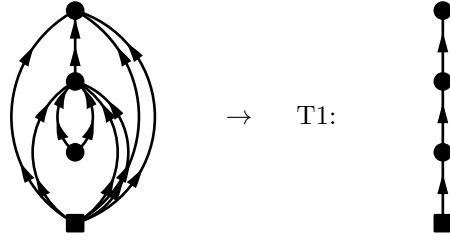$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3) a_3} \tag{613}$$

$$a_1 = \epsilon^{k_7 k_8}$$

$$a_2 = \epsilon^{k_9 k_{10}}_{k_1 k_2 k_3 k_7}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}$$

Diagram 305:

$$\text{PO3.305} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{15}_{k_9 k_7 k_8 k_1 k_2 k_3} \Omega^{04}_{k_9 k_4 k_5 k_6} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_3 k_7 k_8}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{15}_{k_9 k_7 k_8 k_1 k_2 k_3} \Omega^{04}_{k_9 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_1 k_2 k_3 k_7 k_8 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_6 k_9}} \tag{614}$$

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$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{615}$$
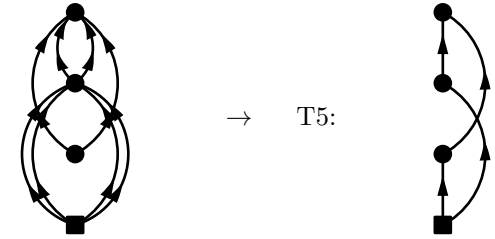
$$a_1 = \epsilon^{k_7 k_8}$$
$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_3 k_7 k_8}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_9}$$

Diagram 306:

$$\text{PO3.306} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{04}_{k_7 k_8 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{04}_{k_7 k_8 k_5 k_6} \left[\frac{1}{\epsilon_{k_7 k_8} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_5 k_6 k_7 k_8}} \right] \tag{616}$$
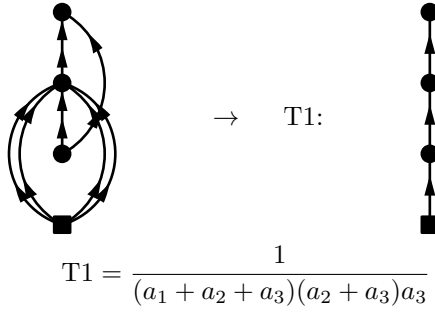

$$\rightarrow \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{617}$$

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$$a_1 = \epsilon^{k_5 k_6}$$

$$a_2 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$

$$a_3 = \epsilon_{k_5 k_6 k_7 k_8}$$

Diagram 307:

$$\text{PO3.307} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{15}_{k_7 k_5 k_1 k_2 k_3 k_4} \Omega^{02}_{k_7 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}} e^{-\tau_2 \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7}}$$

$$= \frac{(-1)^3}{(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{20}_{k_5 k_6} \Omega^{15}_{k_7 k_5 k_1 k_2 k_3 k_4} \Omega^{02}_{k_7 k_6}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_6 k_7}} \tag{618}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3) a_3} \tag{619}$$

$$a_1 = \epsilon^{k_5 k_6}$$

$$a_2 = \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}$$

$$a_3 = \epsilon_{k_6 k_7}$$

Diagram 308:

$$\text{PO3.308} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3 (4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{24}_{k_9 k_{10} k_1 k_2 k_3 k_4} \Omega^{06}_{k_9 k_{10} k_7 k_8 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_1 k_2 k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3 (4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{24}_{k_9 k_{10} k_1 k_2 k_3 k_4} \Omega^{06}_{k_9 k_{10} k_7 k_8 k_5 k_6} \left[\frac{1}{\epsilon_{k_5 k_6 k_9 k_{10}} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8} \; \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \right] \tag{620}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{621}$$

$$a_1 = \epsilon^{k_7 k_8}$$
$$a_2 = \epsilon^{k_9 k_{10}}_{k_1 k_2 k_3 k_4}$$
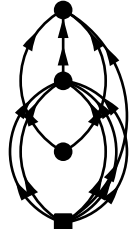$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 309:

$$\text{PO3.309} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{15}_{k_9 k_7 k_1 k_2 k_3 k_4} \Omega^{04}_{k_9 k_8 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_3 k_4 k_7}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{15}_{k_9 k_7 k_1 k_2 k_3 k_4} \Omega^{04}_{k_9 k_8 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_1 k_2 k_3 k_4 k_7 k_5 k_6 k_8} \; \epsilon_{k_5 k_6 k_8 k_9}} \tag{622}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{623}$$

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$$a_1 = \epsilon^{k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_3 k_4 k_7}$$

$$a_3 = \epsilon_{k_5 k_6 k_8 k_9}$$

Diagram 310:

$$\text{PO3.310} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{15}_{k_9 k_1 k_2 k_3 k_4 k_5} \Omega^{04}_{k_9 k_7 k_8 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}} e^{-\tau_2 \epsilon^{k_9}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{20}_{k_7 k_8} \Omega^{15}_{k_9 k_1 k_2 k_3 k_4 k_5} \Omega^{04}_{k_9 k_7 k_8 k_6} \left[\frac{1}{\epsilon_{k_6 k_9} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7 k_8 k_9}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_6 k_7 k_8 k_9}} \right]$$

(624)

$$\to \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3}$$

(625)

$$a_1 = \epsilon^{k_7 k_8}$$

$$a_2 = \epsilon^{k_9}_{k_1 k_2 k_3 k_4 k_5}$$

$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 311:

$$\text{PO3.311} = \lim_{\tau \to \infty} \frac{(-1)^3}{(5!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{11}_{k_3 k_1} \Omega^{51}_{k_4 k_5 k_6 k_7 k_8 k_3} \Omega^{06}_{k_4 k_5 k_6 k_7 k_8 k_2} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_3}_{k_1}} e^{-\tau_2 \epsilon^{k_4 k_5 k_6 k_7 k_8}_{k_3}} e^{-\tau_3 \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(5!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{11}_{k_3 k_1} \Omega^{51}_{k_4 k_5 k_6 k_7 k_8 k_3} \Omega^{06}_{k_4 k_5 k_6 k_7 k_8 k_2}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_2} \ \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}}$$
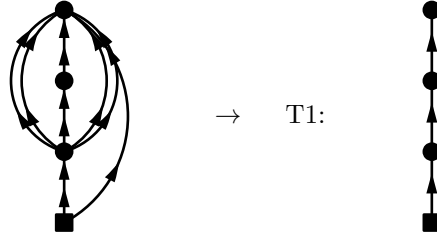
(626)

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$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{627}$$

$$a_1 = \epsilon_{k_1}^{k_3}$$
$$a_2 = \epsilon_{k_3}^{k_4 k_5 k_6 k_7 k_8}$$
$$a_3 = \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}$$

Diagram 312:

$$\text{PO3.312} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_3}^{11} \Omega_{k_8 k_4 k_5 k_6 k_7 k_2}^{06} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_3}^{k_8}} e^{-\tau_3 \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(4!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_3}^{11} \Omega_{k_8 k_4 k_5 k_6 k_7 k_2}^{06}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_2 k_4 k_5 k_6 k_7} \; \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}} \tag{628}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{629}$$

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$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}$$

$$a_2 = \epsilon_{k_3}^{k_8}$$

$$a_3 = \epsilon_{k_2 k_4 k_5 k_6 k_7 k_8}$$

Diagram 313:

$$PO3.313 = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_3 k_4}^{02} \Omega_{k_5 k_6 k_7 k_2}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_2 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_3 k_4}^{02} \Omega_{k_5 k_6 k_7 k_2}^{04}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4} \ \epsilon_{k_2 k_5 k_6 k_7}} \tag{630}$$

$$\rightarrow \quad \text{T2:}$$
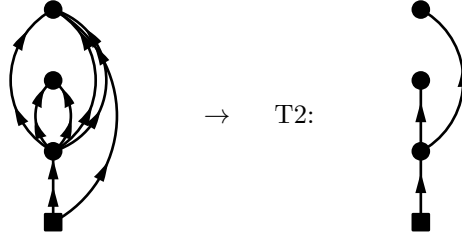
$$T2 = \frac{1}{(a_1 + a_2 + a_3) a_2 a_3} \tag{631}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}$$

$$a_2 = \epsilon_{k_3 k_4}$$

$$a_3 = \epsilon_{k_2 k_5 k_6 k_7}$$

Diagram 314:

$$PO3.314 = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_3 k_4 k_5 k_6}^{04} \Omega_{k_7 k_2}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_2 k_7}}$$

$$= \frac{(-1)^3}{(4!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_3 k_4 k_5 k_6}^{04} \Omega_{k_7 k_2}^{02}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_7}} \tag{632}$$

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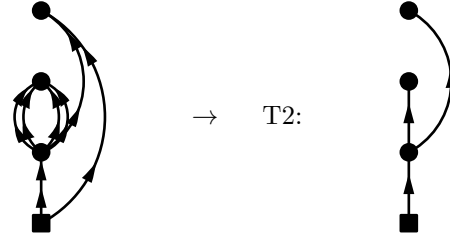
$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{633}$$
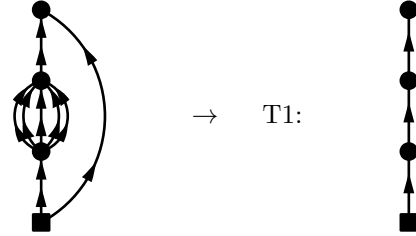
$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_3 k_4 k_5 k_6}$$
$$a_3 = \epsilon_{k_2 k_7}$$

Diagram 315:

$$\text{PO3.315} = \lim_{\tau \to \infty} \frac{(-1)^3}{(5!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_3 k_4 k_5 k_6 k_7}^{15} \Omega_{k_8 k_2}^{02} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5 k_6 k_7}^{k_8}} e^{-\tau_3 \epsilon_{k_2 k_8}}$$

$$= \frac{(-1)^3}{(5!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_3 k_4 k_5 k_6 k_7}^{15} \Omega_{k_8 k_2}^{02}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6 k_7 k_2} \; \epsilon_{k_2 k_8}} \tag{634}$$
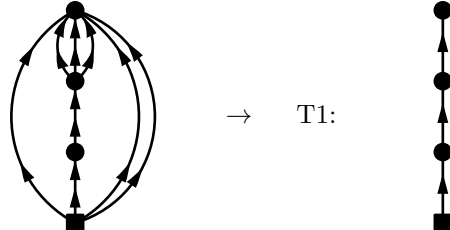
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{635}$$

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$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}$$

$$a_2 = \epsilon_{k_3 k_4 k_5 k_6 k_7}^{k_8}$$

$$a_3 = \epsilon_{k_2 k_8}$$

Diagram 316:

$$\text{PO3.316} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_6 k_7 k_8 k_5}^{31} \Omega_{k_6 k_7 k_8 k_2 k_3 k_4}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5}} e^{-\tau_2 \epsilon_{k_5}^{k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_6 k_7 k_8 k_5}^{31} \Omega_{k_6 k_7 k_8 k_2 k_3 k_4}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}} \tag{636}$$


$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3) a_3} \tag{637}$$

$$a_1 = \epsilon_{k_1}^{k_5}$$

$$a_2 = \epsilon_{k_5}^{k_6 k_7 k_8}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}$$

