X=T, n=3 : Operators and Kinematic Factors

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(4, 1)

(Block 1) Trace = 0, Symmetric, C = 1

$$O_1^{T(4,1),1} = O_{1,1,1}$$
$$K_1^{T(4,1),1} = 0$$

$$O_2^{T(4,1),1} = O_{2,2,2}$$
$$K_2^{T(4,1),1} = 0$$

$$O_3^{T(4,1),1} = O_{3,3,3}$$
$$K_3^{T(4,1),1} = 0$$

$$O_4^{T(4,1),1} = O_{4,4,4}$$
$$K_4^{T(4,1),1} = 0$$

(Block 2) Trace = 0, Mixed Symmetry, C = 1

$$O_1^{T(4,1),2} = O_{1,2,2} + O_{1,3,3} + O_{1,4,4}$$
$$K_1^{T(4,1),2} = 0$$

$$O_2^{T(4,1),2} = O_{2,1,1} + O_{2,3,3} + O_{2,4,4}$$
$$K_2^{T(4,1),2} = 0$$

$$O_3^{T(4,1),2} = O_{3,1,1} + O_{3,2,2} + O_{3,4,4}$$
$$K_3^{T(4,1),2} = 0$$

$$O_4^{T(4,1),2} = O_{4,1,1} + O_{4,2,2} + O_{4,3,3}$$
$$K_4^{T(4,1),2} = 0$$

(Block 3) Trace = 0, Mixed Symmetry, C = 1

$$O_1^{T(4,1),3} = O_{2,1,2} + O_{3,1,3} + O_{4,1,4}$$
$$K_1^{T(4,1),3} = 0$$

$$O_2^{T(4,1),3} = O_{1,2,1} + O_{3,2,3} + O_{4,2,4}$$
$$K_2^{T(4,1),3} = 0$$

$$O_3^{T(4,1),3} = O_{1,3,1} + O_{2,3,2} + O_{4,3,4}$$
$$K_3^{T(4,1),3} = 0$$

$$O_4^{T(4,1),3} = O_{1,4,1} + O_{2,4,2} + O_{3,4,3}$$
$$K_4^{T(4,1),3} = 0$$

(Block 4) Trace = 0, Mixed Symmetry, C = 1

$$O_1^{T(4,1),4} = O_{2,2,1} + O_{3,3,1} + O_{4,4,1}$$
$$K_1^{T(4,1),4} = 0$$

$$O_2^{T(4,1),4} = O_{1,1,2} + O_{3,3,2} + O_{4,4,2}$$
$$K_2^{T(4,1),4} = 0$$

$$O_3^{T(4,1),4} = O_{1,1,3} + O_{2,2,3} + O_{4,4,3}$$
$$K_3^{T(4,1),4} = 0$$

$$O_4^{T(4,1),4} = O_{1,1,4} + O_{2,2,4} + O_{3,3,4}$$
$$K_4^{T(4,1),4} = 0$$

(4, 2)

(Block 1) Trace = 0, Symmetric, C = 1

$$O_1^{T(4,2),1} = O_{2,3,4} + O_{2,4,3} + O_{3,2,4} + O_{3,4,2} + O_{4,2,3} + O_{4,3,2}$$
$$K_1^{T(4,2),1} = 0$$

$$O_2^{T(4,2),1} = O_{1,3,4} + O_{1,4,3} + O_{3,1,4} + O_{3,4,1} + O_{4,1,3} + O_{4,3,1}$$
$$K_2^{T(4,2),1} = 0$$

$$O_3^{T(4,2),1} = O_{1,2,4} + O_{1,4,2} + O_{2,1,4} + O_{2,4,1} + O_{4,1,2} + O_{4,2,1}$$
$$K_3^{T(4,2),1} = 0$$

$$O_4^{T(4,2),1} = O_{1,2,3} + O_{1,3,2} + O_{2,1,3} + O_{2,3,1} + O_{3,1,2} + O_{3,2,1}$$
$$K_4^{T(4,2),1} = 0$$

(4, 4)