Diagram 317:

$$\text{PO3.317} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1}^{31} \Omega_{k_8 k_5}^{11} \Omega_{k_8 k_6 k_7 k_2 k_3 k_4}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_5}^{k_8}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1}^{31} \Omega_{k_8 k_5}^{11} \Omega_{k_8 k_6 k_7 k_2 k_3 k_4}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_2 k_3 k_4 k_6 k_7} \ \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}} \tag{638}$$

$$\rightarrow \quad \text{T1:}$$
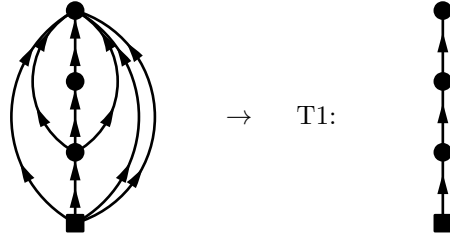
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{639}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_5}^{k_8}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_6 k_7 k_8}$$

Diagram 318:

$$\text{PO3.318} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_5 k_6}^{02} \Omega_{k_7 k_8 k_9 k_2 k_3 k_4}^{06} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_5 k_6}^{02} \Omega_{k_7 k_8 k_9 k_2 k_3 k_4}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}} \tag{640}$$

$$\rightarrow \quad \text{T2:}$$
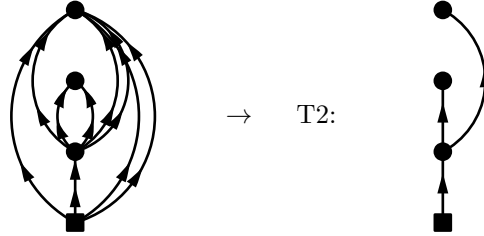
$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{641}$$

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$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_5 k_6}$$

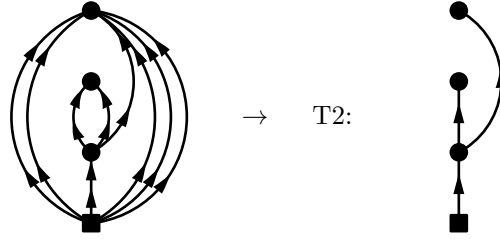$$a_3 = \epsilon_{k_2 k_3 k_4 k_7 k_8 k_9}$$

Diagram 319:

$$\text{PO3.319} = \lim_{\tau \to \infty} \frac{(-1)^3}{(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{11}_{k_8 k_7} \Omega^{06}_{k_8 k_2 k_3 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_7}^{k_8}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_8}}$$

$$= \frac{(-1)^3}{(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{11}_{k_8 k_7} \Omega^{06}_{k_8 k_2 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_8}} \tag{642}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{643}$$

$$a_1 = \epsilon_{k_1}^{k_7}$$

$$a_2 = \epsilon_{k_7}^{k_8}$$

$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_8}$$

Diagram 320:

$$\text{PO3.320} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{02}_{k_7 k_8} \Omega^{06}_{k_9 k_2 k_3 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_7 k_8}} e^{-\tau_3 \epsilon_{k_2 k_3 k_4 k_5 k_6 k_9}}$$

$$= \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{02}_{k_7 k_8} \Omega^{06}_{k_9 k_2 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_8} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_9}} \tag{644}$$

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$$\rightarrow \quad \text{T2:}$$

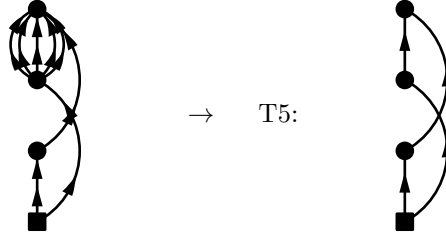$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{645}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_7 k_8}$$
$$a_3 = \epsilon_{k_2 k_3 k_4 k_5 k_6 k_9}$$

Diagram 321:

$$\text{PO3.321} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(5!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{11}_{k_3 k_1} \Omega^{51}_{k_4 k_5 k_6 k_7 k_8 k_2} \Omega^{06}_{k_4 k_5 k_6 k_7 k_8 k_3} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3}} e^{-\tau_2 \epsilon_{k_2}^{k_4 k_5 k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(5!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{11}_{k_3 k_1} \Omega^{51}_{k_4 k_5 k_6 k_7 k_8 k_2} \Omega^{06}_{k_4 k_5 k_6 k_7 k_8 k_3} \left[\frac{1}{\epsilon_{k_1 k_4 k_5 k_6 k_7 k_8} \; \epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2} \; \epsilon_{k_2 k_3} \; \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} \right] \tag{646}$$

$$\rightarrow \quad \text{T5:}$$
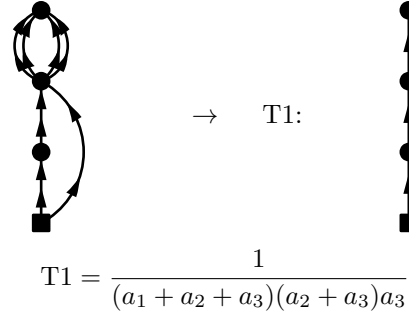
$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{647}$$

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$$a_1 = \epsilon_{k_1}^{k_3}$$
$$a_2 = \epsilon_{k_2}^{k_4 k_5 k_6 k_7 k_8}$$
$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}$$

Diagram 322:

$$\text{PO3.322} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_1}^{11} \Omega_{k_4 k_5 k_6 k_7 k_3 k_2}^{42} \Omega_{k_4 k_5 k_6 k_7}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3}} e^{-\tau_2 \epsilon_{k_2 k_3}^{k_4 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(4!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_1}^{11} \Omega_{k_4 k_5 k_6 k_7 k_3 k_2}^{42} \Omega_{k_4 k_5 k_6 k_7}^{04}}{\epsilon_{k_1 k_2} \ \epsilon_{k_2 k_3} \ \epsilon_{k_4 k_5 k_6 k_7}} \tag{648}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{649}$$

$$a_1 = \epsilon_{k_1}^{k_3}$$
$$a_2 = \epsilon_{k_2 k_3}^{k_4 k_5 k_6 k_7}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_7}$$

Diagram 323:

$$\text{PO3.323} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_1}^{31} \Omega_{k_6 k_7 k_3 k_4 k_5 k_2}^{24} \Omega_{k_6 k_7}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5}^{k_6 k_7}} e^{-\tau_3 \epsilon_{k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_1}^{31} \Omega_{k_6 k_7 k_3 k_4 k_5 k_2}^{24} \Omega_{k_6 k_7}^{02}}{\epsilon_{k_1 k_2} \ \epsilon_{k_2 k_3 k_4 k_5} \ \epsilon_{k_6 k_7}} \tag{650}$$
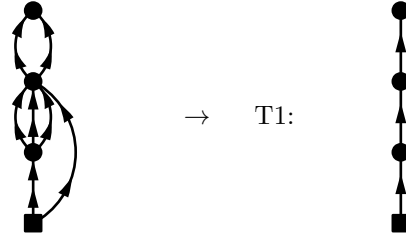
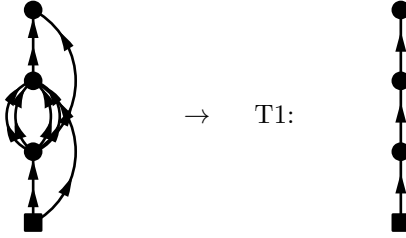$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{651}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5}^{k_6 k_7}$$
$$a_3 = \epsilon_{k_6 k_7}$$

Diagram 324:

$$\text{PO3.324} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(4!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_3 k_4 k_5 k_6 k_2}^{15} \Omega_{k_8 k_7}^{02} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_8}} e^{-\tau_3 \epsilon_{k_7 k_8}}$$

$$= \frac{-(-1)^3}{(4!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_7 k_1}^{51} \Omega_{k_8 k_3 k_4 k_5 k_6 k_2}^{15} \Omega_{k_8 k_7}^{02}}{\epsilon_{k_1 k_2} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_7 k_8}} \tag{652}$$
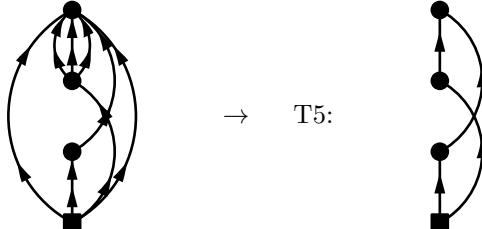
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{653}$$

$$a_1 = \epsilon_{k_1}^{k_3 k_4 k_5 k_6 k_7}$$

$$a_2 = \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_8}$$

$$a_3 = \epsilon_{k_7 k_8}$$

Diagram 325:

$$\text{PO3.325} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{31}_{k_6 k_7 k_8 k_2} \Omega^{06}_{k_6 k_7 k_8 k_5 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5}} e^{-\tau_2 \epsilon_{k_2}^{k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{31}_{k_6 k_7 k_8 k_2} \Omega^{06}_{k_6 k_7 k_8 k_5 k_3 k_4} \left[\frac{1}{\epsilon_{k_1 k_3 k_4 k_6 k_7 k_8}\ \epsilon_{k_1 k_2 k_3 k_4}\ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4}\ \epsilon_{k_2 k_3 k_4 k_5}\ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} \right]$$

(654)

$$\to \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3}$$

(655)

$$a_1 = \epsilon_{k_1}^{k_5}$$

$$a_2 = \epsilon_{k_2}^{k_6 k_7 k_8}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}$$

Diagram 326:

$$\text{PO3.326} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{42}_{k_6 k_7 k_8 k_9 k_5 k_2} \Omega^{06}_{k_6 k_7 k_8 k_9 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5}} e^{-\tau_2 \epsilon_{k_2 k_5}^{k_6 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{42}_{k_6 k_7 k_8 k_9 k_5 k_2} \Omega^{06}_{k_6 k_7 k_8 k_9 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4}\ \epsilon_{k_2 k_5 k_3 k_4}\ \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}}$$

(656)

$$\rightarrow \quad \text{T1:}$$
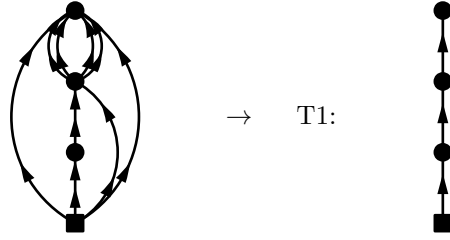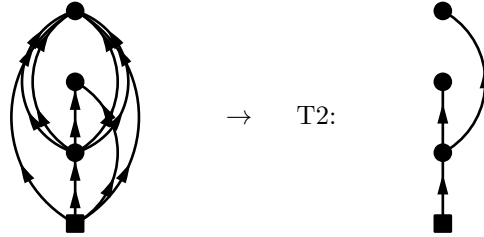
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{657}$$

$$a_1 = \epsilon_{k_1}^{k_5}$$
$$a_2 = \epsilon_{k_2 k_5}^{k_6 k_7 k_8 k_9}$$
$$a_3 = \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}$$

Diagram 327:

$$\text{PO3.327} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_5 k_2}^{02} \Omega_{k_6 k_7 k_8 k_9 k_3 k_4}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_5}} e^{-\tau_3 \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_9 k_1}^{51} \Omega_{k_5 k_2}^{02} \Omega_{k_6 k_7 k_8 k_9 k_3 k_4}^{06}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_5} \ \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}} \tag{658}$$

$$\rightarrow \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{659}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_5}$$

$$a_3 = \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}$$

Diagram 328:

$$\text{PO3.328} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{06}_{k_5 k_6 k_7 k_8 k_9 k_2} \Omega^{02}_{k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_3 k_4}}$$

$$= \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{51}_{k_5 k_6 k_7 k_8 k_9 k_1} \Omega^{06}_{k_5 k_6 k_7 k_8 k_9 k_2} \Omega^{02}_{k_3 k_4}}{\epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9} \ \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9 k_3 k_4} \ \epsilon_{k_3 k_4}} \tag{660}$$

$$\to \quad \text{T3:}$$
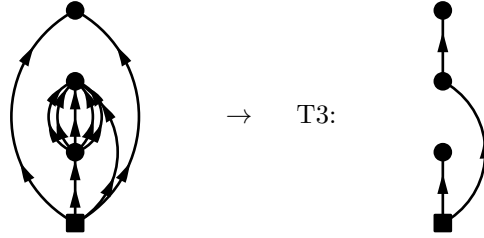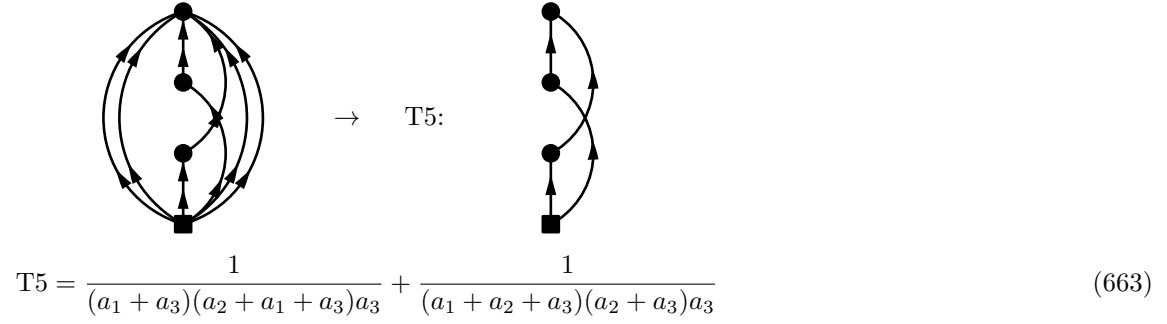
$$\text{T3} = \frac{1}{a_1 (a_2 + a_3) a_3} \tag{661}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_5 k_6 k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_3 k_4}$$

Diagram 329:

$$\text{PO3.329} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{11}_{k_8 k_2} \Omega^{06}_{k_8 k_7 k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2}^{k_8}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{2(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{11}_{k_8 k_2} \Omega^{06}_{k_8 k_7 k_3 k_4 k_5 k_6} \left[\frac{1}{\epsilon_{k_1 k_3 k_4 k_5 k_6 k_8} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}} \right] \tag{662}$$
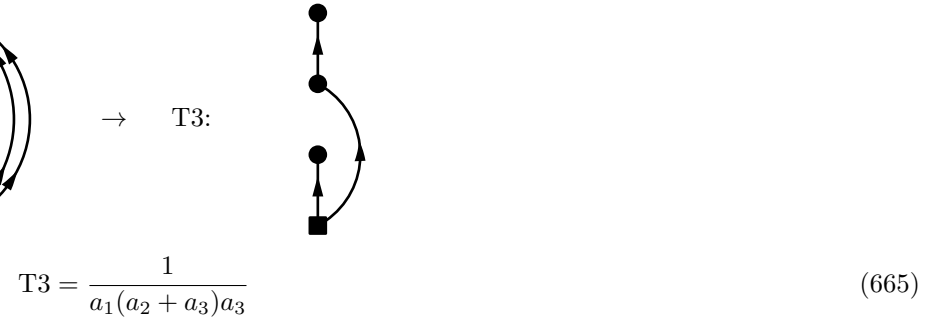
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$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{663}$$

$$a_1 = \epsilon_{k_1}^{k_7}$$
$$a_2 = \epsilon_{k_2}^{k_8}$$
$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8}$$

Diagram 330:

$$\text{PO3.330} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1}^{11} \Omega_{k_7 k_2}^{02} \Omega_{k_3 k_4 k_5 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_7}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1}^{11} \Omega_{k_7 k_2}^{02} \Omega_{k_3 k_4 k_5 k_6}^{04}}{\epsilon_{k_1}^{k_7} \, \epsilon_{k_2 k_7} \, \epsilon_{k_2 k_7 k_3 k_4 k_5 k_6}} \tag{664}$$

$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{665}$$

$$a_1 = \epsilon_{k_1}^{k_7}$$

$$a_2 = \epsilon_{k_3 k_4 k_5 k_6}$$

$$a_3 = \epsilon_{k_2 k_7}$$

Diagram 331:

$$\text{PO3.331} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{22}_{k_8 k_9 k_7 k_2} \Omega^{06}_{k_8 k_9 k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_7}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{22}_{k_8 k_9 k_7 k_2} \Omega^{06}_{k_8 k_9 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_7 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}} \tag{666}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{667}$$

$$a_1 = \epsilon_{k_1}^{k_7}$$

$$a_2 = \epsilon_{k_2 k_7}^{k_8 k_9}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}$$

Diagram 332:

$$\text{PO3.332} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{02}_{k_7 k_2} \Omega^{06}_{k_8 k_9 k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_7}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{02}_{k_7 k_2} \Omega^{06}_{k_8 k_9 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_7} \; \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}} \tag{668}$$

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$\rightarrow$ T2:
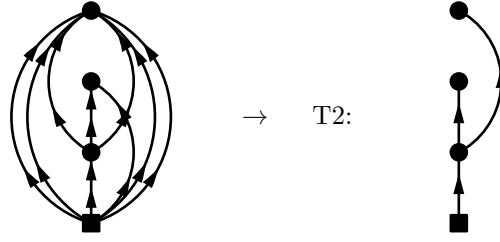
$$T2 = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{669}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_2 k_7}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}$$

Diagram 333:

$$PO3.333 = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{42}_{k_6 k_7 k_8 k_9 k_2 k_3} \Omega^{06}_{k_6 k_7 k_8 k_9 k_5 k_4} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5}_{k_1}} e^{-\tau_2 \epsilon^{k_6 k_7 k_8 k_9}_{k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{42}_{k_6 k_7 k_8 k_9 k_2 k_3} \Omega^{06}_{k_6 k_7 k_8 k_9 k_5 k_4} \left[\frac{1}{\epsilon_{k_1 k_4 k_6 k_7 k_8 k_9} \ \epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5} \ \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \right] \tag{670}$$

$\rightarrow$ T5:

$$T5 = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{671}$$

$$a_1 = \epsilon_{k_1}^{k_5}$$
$$a_2 = \epsilon_{k_2 k_3}^{k_6 k_7 k_8 k_9}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 334:

$$\text{PO3.334} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{33}_{k_6 k_7 k_8 k_5 k_2 k_3} \Omega^{04}_{k_6 k_7 k_8 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5}} e^{-\tau_2 \epsilon_{k_2 k_3 k_5}^{k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{33}_{k_6 k_7 k_8 k_5 k_2 k_3} \Omega^{04}_{k_6 k_7 k_8 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_5 k_4} \ \epsilon_{k_4 k_6 k_7 k_8}} \tag{672}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{673}$$

$$a_1 = \epsilon_{k_1}^{k_5}$$
$$a_2 = \epsilon_{k_2 k_3 k_5}^{k_6 k_7 k_8}$$
$$a_3 = \epsilon_{k_4 k_6 k_7 k_8}$$

Diagram 335:

$$\text{PO3.335} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{15}_{k_8 k_5 k_6 k_7 k_2 k_3} \Omega^{02}_{k_8 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_5 k_6 k_7}^{k_8}} e^{-\tau_3 \epsilon_{k_4 k_8}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{31}_{k_5 k_6 k_7 k_1} \Omega^{15}_{k_8 k_5 k_6 k_7 k_2 k_3} \Omega^{02}_{k_8 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_5 k_6 k_7 k_4} \ \epsilon_{k_4 k_8}} \tag{674}$$
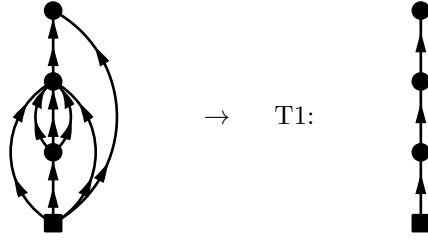
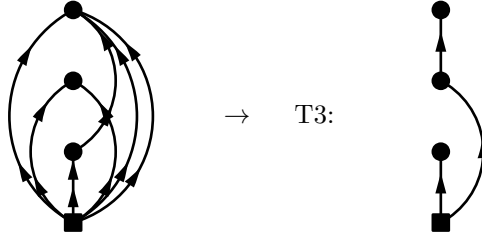$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \qquad (675)$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$

$$a_2 = \epsilon_{k_2 k_3 k_5 k_6 k_7}^{k_8}$$

$$a_3 = \epsilon_{k_4 k_8}$$

Diagram 336:

$$\text{PO3.336} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1}^{11} \Omega_{k_2 k_3}^{02} \Omega_{k_7 k_4 k_5 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1}^{11} \Omega_{k_2 k_3}^{02} \Omega_{k_7 k_4 k_5 k_6}^{04}}{\epsilon_{k_1}^{k_7} \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \epsilon_{k_4 k_5 k_6 k_7}} \qquad (676)$$

$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \qquad (677)$$

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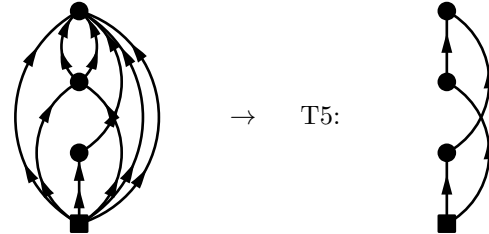
$$a_1 = \epsilon_{k_1}^{k_7}$$

$$a_2 = \epsilon_{k_2 k_3}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_7}$$

Diagram 337:

$$\text{PO3.337} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{22}_{k_8 k_9 k_2 k_3} \Omega^{06}_{k_8 k_9 k_7 k_4 k_5 k_6} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_3}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{22}_{k_8 k_9 k_2 k_3} \Omega^{06}_{k_8 k_9 k_7 k_4 k_5 k_6} \left[\frac{1}{\epsilon_{k_1 k_4 k_5 k_6 k_8 k_9} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}} \right]$$

$$(678)$$

$$\rightarrow \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3) a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3) a_3} \tag{679}$$

$$a_1 = \epsilon_{k_1}^{k_7}$$

$$a_2 = \epsilon_{k_2 k_3}^{k_8 k_9}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$

Diagram 338:

$$\text{PO3.338} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{02}_{k_2 k_3} \Omega^{06}_{k_7 k_8 k_9 k_4 k_5 k_6} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_2 k_3}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{31}_{k_7 k_8 k_9 k_1} \Omega^{02}_{k_2 k_3} \Omega^{06}_{k_7 k_8 k_9 k_4 k_5 k_6}}{\epsilon_{k_1}^{k_7 k_8 k_9} \ \epsilon_{k_2 k_3} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7 k_8 k_9}} \tag{680}$$