(Block 1) Trace = 0, Antisymmetric, C = 1

$$O_1^{T(4,4),1} = O_{2,3,4} - O_{2,4,3} - O_{3,2,4} + O_{3,4,2} + O_{4,2,3} - O_{4,3,2}$$
$$K_1^{T(4,4),1} = \frac{-4m_N p_1 p_3}{(E(p)(E(p)+m_N))}$$

$$O_2^{T(4,4),1} = O_{1,3,4} - O_{1,4,3} - O_{3,1,4} + O_{3,4,1} + O_{4,1,3} - O_{4,3,1}$$
$$K_2^{T(4,4),1} = \frac{4m_N p_2 p_3}{(E(p)(E(p)+m_N))}$$

$$O_3^{T(4,4),1} = O_{1,2,4} - O_{1,4,2} - O_{2,1,4} + O_{2,4,1} + O_{4,1,2} - O_{4,2,1}$$
$$K_3^{T(4,4),1} = \frac{2(-E(p)^3 - E(p)m_N^2 + E(p)p_1^2 + E(p)p_2^2 + E(p)p_3^2 - 2m_N^3 - 2m_N p_3^2)}{(E(p)(E(p)+m_N))}$$

$$O_4^{T(4,4),1} = O_{1,2,3} - O_{1,3,2} - O_{2,1,3} + O_{2,3,1} + O_{3,1,2} - O_{3,2,1}$$
$$K_4^{T(4,4),1} = \frac{4im_N p_3}{E(p)}$$

(8, 1)

(Block 1) Trace = 0, Mixed Symmetry, C = 1

$$O_1^{T(8,1),1} = O_{1,2,2} - O_{1,3,3}/2 - O_{1,4,4}/2$$
$$K_1^{T(8,1),1} = \frac{3ip_2(E(p)m_N + m_N^2 + p_1^2 + p_2^2)}{(E(p)(E(p) + m_N))}$$

$$O_2^{T(8,1),1} = O_{2,1,1} - O_{2,3,3}/2 - O_{2,4,4}/2$$
$$K_2^{T(8,1),1} = \frac{-3ip_1(E(p)m_N + m_N^2 + p_1^2 + p_2^2)}{(E(p)(E(p) + m_N))}$$

$$O_3^{T(8,1),1} = O_{3,1,1} + O_{3,2,2} - 2O_{3,4,4}$$
$$K_3^{T(8,1),1} = 0$$

$$O_4^{T(8,1),1} = O_{4,1,1} + O_{4,2,2} - 2O_{4,3,3}$$
$$K_4^{T(8,1),1} = 0$$

$$O_5^{T(8,1),1} = O_{1,3,3} - O_{1,4,4}$$
$$K_5^{T(8,1),1} = \frac{2ip_2(E(p)m_N + m_N^2 + p_1^2 + p_2^2 + 2p_3^2)}{(E(p)(E(p) + m_N))}$$

$$O_6^{T(8,1),1} = O_{2,3,3} - O_{2,4,4}$$
$$K_6^{T(8,1),1} = \frac{-2ip_1(E(p)m_N + m_N^2 + p_1^2 + p_2^2 + 2p_3^2)}{(E(p)(E(p) + m_N))}$$

$$O_7^{T(8,1),1} = O_{3,1,1} - O_{3,2,2}$$
$$K_7^{T(8,1),1} = \frac{-4ip_1p_2p_3}{(E(p)(E(p) + m_N))}$$

$$O_8^{T(8,1),1} = O_{4,1,1} - O_{4,2,2}$$
$$K_8^{T(8,1),1} = \frac{4p_1p_2}{E(p)}$$

(Block 2) Trace = 0, Mixed Symmetry, C = 1

$$O_1^{T^{(8,1),2}} = O_{2,1,2} - O_{3,1,3}/2 - O_{4,1,4}/2$$
$$K_1^{T^{(8,1),2}} = \frac{-3ip_2(E(p)m_N + m_N^2 + p_1^2 + p_2^2)}{(E(p)(E(p) + m_N))}$$

$$O_2^{T^{(8,1),2}} = O_{1,2,1} - O_{3,2,3}/2 - O_{4,2,4}/2$$
$$K_2^{T^{(8,1),2}} = \frac{3ip_1(E(p)m_N + m_N^2 + p_1^2 + p_2^2)}{(E(p)(E(p) + m_N))}$$