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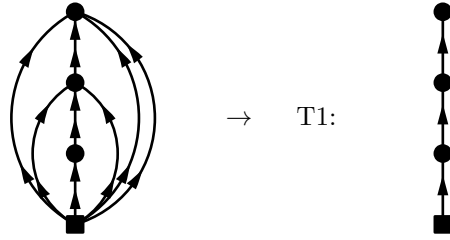$\rightarrow$ T3:
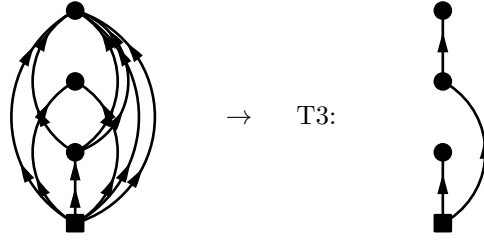
$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{681}$$

$$a_1 = \epsilon_{k_1}^{k_7 k_8 k_9}$$
$$a_2 = \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9}$$
$$a_3 = \epsilon_{k_2 k_3}$$

Diagram 339:

$$\text{PO3.339} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{13}_{k_8 k_7 k_2 k_3} \Omega^{04}_{k_8 k_4 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_7}^{k_8}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{13}_{k_8 k_7 k_2 k_3} \Omega^{04}_{k_8 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_7 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_6 k_8}} \tag{682}$$

$\rightarrow$ T1:
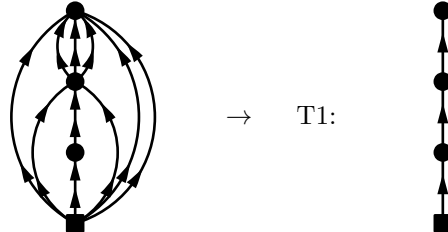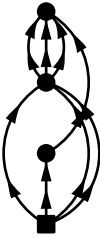
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{683}$$

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$$a_1 = \epsilon_{k_1}^{k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_7}^{k_8}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_8}$$

Diagram 340:

$$\text{PO3.340} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_7 k_2 k_3} \Omega^{06}_{k_8 k_9 k_{10} k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_7}^{k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_7 k_2 k_3} \Omega^{06}_{k_8 k_9 k_{10} k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \, \epsilon_{k_2 k_3 k_7 k_4 k_5 k_6} \, \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}} \tag{684}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{685}$$

$$a_1 = \epsilon_{k_1}^{k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_7}^{k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}$$

Diagram 341:

$$\text{PO3.341} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{33}_{k_6 k_7 k_8 k_2 k_3 k_4} \Omega^{04}_{k_6 k_7 k_8 k_5} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{11}_{k_5 k_1} \Omega^{33}_{k_6 k_7 k_8 k_2 k_3 k_4} \Omega^{04}_{k_6 k_7 k_8 k_5} \left[\frac{1}{\epsilon_{k_1 k_6 k_7 k_8} \, \epsilon_{k_1 k_2 k_3 k_4} \, \epsilon_{k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4} \, \epsilon_{k_2 k_3 k_4 k_5} \, \epsilon_{k_5 k_6 k_7 k_8}} \right] \tag{686}$$

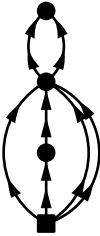$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \qquad (687)$$

$$a_1 = \epsilon_{k_1}^{k_5}$$
$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_6 k_7 k_8}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8}$$

Diagram 342:

$$\text{PO3.342} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_6 k_7 k_5 k_2 k_3 k_4}^{24} \Omega_{k_6 k_7}^{02} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5}^{k_6 k_7}} e^{-\tau_3 \epsilon_{k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_1}^{11} \Omega_{k_6 k_7 k_5 k_2 k_3 k_4}^{24} \Omega_{k_6 k_7}^{02}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_2 k_3 k_4 k_5} \; \epsilon_{k_6 k_7}} \qquad (688)$$
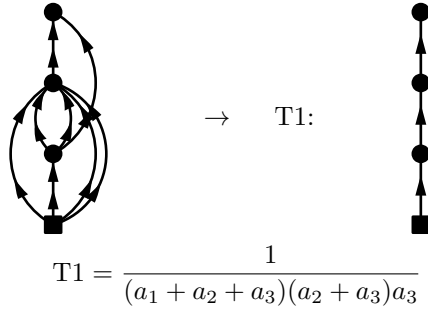

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \qquad (689)$$

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$$a_1 = \epsilon_{k_1}^{k_5}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5}^{k_6 k_7}$$
$$a_3 = \epsilon_{k_6 k_7}$$

Diagram 343:

$$\text{PO3.343} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1}^{31} \Omega_{k_8 k_5 k_6 k_2 k_3 k_4}^{15} \Omega_{k_8 k_7}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_8}} e^{-\tau_3 \epsilon_{k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1}^{31} \Omega_{k_8 k_5 k_6 k_2 k_3 k_4}^{15} \Omega_{k_8 k_7}^{02}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_7 k_8}} \tag{690}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{691}$$

$$a_1 = \epsilon_{k_1}^{k_5 k_6 k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_8}$$
$$a_3 = \epsilon_{k_7 k_8}$$

Diagram 344:

$$\text{PO3.344} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1}^{11} \Omega_{k_8 k_2 k_3 k_4}^{13} \Omega_{k_8 k_7 k_5 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_8}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8}}$$
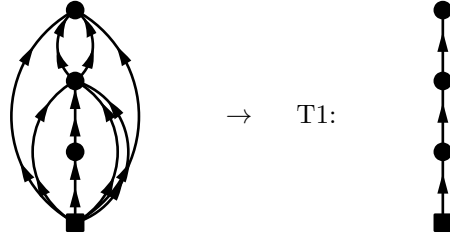
$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1}^{11} \Omega_{k_8 k_2 k_3 k_4}^{13} \Omega_{k_8 k_7 k_5 k_6}^{04} \left[\frac{1}{\epsilon_{k_1 k_5 k_6 k_8} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_5 k_6 k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_5 k_6 k_7 k_8}} \right] \tag{692}$$

$$\rightarrow \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{693}$$

$$a_1 = \epsilon_{k_1}^{k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_8}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8}$$

Diagram 345:

$$\text{PO3.345} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_2 k_3 k_4} \Omega^{06}_{k_8 k_9 k_{10} k_7 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4}^{k_8 k_9 k_{10}}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{33}_{k_8 k_9 k_{10} k_2 k_3 k_4} \Omega^{06}_{k_8 k_9 k_{10} k_7 k_5 k_6} \left[\frac{1}{\epsilon_{k_1 k_5 k_6 k_8 k_9 k_{10}} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \right] \tag{694}$$

$$\rightarrow \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{695}$$

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$$a_1 = \epsilon_{k_1}^{k_7}$$

$$a_2 = \epsilon_{k_2 k_3 k_4}^{k_8 k_9 k_{10}}$$

$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 346:

$$\text{PO3.346} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{24}_{k_8 k_9 k_7 k_2 k_3 k_4} \Omega^{04}_{k_8 k_9 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_7}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{24}_{k_8 k_9 k_7 k_2 k_3 k_4} \Omega^{04}_{k_8 k_9 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_7 k_5 k_6} \ \epsilon_{k_5 k_6 k_8 k_9}} \tag{696}$$

$$\to \quad \text{T1:}$$
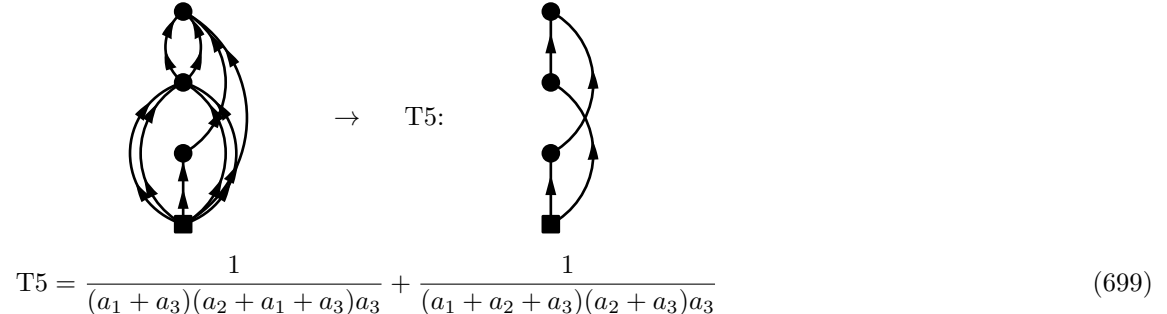
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{697}$$

$$a_1 = \epsilon_{k_1}^{k_7}$$

$$a_2 = \epsilon_{k_2 k_3 k_4 k_7}^{k_8 k_9}$$

$$a_3 = \epsilon_{k_5 k_6 k_8 k_9}$$

Diagram 347:

$$\text{PO3.347} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{24}_{k_8 k_9 k_2 k_3 k_4 k_5} \Omega^{04}_{k_8 k_9 k_7 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{11}_{k_7 k_1} \Omega^{24}_{k_8 k_9 k_2 k_3 k_4 k_5} \Omega^{04}_{k_8 k_9 k_7 k_6} \left[\frac{1}{\epsilon_{k_1 k_6 k_8 k_9} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7 k_8 k_9}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_6 k_7 k_8 k_9}} \right] \tag{698}$$

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$$\rightarrow \quad \text{T5:}$$

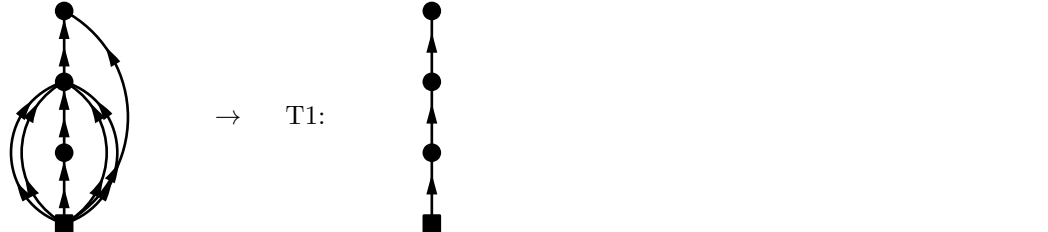$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{699}$$

$$a_1 = \epsilon_{k_1}^{k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5}^{k_8 k_9}$$
$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 348:

$$\text{PO3.348} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1}^{11} \Omega_{k_8 k_7 k_2 k_3 k_4 k_5}^{15} \Omega_{k_8 k_6}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5 k_7}^{k_8}} e^{-\tau_3 \epsilon_{k_6 k_8}}$$

$$= \frac{(-1)^3}{(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1}^{11} \Omega_{k_8 k_7 k_2 k_3 k_4 k_5}^{15} \Omega_{k_8 k_6}^{02}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_2 k_3 k_4 k_5 k_7 k_6} \; \epsilon_{k_6 k_8}} \tag{700}$$

$$\rightarrow \quad \text{T1:}$$
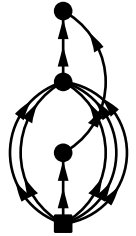
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{701}$$

$$a_1 = \epsilon_{k_1}^{k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5 k_7}^{k_8}$$
$$a_3 = \epsilon_{k_6 k_8}$$