$$O_3^{T^{(8,1),2}} = O_{1,3,1} + O_{2,3,2} - 2O_{4,3,4}$$
$$K_3^{T^{(8,1),2}} = 0$$

$$O_4^{T^{(8,1),2}} = O_{1,4,1} + O_{2,4,2} - 2O_{3,4,3}$$
$$K_4^{T^{(8,1),2}} = 0$$

$$O_5^{T^{(8,1),2}} = O_{3,1,3} - O_{4,1,4}$$
$$K_5^{T^{(8,1),2}} = \frac{-2ip_2(E(p)m_N + m_N^2 + p_1^2 + p_2^2 + 2p_3^2)}{(E(p)(E(p) + m_N))}$$

$$O_6^{T^{(8,1),2}} = O_{3,2,3} - O_{4,2,4}$$
$$K_6^{T^{(8,1),2}} = \frac{2ip_1(E(p)m_N + m_N^2 + p_1^2 + p_2^2 + 2p_3^2)}{(E(p)(E(p) + m_N))}$$

$$O_7^{T^{(8,1),2}} = O_{1,3,1} - O_{2,3,2}$$
$$K_7^{T^{(8,1),2}} = \frac{4ip_1p_2p_3}{(E(p)(E(p) + m_N))}$$

$$O_8^{T^{(8,1),2}} = O_{1,4,1} - O_{2,4,2}$$
$$K_8^{T^{(8,1),2}} = \frac{-4p_1p_2}{E(p)}$$

(Block 3) Trace = 0, Mixed Symmetry, C = 1

$$O_1^{T(8,1),3} = O_{2,2,1} - O_{3,3,1}/2 - O_{4,4,1}/2$$
$$K_1^{T(8,1),3} = 0$$

$$O_2^{T(8,1),3} = O_{1,1,2} - O_{3,3,2}/2 - O_{4,4,2}/2$$
$$K_2^{T(8,1),3} = 0$$

$$O_3^{T(8,1),3} = O_{1,1,3} + O_{2,2,3} - 2O_{4,4,3}$$
$$K_3^{T(8,1),3} = 0$$

$$O_4^{T(8,1),3} = O_{1,1,4} + O_{2,2,4} - 2O_{3,3,4}$$
$$K_4^{T(8,1),3} = 0$$

$$O_5^{T(8,1),3} = O_{3,3,1} - O_{4,4,1}$$
$$K_5^{T(8,1),3} = 0$$

$$O_6^{T(8,1),3} = O_{3,3,2} - O_{4,4,2}$$
$$K_6^{T(8,1),3} = 0$$

$$O_7^{T(8,1),3} = O_{1,1,3} - O_{2,2,3}$$
$$K_7^{T(8,1),3} = 0$$

$$O_8^{T(8,1),3} = O_{1,1,4} - O_{2,2,4}$$
$$K_8^{T(8,1),3} = 0$$

(8, 2)

(Block 1) Trace = 0, Mixed Symmetry, C = 1

$$O_1^{T(8,2),1} = O_{2,3,4} + O_{2,4,3} - O_{3,2,4} - O_{4,2,3}$$
$$K_1^{T(8,2),1} = \frac{4p_1p_3(2E(p) + m_N)}{(E(p)(E(p) + m_N))}$$

$$O_2^{T(8,2),1} = O_{1,3,4} + O_{1,4,3} - O_{3,1,4} - O_{4,1,3}$$
$$K_2^{T(8,2),1} = \frac{-4p_2p_3(2E(p) + m_N)}{(E(p)(E(p) + m_N))}$$

$$O_3^{T(8,2),1} = O_{1,4,2} + O_{2,4,1} - O_{4,1,2} - O_{4,2,1}$$
$$K_3^{T(8,2),1} = \frac{4(p_1^2 - p_2^2)}{E(p)}$$

$$O_4^{T(8,2),1} = O_{1,3,2} + O_{2,3,1} - O_{3,1,2} - O_{3,2,1}$$
$$K_4^{T(8,2),1} = \frac{4ip_3(-p_1^2 + p_2^2)}{(E(p)(E(p) + m_N))}$$

$$O_5^{T(8,2),1} = O_{2,3,4} - O_{2,4,3} - O_{3,2,4} - 2O_{3,4,2} + O_{4,2,3} + 2O_{4,3,2}$$
$$K_5^{T(8,2),1} = \frac{-4m_Np_1p_3}{(E(p)(E(p) + m_N))}$$

$$O_6^{T(8,2),1} = O_{1,3,4} - O_{1,4,3} - O_{3,1,4} - 2O_{3,4,1} + O_{4,1,3} + 2O_{4,3,1}$$
$$K_6^{T(8,2),1} = \frac{4m_Np_2p_3}{(E(p)(E(p) + m_N))}$$

$$O_7^{T(8,2),1} = O_{1,2,4} + O_{1,4,2}/2 - O_{2,1,4} - O_{2,4,1}/2 - O_{4,1,2}/2 + O_{4,2,1}/2$$
$$K_7^{T(8,2),1} = \frac{2(-E(p)^3 - E(p)m_N^2 - 2E(p)p_1^2 - 2E(p)p_2^2 + E(p)p_3^2 - 2m_N^3 - 3m_Np_1^2 - 3m_Np_2^2 - 2m_Np_3^2)}{(E(p)(E(p) + m_N))}$$

$$O_8^{T(8,2),1} = O_{1,2,3} + O_{1,3,2}/2 - O_{2,1,3} - O_{2,3,1}/2 - O_{3,1,2}/2 + O_{3,2,1}/2$$
$$K_8^{T(8,2),1} = \frac{2ip_3(2E(p)m_N + 2m_N^2 + 3p_1^2 + 3p_2^2)}{(E(p)(E(p) + m_N))}$$

(Block 2) Trace = 0, Mixed Symmetry, C = 1

$$O_1^{T(8,2),2} = O_{2,3,4} + O_{2,4,3} - O_{3,4,2} - O_{4,3,2}$$
$$K_1^{T(8,2),2} = \frac{2p_1p_3(2E(p) + m_N)}{(E(p)(E(p) + m_N))}$$

$$O_2^{T(8,2),2} = O_{1,3,4} + O_{1,4,3} - O_{3,4,1} - O_{4,3,1}$$
$$K_2^{T(8,2),2} = \frac{-2p_2p_3(2E(p) + m_N)}{(E(p)(E(p) + m_N))}$$

$$O_3^{T(8,2),2} = O_{1,2,4} + O_{2,1,4} - O_{4,1,2} - O_{4,2,1}$$
$$K_3^{T(8,2),2} = \frac{2(p_1^2 - p_2^2)}{E(p)}$$

$$O_4^{T(8,2),2} = O_{1,2,3} + O_{2,1,3} - O_{3,1,2} - O_{3,2,1}$$
$$K_4^{T(8,2),2} = \frac{2ip_3(-p_1^2 + p_2^2)}{(E(p)(E(p) + m_N))}$$

$$O_5^{T(8,2),2} = O_{2,3,4} - O_{2,4,3} + 2O_{3,2,4} + O_{3,4,2} - 2O_{4,2,3} - O_{4,3,2}$$
$$K_5^{T(8,2),2} = \frac{2m_Np_1p_3}{(E(p)(E(p) + m_N))}$$

$$O_6^{T(8,2),2} = O_{1,3,4} - O_{1,4,3} + 2O_{3,1,4} + O_{3,4,1} - 2O_{4,1,3} - O_{4,3,1}$$
$$K_6^{T(8,2),2} = \frac{-2m_Np_2p_3}{(E(p)(E(p) + m_N))}$$

$$O_7^{T(8,2),2} = O_{1,2,4} + 2O_{1,4,2} - O_{2,1,4} - 2O_{2,4,1} + O_{4,1,2} - O_{4,2,1}$$
$$K_7^{T(8,2),2} = \frac{2(-E(p)^3 - E(p)m_N^2 - 2E(p)p_1^2 - 2E(p)p_2^2 + E(p)p_3^2 - 2m_N^3 - 3m_Np_1^2 - 3m_Np_2^2 - 2m_Np_3^2)}{(E(p)(E(p) + m_N))}$$

$$O_8^{T(8,2),2} = O_{1,2,3} + 2O_{1,3,2} - O_{2,1,3} - 2O_{2,3,1} + O_{3,1,2} - O_{3,2,1}$$
$$K_8^{T(8,2),2} = \frac{2ip_3(2E(p)m_N + 2m_N^2 + 3p_1^2 + 3p_2^2)}{(E(p)(E(p) + m_N))}$$