Diagram 349:

$$\text{PO3.349} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(5!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1}^{11} \Omega_{k_8 k_2 k_3 k_4 k_5 k_6}^{15} \Omega_{k_8 k_7}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1}^{k_7}} e^{-\tau_2 \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_8}} e^{-\tau_3 \epsilon_{k_7 k_8}}$$

$$= \frac{-(-1)^3}{(5!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1}^{11} \Omega_{k_8 k_2 k_3 k_4 k_5 k_6}^{15} \Omega_{k_8 k_7}^{02} \left[\frac{1}{\epsilon_{k_1 k_8} \ \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_2 k_3 k_4 k_5 k_6 k_7} \ \epsilon_{k_7 k_8}} \right] \quad (702)$$

$$\rightarrow \quad \text{T5:}$$

$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \quad (703)$$

$$a_1 = \epsilon_{k_1}^{k_7}$$
$$a_2 = \epsilon_{k_2 k_3 k_4 k_5 k_6}^{k_8}$$
$$a_3 = \epsilon_{k_7 k_8}$$

Diagram 350:

$$\text{PO3.350} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_1 k_2}^{42} \Omega_{k_7 k_3}^{11} \Omega_{k_7 k_4 k_5 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon_{k_3}^{k_7}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_1 k_2}^{42} \Omega_{k_7 k_3}^{11} \Omega_{k_7 k_4 k_5 k_6}^{04}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_6 k_7}} \quad (704)$$

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$\rightarrow$ T1:
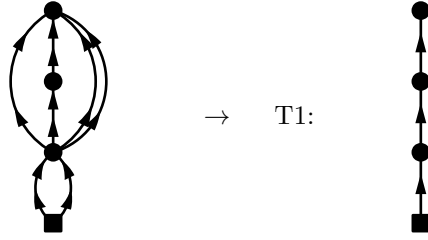
$$T1 = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{705}$$
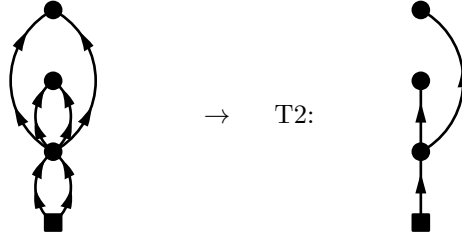
$$a_1 = \epsilon_{k_1 k_2}^{k_3 k_4 k_5 k_6}$$
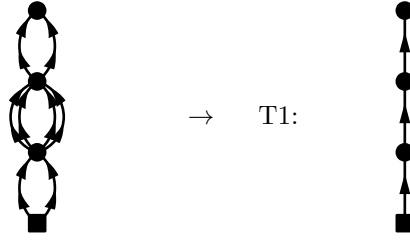$$a_2 = \epsilon_{k_3}^{k_7}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_7}$$

Diagram 351:

$$\text{PO3.351} = \lim_{\tau \to \infty} \frac{(-1)^3}{2(2!)^3} \sum_{k_i} O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_1 k_2}^{42} \Omega_{k_3 k_4}^{02} \Omega_{k_5 k_6}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6}}$$

$$= \frac{(-1)^3}{2(2!)^3} \sum_{k_i} \frac{O_{k_1 k_2}^{20} \Omega_{k_3 k_4 k_5 k_6 k_1 k_2}^{42} \Omega_{k_3 k_4}^{02} \Omega_{k_5 k_6}^{02}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4} \; \epsilon_{k_5 k_6}} \tag{706}$$

$\rightarrow$ T2:

$$T2 = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{707}$$

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$$a_1 = \epsilon_{k_1 k_2}^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon_{k_3 k_4}$$

$$a_3 = \epsilon_{k_5 k_6}$$

Diagram 352:

$$\text{PO3.352} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{13}_{k_7 k_3 k_4 k_5} \Omega^{02}_{k_7 k_6} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5}^{k_7}} e^{-\tau_3 \epsilon_{k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{13}_{k_7 k_3 k_4 k_5} \Omega^{02}_{k_7 k_6}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6} \; \epsilon_{k_6 k_7}} \tag{708}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{709}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon_{k_3 k_4 k_5}^{k_7}$$

$$a_3 = \epsilon_{k_6 k_7}$$

Diagram 353:

$$\text{PO3.353} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{24}_{k_7 k_8 k_3 k_4 k_5 k_6} \Omega^{02}_{k_7 k_8} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_3 k_4 k_5 k_6}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5 k_6}^{k_7 k_8}} e^{-\tau_3 \epsilon_{k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{20}_{k_1 k_2} \Omega^{42}_{k_3 k_4 k_5 k_6 k_1 k_2} \Omega^{24}_{k_7 k_8 k_3 k_4 k_5 k_6} \Omega^{02}_{k_7 k_8}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8}} \tag{710}$$
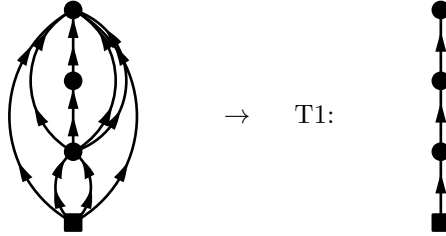
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{711}$$

$$a_1 = \epsilon^{k_3 k_4 k_5 k_6}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_7 k_8}_{k_3 k_4 k_5 k_6}$$
$$a_3 = \epsilon_{k_7 k_8}$$

Diagram 354:

$$\text{PO3.354} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{11}_{k_9 k_5} \Omega^{06}_{k_9 k_6 k_7 k_8 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2)e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_9}_{k_5}} e^{-\tau_3 \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{11}_{k_9 k_5} \Omega^{06}_{k_9 k_6 k_7 k_8 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_3 k_4 k_6 k_7 k_8} \ \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}} \tag{712}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{713}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2}$$

$$a_2 = \epsilon^{k_9}_{k_5}$$

$$a_3 = \epsilon_{k_3 k_4 k_6 k_7 k_8 k_9}$$

Diagram 355:

$$\text{PO3.355} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^4} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{02}_{k_5 k_6} \Omega^{04}_{k_7 k_8 k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2}} e^{-\tau_2 \epsilon_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_3 k_4 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^4} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{02}_{k_5 k_6} \Omega^{04}_{k_7 k_8 k_3 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \, \epsilon_{k_5 k_6} \, \epsilon_{k_3 k_4 k_7 k_8}} \tag{714}$$

$$\rightarrow \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3) a_2 a_3} \tag{715}$$

$$a_1 = \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2}$$

$$a_2 = \epsilon_{k_5 k_6}$$

$$a_3 = \epsilon_{k_3 k_4 k_7 k_8}$$

Diagram 356:

$$\text{PO3.356} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{04}_{k_5 k_6 k_7 k_8} \Omega^{02}_{k_3 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2}} e^{-\tau_2 \epsilon_{k_5 k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_3 k_4}}$$

$$= \frac{(-1)^3}{(2!)^2 (4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{04}_{k_5 k_6 k_7 k_8} \Omega^{02}_{k_3 k_4}}{\epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2} \, \epsilon_{k_5 k_6 k_7 k_8 k_3 k_4} \, \epsilon_{k_3 k_4}} \tag{716}$$

$$\rightarrow \quad \text{T3:}$$
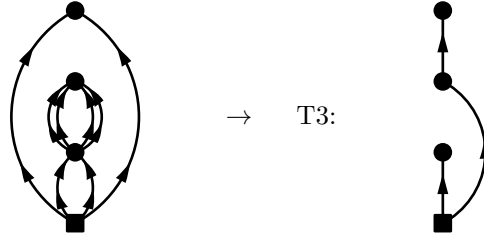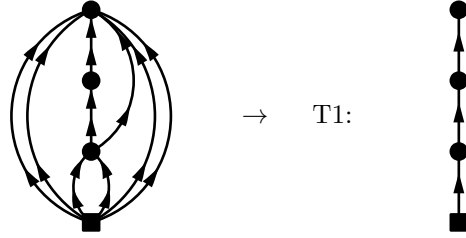
$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{717}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_5 k_6 k_7 k_8}$$

$$a_3 = \epsilon_{k_3 k_4}$$

Diagram 357:

$$\text{PO3.357} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{11}_{k_9 k_7} \Omega^{06}_{k_9 k_8 k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_7}^{k_9}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{11}_{k_9 k_7} \Omega^{06}_{k_9 k_8 k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_3 k_4 k_5 k_6 k_8} \ \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}} \tag{718}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{719}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$

$$a_2 = \epsilon_{k_7}^{k_9}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_8 k_9}$$

Diagram 358:

$$\text{PO3.358} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{02}_{k_7 k_8} \Omega^{04}_{k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_7 k_8}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{02}_{k_7 k_8} \Omega^{04}_{k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2} \ \epsilon_{k_7 k_8} \ \epsilon_{k_3 k_4 k_5 k_6}}$$

(720)

$$\to \quad \text{T3:}$$

$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3}$$

(721)
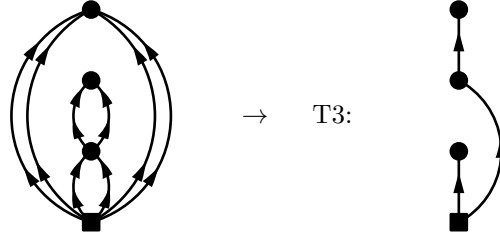
$$a_1 = \epsilon_{k_3 k_4 k_5 k_6}$$

$$a_2 = \epsilon_{k_1 k_2}^{k_7 k_8}$$

$$a_3 = \epsilon_{k_7 k_8}$$

Diagram 359:

$$\text{PO3.359} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{02}_{k_7 k_8} \Omega^{06}_{k_9 k_{10} k_3 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_7 k_8}} e^{-\tau_3 \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_1 k_2} \Omega^{02}_{k_7 k_8} \Omega^{06}_{k_9 k_{10} k_3 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_8} \ \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}}$$

(722)

$$\rightarrow \quad \text{T2:}$$
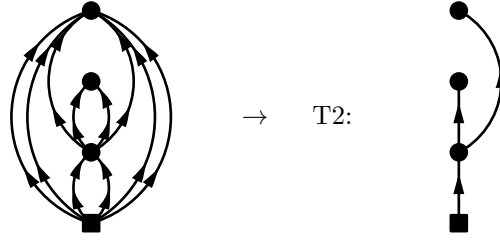
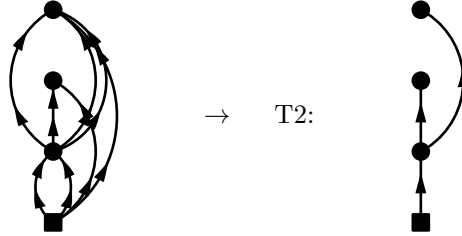$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{723}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}$$

$$a_2 = \epsilon_{k_7 k_8}$$

$$a_3 = \epsilon_{k_3 k_4 k_5 k_6 k_9 k_{10}}$$

Diagram 360:

$$\text{PO3.360} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_5 k_3}^{02} \Omega_{k_6 k_7 k_8 k_4}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_5}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_8 k_1 k_2}^{42} \Omega_{k_5 k_3}^{02} \Omega_{k_6 k_7 k_8 k_4}^{04}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_5} \ \epsilon_{k_4 k_6 k_7 k_8}} \tag{724}$$

$$\rightarrow \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{725}$$

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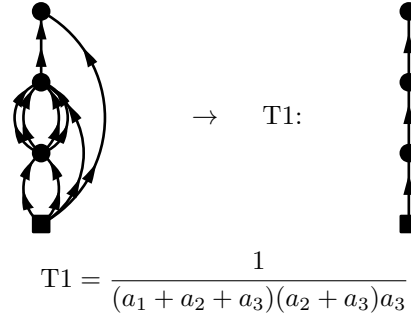
$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_5}$$

$$a_3 = \epsilon_{k_4 k_6 k_7 k_8}$$

Diagram 361:

$$\text{PO3.361} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{15}_{k_9 k_5 k_6 k_7 k_8 k_3} \Omega^{02}_{k_9 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_5 k_6 k_7 k_8}^{k_9}} e^{-\tau_3 \epsilon_{k_4 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{15}_{k_9 k_5 k_6 k_7 k_8 k_3} \Omega^{02}_{k_9 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_3 k_5 k_6 k_7 k_8 k_4} \; \epsilon_{k_4 k_9}} \tag{726}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{727}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_5 k_6 k_7 k_8}^{k_9}$$

$$a_3 = \epsilon_{k_4 k_9}$$

Diagram 362:

$$\text{PO3.362} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{02}_{k_7 k_3} \Omega^{04}_{k_8 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_7}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8}}$$

$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{02}_{k_7 k_3} \Omega^{04}_{k_8 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_3 k_7} \; \epsilon_{k_4 k_5 k_6 k_8}} \tag{728}$$

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$$\rightarrow \quad \text{T2:}$$
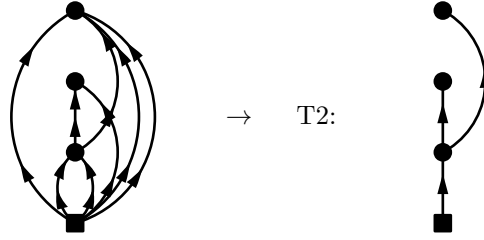
$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{729}$$
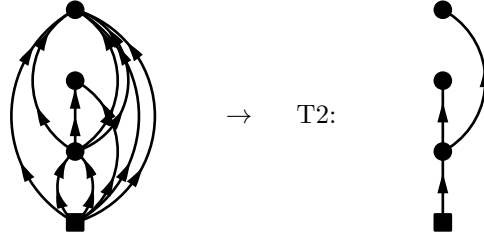
$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$

$$a_2 = \epsilon_{k_3 k_7}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_8}$$

Diagram 363:

$$\text{PO3.363} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_7 k_3}^{02} \Omega_{k_8 k_9 k_{10} k_4 k_5 k_6}^{06} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8 k_9 k_{10}}} e^{-\tau_2 \epsilon_{k_3 k_7}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_{10} k_1 k_2}^{42} \Omega_{k_7 k_3}^{02} \Omega_{k_8 k_9 k_{10} k_4 k_5 k_6}^{06}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_7} \ \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}} \tag{730}$$

$$\rightarrow \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{731}$$

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$$a_1 = \epsilon^{k_7 k_8 k_9 k_{10}}_{k_1 k_2}$$

$$a_2 = \epsilon_{k_3 k_7}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}$$

Diagram 364:

$$\text{PO3.364} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^4} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{24}_{k_7 k_8 k_5 k_6 k_3 k_4} \Omega^{02}_{k_7 k_8} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_3 k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^4} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{22}_{k_5 k_6 k_1 k_2} \Omega^{24}_{k_7 k_8 k_5 k_6 k_3 k_4} \Omega^{02}_{k_7 k_8}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_8}} \tag{732}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3) a_3} \tag{733}$$

$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2}$$

$$a_2 = \epsilon^{k_7 k_8}_{k_3 k_4 k_5 k_6}$$

$$a_3 = \epsilon_{k_7 k_8}$$

Diagram 365:

$$\text{PO3.365} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{15}_{k_9 k_5 k_6 k_7 k_3 k_4} \Omega^{02}_{k_9 k_8} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7 k_8}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_9}_{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{42}_{k_5 k_6 k_7 k_8 k_1 k_2} \Omega^{15}_{k_9 k_5 k_6 k_7 k_3 k_4} \Omega^{02}_{k_9 k_8}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_8 k_9}} \tag{734}$$

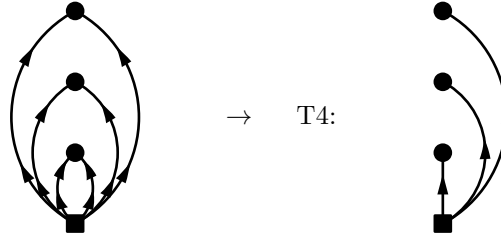$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{735}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_5 k_6 k_7 k_8}$$
$$a_2 = \epsilon_{k_3 k_4 k_5 k_6 k_7}^{k_9}$$
$$a_3 = \epsilon_{k_8 k_9}$$

Diagram 366:

$$\text{PO3.366} = \lim_{\tau \to \infty} \frac{(-1)^3}{6(2!)^3} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{02}_{k_3 k_4} \Omega^{02}_{k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 e^{-\tau_1 \epsilon_{k_1 k_2}} e^{-\tau_2 \epsilon_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6}}$$

$$= \frac{(-1)^3}{6(2!)^3} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{02}_{k_3 k_4} \Omega^{02}_{k_5 k_6}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4} \ \epsilon_{k_5 k_6}} \tag{736}$$

$$\text{T4} = \frac{1}{a_1 a_2 a_3} \tag{737}$$

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$$a_1 = \epsilon_{k_1 k_2}$$
$$a_2 = \epsilon_{k_3 k_4}$$
$$a_3 = \epsilon_{k_5 k_6}$$

Diagram 367:

$$\mathrm{PO3.367} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^4} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{22}_{k_7 k_8 k_3 k_4} \Omega^{04}_{k_7 k_8 k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^4} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{22}_{k_7 k_8 k_3 k_4} \Omega^{04}_{k_7 k_8 k_5 k_6}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_6 k_7 k_8}} \tag{738}$$

$$\to \quad \mathrm{T3:}$$

$$\mathrm{T3} = \frac{1}{a_1 (a_2 + a_3) a_3} \tag{739}$$

$$a_1 = \epsilon_{k_1 k_2}$$
$$a_2 = \epsilon^{k_7 k_8}_{k_3 k_4}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8}$$

Diagram 368:

$$\mathrm{PO3.368} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3 (4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_3 k_4} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_5 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_7 k_8 k_9 k_{10}}_{k_3 k_4}} e^{-\tau_3 \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3 (4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{42}_{k_7 k_8 k_9 k_{10} k_3 k_4} \Omega^{06}_{k_7 k_8 k_9 k_{10} k_5 k_6}}{\epsilon_{k_1 k_2} \; \epsilon_{k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}} \tag{740}$$

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$$\rightarrow \quad \text{T3:}$$

$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{741}$$

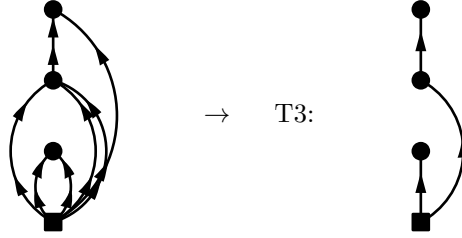$$a_1 = \epsilon_{k_1 k_2}$$
$$a_2 = \epsilon_{k_3 k_4}^{k_7 k_8 k_9 k_{10}}$$
$$a_3 = \epsilon_{k_5 k_6 k_7 k_8 k_9 k_{10}}$$

Diagram 369:

$$\text{PO3.369} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{13}_{k_7 k_3 k_4 k_5} \Omega^{02}_{k_7 k_6} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5}^{k_7}} e^{-\tau_3 \epsilon_{k_6 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{13}_{k_7 k_3 k_4 k_5} \Omega^{02}_{k_7 k_6}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7}} \tag{742}$$

$$\rightarrow \quad \text{T3:}$$

$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{743}$$

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$$a_1 = \epsilon_{k_1 k_2}$$

$$a_2 = \epsilon_{k_3 k_4 k_5}^{k_7}$$

$$a_3 = \epsilon_{k_6 k_7}$$

Diagram 370:

$$\text{PO3.370} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{33}_{k_7 k_8 k_9 k_3 k_4 k_5} \Omega^{04}_{k_7 k_8 k_9 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5}^{k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_6 k_7 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{33}_{k_7 k_8 k_9 k_3 k_4 k_5} \Omega^{04}_{k_7 k_8 k_9 k_6}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_5 k_6} \ \epsilon_{k_6 k_7 k_8 k_9}} \tag{744}$$

$$\to \quad \text{T3:}$$

$$\text{T3} = \frac{1}{a_1 (a_2 + a_3) a_3} \tag{745}$$

$$a_1 = \epsilon_{k_1 k_2}$$

$$a_2 = \epsilon_{k_3 k_4 k_5}^{k_7 k_8 k_9}$$

$$a_3 = \epsilon_{k_6 k_7 k_8 k_9}$$

Diagram 371:

$$\text{PO3.371} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{15}_{k_9 k_7 k_8 k_3 k_4 k_5} \Omega^{02}_{k_9 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1) \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_3 k_4 k_5 k_7 k_8}^{k_9}} e^{-\tau_3 \epsilon_{k_6 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2 (3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{15}_{k_9 k_7 k_8 k_3 k_4 k_5} \Omega^{02}_{k_9 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_5 k_7 k_8 k_6} \ \epsilon_{k_6 k_9}} \tag{746}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{747}$$

$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2}$$
$$a_2 = \epsilon^{k_9}_{k_3 k_4 k_5 k_7 k_8}$$
$$a_3 = \epsilon_{k_6 k_9}$$

Diagram 372:

$$\text{PO3.372} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{24}_{k_7 k_8 k_3 k_4 k_5 k_6} \Omega^{02}_{k_7 k_8} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_3 k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{02}_{k_1 k_2} \Omega^{24}_{k_7 k_8 k_3 k_4 k_5 k_6} \Omega^{02}_{k_7 k_8}}{\epsilon_{k_1 k_2} \ \epsilon_{k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_8}} \tag{748}$$

$$\rightarrow \quad \text{T3:}$$

$$\text{T3} = \frac{1}{a_1(a_2 + a_3)a_3} \tag{749}$$

$$a_1 = \epsilon_{k_1 k_2}$$
$$a_2 = \epsilon_{k_3 k_4 k_5 k_6}^{k_7 k_8}$$
$$a_3 = \epsilon_{k_7 k_8}$$

Diagram 373:

$$\text{PO3.373} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{15}_{k_9 k_7 k_3 k_4 k_5 k_6} \Omega^{02}_{k_9 k_8} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2}} e^{-\tau_2 \epsilon^{k_9}_{k_3 k_4 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{22}_{k_7 k_8 k_1 k_2} \Omega^{15}_{k_9 k_7 k_3 k_4 k_5 k_6} \Omega^{02}_{k_9 k_8}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_3 k_4 k_5 k_6 k_7 k_8} \ \epsilon_{k_8 k_9}} \tag{750}$$

$$\to \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{751}$$

$$a_1 = \epsilon_{k_1 k_2}^{k_7 k_8}$$
$$a_2 = \epsilon_{k_3 k_4 k_5 k_6 k_7}^{k_9}$$
$$a_3 = \epsilon_{k_8 k_9}$$

Diagram 374:

$$\text{PO3.374} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{11}_{k_8 k_5} \Omega^{04}_{k_8 k_6 k_7 k_4} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8}_{k_5}} e^{-\tau_3 \epsilon_{k_4 k_6 k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{11}_{k_8 k_5} \Omega^{04}_{k_8 k_6 k_7 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_4 k_6 k_7} \ \epsilon_{k_4 k_6 k_7 k_8}} \tag{752}$$

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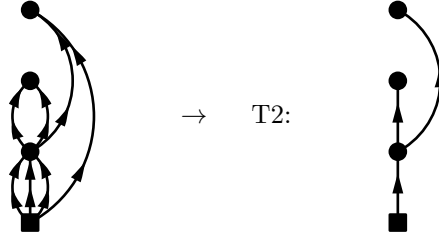$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{753}$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_5 k_6 k_7}$$

$$a_2 = \epsilon_{k_5}^{k_8}$$

$$a_3 = \epsilon_{k_4 k_6 k_7 k_8}$$

Diagram 375:
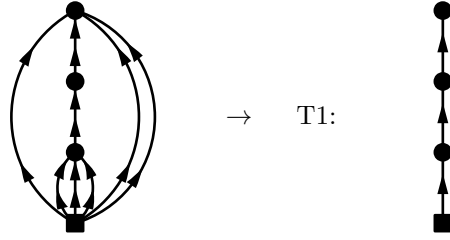
$$\text{PO3.375} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1 k_2 k_3}^{33} \Omega_{k_5 k_6}^{02} \Omega_{k_7 k_4}^{02} \int_0^{\tau} d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_5 k_6 k_7}} e^{-\tau_2 \epsilon_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_4 k_7}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4}^{40} \Omega_{k_5 k_6 k_7 k_1 k_2 k_3}^{33} \Omega_{k_5 k_6}^{02} \Omega_{k_7 k_4}^{02}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6} \ \epsilon_{k_4 k_7}} \tag{754}$$

$$\rightarrow \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{755}$$

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$$a_1 = \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}$$

$$a_2 = \epsilon_{k_5 k_6}$$

$$a_3 = \epsilon_{k_4 k_7}$$

Diagram 376:

$$\text{PO3.376} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{13}_{k_8 k_5 k_6 k_7} \Omega^{02}_{k_8 k_4} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8}_{k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_4 k_8}}$$

$$= \frac{(-1)^3}{(3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{13}_{k_8 k_5 k_6 k_7} \Omega^{02}_{k_8 k_4}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6 k_7 k_4} \ \epsilon_{k_4 k_8}} \tag{756}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{757}$$

$$a_1 = \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}$$

$$a_2 = \epsilon^{k_8}_{k_5 k_6 k_7}$$

$$a_3 = \epsilon_{k_4 k_8}$$

Diagram 377:

$$\text{PO3.377} = \lim_{\tau \to \infty} \frac{(-1)^3}{(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{11}_{k_8 k_7} \Omega^{04}_{k_8 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8}_{k_7}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8}}$$

$$= \frac{(-1)^3}{(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{11}_{k_8 k_7} \Omega^{04}_{k_8 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_6 k_8}} \tag{758}$$
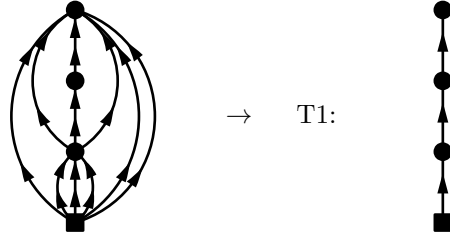
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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{759}$$

$$a_1 = \epsilon^{k_7}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_8}_{k_7}$$
$$a_3 = \epsilon_{k_4 k_5 k_6 k_8}$$

Diagram 378:

$$\text{PO3.378} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{11}_{k_{10} k_7} \Omega^{06}_{k_{10} k_8 k_9 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_{10}}_{k_7}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{11}_{k_{10} k_7} \Omega^{06}_{k_{10} k_8 k_9 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_4 k_5 k_6 k_8 k_9} \ \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}} \tag{760}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{761}$$

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$$a_1 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$

$$a_2 = \epsilon^{k_{10}}_{k_7}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_8 k_9 k_{10}}$$

Diagram 379:

$$\text{PO3.379} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{02}_{k_7 k_8} \Omega^{04}_{k_9 k_4 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon_{k_7 k_8}} e^{-\tau_3 \epsilon_{k_4 k_5 k_6 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{02}_{k_7 k_8} \Omega^{04}_{k_9 k_4 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_8} \ \epsilon_{k_4 k_5 k_6 k_9}} \tag{762}$$

$$\to \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3) a_2 a_3} \tag{763}$$

$$a_1 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$

$$a_2 = \epsilon_{k_7 k_8}$$

$$a_3 = \epsilon_{k_4 k_5 k_6 k_9}$$

Diagram 380:

$$\text{PO3.380} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{13}_{k_8 k_5 k_6 k_4} \Omega^{02}_{k_8 k_7} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8}_{k_4 k_5 k_6}} e^{-\tau_3 \epsilon_{k_7 k_8}}$$

$$= \frac{-(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{13}_{k_8 k_5 k_6 k_4} \Omega^{02}_{k_8 k_7}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_4 k_5 k_6 k_7} \ \epsilon_{k_7 k_8}} \tag{764}$$
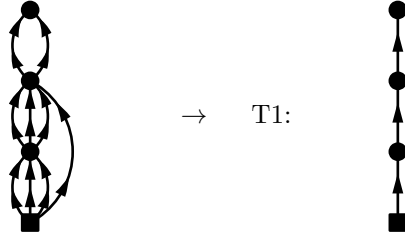
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$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{765}$$

$$a_1 = \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_8}_{k_4 k_5 k_6}$$
$$a_3 = \epsilon_{k_7 k_8}$$

Diagram 381:

$$\text{PO3.381} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{24}_{k_8 k_9 k_5 k_6 k_7 k_4} \Omega^{02}_{k_8 k_9} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8 k_9}_{k_4 k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{33}_{k_5 k_6 k_7 k_1 k_2 k_3} \Omega^{24}_{k_8 k_9 k_5 k_6 k_7 k_4} \Omega^{02}_{k_8 k_9}}{\epsilon_{k_1 k_2 k_3 k_4} \; \epsilon_{k_4 k_5 k_6 k_7} \; \epsilon_{k_8 k_9}} \tag{766}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{767}$$

$$a_1 = \epsilon^{k_5 k_6 k_7}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_8 k_9}_{k_4 k_5 k_6 k_7}$$
$$a_3 = \epsilon_{k_8 k_9}$$

Diagram 382:

$$\text{PO3.382} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{02}_{k_7 k_4} \Omega^{04}_{k_8 k_9 k_5 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon_{k_4 k_7}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)^2(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{02}_{k_7 k_4} \Omega^{04}_{k_8 k_9 k_5 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_7} \ \epsilon_{k_5 k_6 k_8 k_9}} \tag{768}$$

$$\to \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3) a_2 a_3} \tag{769}$$

$$a_1 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon_{k_4 k_7}$$
$$a_3 = \epsilon_{k_5 k_6 k_8 k_9}$$

Diagram 383:

$$\text{PO3.383} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{13}_{k_8 k_7 k_4 k_5} \Omega^{02}_{k_8 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_8}_{k_4 k_5 k_7}} e^{-\tau_3 \epsilon_{k_6 k_8}}$$

$$= \frac{(-1)^3}{(2!)(3!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{13}_{k_7 k_1 k_2 k_3} \Omega^{13}_{k_8 k_7 k_4 k_5} \Omega^{02}_{k_8 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_7 k_6} \ \epsilon_{k_6 k_8}} \tag{770}$$
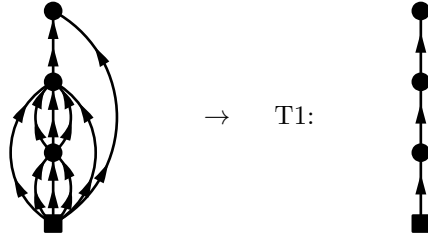
$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{771}$$

$$a_1 = \epsilon^{k_7}_{k_1 k_2 k_3}$$
$$a_2 = \epsilon^{k_8}_{k_4 k_5 k_7}$$
$$a_3 = \epsilon_{k_6 k_8}$$

Diagram 384:

$$\text{PO3.384} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{15}_{k_{10} k_7 k_8 k_9 k_4 k_5} \Omega^{02}_{k_{10} k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}} e^{-\tau_2 \epsilon^{k_{10}}_{k_4 k_5 k_7 k_8 k_9}} e^{-\tau_3 \epsilon_{k_6 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{33}_{k_7 k_8 k_9 k_1 k_2 k_3} \Omega^{15}_{k_{10} k_7 k_8 k_9 k_4 k_5} \Omega^{02}_{k_{10} k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_4 k_5 k_7 k_8 k_9 k_6} \ \epsilon_{k_6 k_{10}}} \tag{772}$$
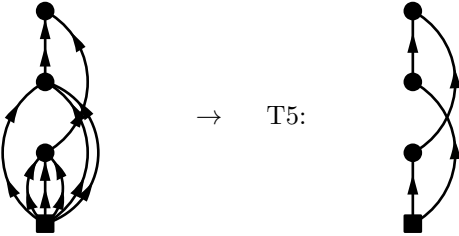

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{773}$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}$$

$$a_2 = \epsilon_{k_4 k_5 k_7 k_8 k_9}^{k_{10}}$$

$$a_3 = \epsilon_{k_6 k_{10}}$$

Diagram 385:

$$\text{PO3.385} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1 k_2 k_3}^{13} \Omega_{k_8 k_4 k_5 k_6}^{13} \Omega_{k_8 k_7}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_7}} e^{-\tau_2 \epsilon_{k_4 k_5 k_6}^{k_8}} e^{-\tau_3 \epsilon_{k_7 k_8}}$$

$$= \frac{-(-1)^3}{2(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1 k_2 k_3}^{13} \Omega_{k_8 k_4 k_5 k_6}^{13} \Omega_{k_8 k_7}^{02} \left[\frac{1}{\epsilon_{k_1 k_2 k_3 k_8} \; \epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_7 k_8}} + \frac{1}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_6 k_7} \; \epsilon_{k_7 k_8}} \right] \quad (774)$$

$$\to \quad \text{T5:}$$
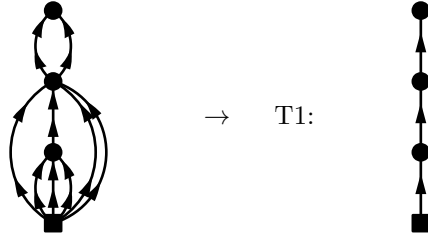
$$\text{T5} = \frac{1}{(a_1 + a_3)(a_2 + a_1 + a_3)a_3} + \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \quad (775)$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_7}$$

$$a_2 = \epsilon_{k_4 k_5 k_6}^{k_8}$$

$$a_3 = \epsilon_{k_7 k_8}$$

Diagram 386:

$$\text{PO3.386} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1 k_2 k_3}^{13} \Omega_{k_8 k_9 k_7 k_4 k_5 k_6}^{24} \Omega_{k_8 k_9}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_7}} e^{-\tau_2 \epsilon_{k_4 k_5 k_6 k_7}^{k_8 k_9}} e^{-\tau_3 \epsilon_{k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_1 k_2 k_3}^{13} \Omega_{k_8 k_9 k_7 k_4 k_5 k_6}^{24} \Omega_{k_8 k_9}^{02}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_6 k_7} \; \epsilon_{k_8 k_9}} \quad (776)$$

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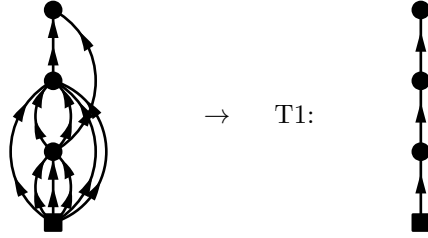$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{777}$$

$$a_1 = \epsilon_{k_1 k_2 k_3}^{k_7}$$
$$a_2 = \epsilon_{k_4 k_5 k_6 k_7}^{k_8 k_9}$$
$$a_3 = \epsilon_{k_8 k_9}$$

Diagram 387:

$$\text{PO3.387} = \lim_{\tau \to \infty} \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_7 k_8 k_4 k_5 k_6}^{15} \Omega_{k_{10} k_9}^{02} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3}^{k_7 k_8 k_9}} e^{-\tau_2 \epsilon_{k_4 k_5 k_6 k_7 k_8}^{k_{10}}} e^{-\tau_3 \epsilon_{k_9 k_{10}}}$$

$$= \frac{-(-1)^3}{(2!)(3!)^2} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_9 k_1 k_2 k_3}^{33} \Omega_{k_{10} k_7 k_8 k_4 k_5 k_6}^{15} \Omega_{k_{10} k_9}^{02}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_4 k_5 k_6 k_7 k_8 k_9} \; \epsilon_{k_9 k_{10}}} \tag{778}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{779}$$

$$a_1 = \epsilon^{k_7 k_8 k_9}_{k_1 k_2 k_3}$$

$$a_2 = \epsilon^{k_{10}}_{k_4 k_5 k_6 k_7 k_8}$$

$$a_3 = \epsilon_{k_9 k_{10}}$$

Diagram 388:

$$\text{PO3.388} = \lim_{\tau \to \infty} \frac{(-1)^3}{(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{24}_{k_5 k_6 k_1 k_2 k_3 k_4} \Omega^{11}_{k_7 k_5} \Omega^{02}_{k_7 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_7}_{k_5}} e^{-\tau_3 \epsilon_{k_6 k_7}}$$

$$= \frac{(-1)^3}{(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{24}_{k_5 k_6 k_1 k_2 k_3 k_4} \Omega^{11}_{k_7 k_5} \Omega^{02}_{k_7 k_6}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6} \ \epsilon_{k_6 k_7}} \tag{780}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{781}$$

$$a_1 = \epsilon^{k_5 k_6}_{k_1 k_2 k_3 k_4}$$

$$a_2 = \epsilon^{k_7}_{k_5}$$

$$a_3 = \epsilon_{k_6 k_7}$$

Diagram 389:

$$\text{PO3.389} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} O^{40}_{k_1 k_2 k_3 k_4} \Omega^{24}_{k_5 k_6 k_1 k_2 k_3 k_4} \Omega^{22}_{k_7 k_8 k_5 k_6} \Omega^{02}_{k_7 k_8} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_5 k_6}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_7 k_8}_{k_5 k_6}} e^{-\tau_3 \epsilon_{k_7 k_8}}$$

$$= \frac{(-1)^3}{(2!)^2(4!)} \sum_{k_i} \frac{O^{40}_{k_1 k_2 k_3 k_4} \Omega^{24}_{k_5 k_6 k_1 k_2 k_3 k_4} \Omega^{22}_{k_7 k_8 k_5 k_6} \Omega^{02}_{k_7 k_8}}{\epsilon_{k_1 k_2 k_3 k_4} \ \epsilon_{k_5 k_6} \ \epsilon_{k_7 k_8}} \tag{782}$$

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{783}$$

$$a_1 = \epsilon_{k_1 k_2 k_3 k_4}^{k_5 k_6}$$
$$a_2 = \epsilon_{k_5 k_6}^{k_7 k_8}$$
$$a_3 = \epsilon_{k_7 k_8}$$

Diagram 390:

$$\text{PO3.390} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2 k_3 k_4}^{24} \Omega_{k_9 k_7}^{11} \Omega_{k_9 k_8 k_5 k_6}^{04} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon_{k_1 k_2 k_3 k_4}^{k_7 k_8}} e^{-\tau_2 \epsilon_{k_7}^{k_9}} e^{-\tau_3 \epsilon_{k_5 k_6 k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O_{k_1 k_2 k_3 k_4 k_5 k_6}^{60} \Omega_{k_7 k_8 k_1 k_2 k_3 k_4}^{24} \Omega_{k_9 k_7}^{11} \Omega_{k_9 k_8 k_5 k_6}^{04}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_5 k_6 k_8} \ \epsilon_{k_5 k_6 k_8 k_9}} \tag{784}$$

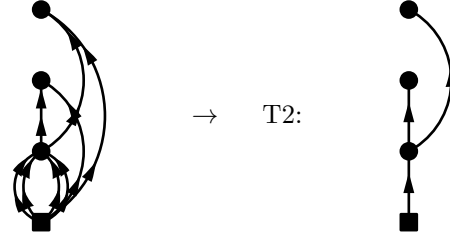$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{785}$$

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$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$

$$a_2 = \epsilon^{k_9}_{k_7}$$

$$a_3 = \epsilon_{k_5 k_6 k_8 k_9}$$

Diagram 391:

$$\text{PO3.391} = \lim_{\tau \to \infty} \frac{-(-1)^3}{2(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{02}_{k_7 k_5} \Omega^{02}_{k_8 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon_{k_5 k_7}} e^{-\tau_3 \epsilon_{k_6 k_8}}$$

$$= \frac{-(-1)^3}{2(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{02}_{k_7 k_5} \Omega^{02}_{k_8 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_7} \; \epsilon_{k_6 k_8}} \tag{786}$$

$$\to \quad \text{T2:}$$

$$\text{T2} = \frac{1}{(a_1 + a_2 + a_3)a_2 a_3} \tag{787}$$

$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$

$$a_2 = \epsilon_{k_5 k_7}$$

$$a_3 = \epsilon_{k_6 k_8}$$

Diagram 392:

$$\text{PO3.392} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{13}_{k_9 k_7 k_8 k_5} \Omega^{02}_{k_9 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_9}_{k_5 k_7 k_8}} e^{-\tau_3 \epsilon_{k_6 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{13}_{k_9 k_7 k_8 k_5} \Omega^{02}_{k_9 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_5 k_7 k_8 k_6} \; \epsilon_{k_6 k_9}} \tag{788}$$

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$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{789}$$

$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$
$$a_2 = \epsilon^{k_9}_{k_5 k_7 k_8}$$
$$a_3 = \epsilon_{k_6 k_9}$$

Diagram 393:

$$\text{PO3.393} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{13}_{k_9 k_7 k_5 k_6} \Omega^{02}_{k_9 k_8} \int_0^{\tau} \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_9}_{k_5 k_6 k_7}} e^{-\tau_3 \epsilon_{k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{13}_{k_9 k_7 k_5 k_6} \Omega^{02}_{k_9 k_8}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_5 k_6 k_7 k_8} \ \epsilon_{k_8 k_9}} \tag{790}$$
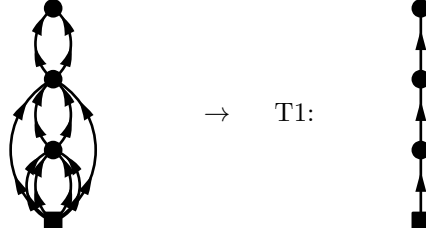

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{791}$$

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$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$

$$a_2 = \epsilon^{k_9}_{k_5 k_6 k_7}$$

$$a_3 = \epsilon_{k_8 k_9}$$

Diagram 394:

$$\text{PO3.394} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{24}_{k_9 k_{10} k_7 k_8 k_5 k_6} \Omega^{02}_{k_9 k_{10}} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}} e^{-\tau_2 \epsilon^{k_9 k_{10}}_{k_5 k_6 k_7 k_8}} e^{-\tau_3 \epsilon_{k_9 k_{10}}}$$

$$= \frac{(-1)^3}{(2!)^3(4!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{24}_{k_7 k_8 k_1 k_2 k_3 k_4} \Omega^{24}_{k_9 k_{10} k_7 k_8 k_5 k_6} \Omega^{02}_{k_9 k_{10}}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_5 k_6 k_7 k_8} \ \epsilon_{k_9 k_{10}}} \tag{792}$$
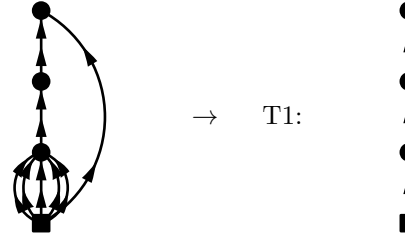

$$\rightarrow \quad \text{T1:}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{793}$$

$$a_1 = \epsilon^{k_7 k_8}_{k_1 k_2 k_3 k_4}$$

$$a_2 = \epsilon^{k_9 k_{10}}_{k_5 k_6 k_7 k_8}$$

$$a_3 = \epsilon_{k_9 k_{10}}$$

Diagram 395:

$$\text{PO3.395} = \lim_{\tau \to \infty} \frac{(-1)^3}{(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_1 k_2 k_3 k_4 k_5} \Omega^{11}_{k_8 k_7} \Omega^{02}_{k_8 k_6} \int_0^\tau d\tau_1 d\tau_2 d\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_2 \epsilon^{k_8}_{k_7}} e^{-\tau_3 \epsilon_{k_6 k_8}}$$

$$= \frac{(-1)^3}{(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_1 k_2 k_3 k_4 k_5} \Omega^{11}_{k_8 k_7} \Omega^{02}_{k_8 k_6}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \ \epsilon_{k_7 k_6} \ \epsilon_{k_6 k_8}} \tag{794}$$

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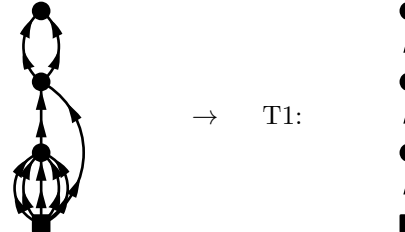$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{795}$$

$$a_1 = \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}$$
$$a_2 = \epsilon^{k_8}_{k_7}$$
$$a_3 = \epsilon_{k_6 k_8}$$

Diagram 396:

$$\text{PO3.396} = \lim_{\tau \to \infty} \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_1 k_2 k_3 k_4 k_5} \Omega^{22}_{k_8 k_9 k_7 k_6} \Omega^{02}_{k_8 k_9} \int_0^\tau \mathrm{d}\tau_1 \mathrm{d}\tau_2 \mathrm{d}\tau_3 \theta(\tau_2 - \tau_1)\theta(\tau_3 - \tau_2) e^{-\tau_1 \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}} e^{-\tau_2 \epsilon^{k_8 k_9}_{k_6 k_7}} e^{-\tau_3 \epsilon_{k_8 k_9}}$$

$$= \frac{(-1)^3}{(2!)(5!)} \sum_{k_i} \frac{O^{60}_{k_1 k_2 k_3 k_4 k_5 k_6} \Omega^{15}_{k_7 k_1 k_2 k_3 k_4 k_5} \Omega^{22}_{k_8 k_9 k_7 k_6} \Omega^{02}_{k_8 k_9}}{\epsilon_{k_1 k_2 k_3 k_4 k_5 k_6} \; \epsilon_{k_6 k_7} \; \epsilon_{k_8 k_9}} \tag{796}$$

$$\text{T1} = \frac{1}{(a_1 + a_2 + a_3)(a_2 + a_3)a_3} \tag{797}$$

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$$a_1 = \epsilon^{k_7}_{k_1 k_2 k_3 k_4 k_5}$$
$$a_2 = \epsilon^{k_8 k_9}_{k_6 k_7}$$
$$a_3 = \epsilon_{k_8 k_9}$$