X=A, n=2 : Operators and Kinematic Factors

E.T.

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(1, 4)

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

$$O_1^{A(1,4),1} = O_{1,1} + O_{2,2} + O_{3,3} + O_{4,4}$$
$$K_1^{A(1,4),1} = \frac{ip_3(-E(p)^2 + m_N^2 + p_1^2 + p_2^2 + p_3^2)}{(2E(p)(E(p) + m_N))}$$

(3, 4)

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

$$O_1^{A(3,4),1} = O_{1,1} + O_{2,2} + O_{3,3} - 3O_{4,4}$$
$$K_1^{A(3,4),1} = \frac{ip_3(7E(p)^2 + 8E(p)m_N + m_N^2 + p_1^2 + p_2^2 + p_3^2)}{(2E(p)(E(p) + m_N))}$$

$$O_2^{A(3,4),1} = O_{1,1} + O_{2,2} - 2O_{3,3}$$
$$K_2^{A(3,4),1} = \frac{ip_3(-E(p)^2 - 2E(p)m_N - m_N^2 + 2p_1^2 + 2p_2^2 - p_3^2)}{(E(p)(E(p) + m_N))}$$

$$O_3^{A(3,4),1} = O_{1,1} - O_{2,2}$$
$$K_3^{A(3,4),1} = \frac{ip_3(p_1^2 - p_2^2)}{(E(p)(E(p) + m_N))}$$

(6, 1)

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

$$O_1^{A(6,1),1} = O_{3,4} - O_{4,3}$$
$$K_1^{A(6,1),1} = \frac{(-E(p)^3 - 2E(p)^2 m_N - E(p)m_N^2 + E(p)p_1^2 + E(p)p_2^2 + E(p)p_3^2 + 2m_N p_3^2)}{(2E(p)(E(p) + m_N))}$$

$$O_2^{A(6,1),1} = O_{2,4} - O_{4,2}$$
$$K_2^{A(6,1),1} = \frac{m_N p_2 p_3}{(E(p)(E(p) + m_N))}$$

$$O_3^{A(6,1),1} = O_{1,4} - O_{4,1}$$
$$K_3^{A(6,1),1} = \frac{m_N p_1 p_3}{(E(p)(E(p) + m_N))}$$

$$O_4^{A(6,1),1} = O_{2,3} - O_{3,2}$$
$$K_4^{A(6,1),1} = \frac{ip_2(-E(p)^2 - 2E(p)m_N - m_N^2 + p_1^2 + p_2^2 + p_3^2)}{(2E(p)(E(p) + m_N))}$$

$$O_5^{A(6,1),1} = O_{1,3} - O_{3,1}$$
$$K_5^{A(6,1),1} = \frac{ip_1(-E(p)^2 - 2E(p)m_N - m_N^2 + p_1^2 + p_2^2 + p_3^2)}{(2E(p)(E(p) + m_N))}$$

$$O_6^{A(6,1),1} = O_{1,2} - O_{2,1}$$
$$K_6^{A(6,1),1} = 0$$

(6, 4)

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

$$O_1^{A(6,4),1} = O_{1,2} + O_{2,1}$$
$$K_1^{A(6,4),1} = \frac{2ip_1p_2p_3}{(E(p)(E(p)+m_N))}$$

$$O_2^{A(6,4),1} = O_{1,3} + O_{3,1}$$
$$K_2^{A(6,4),1} = \frac{ip_1(E(p)^2 + 2E(p)m_N + m_N^2 - p_1^2 - p_2^2 + 3p_3^2)}{(2E(p)(E(p)+m_N))}$$

$$O_3^{A(6,4),1} = O_{2,3} + O_{3,2}$$
$$K_3^{A(6,4),1} = \frac{ip_2(E(p)^2 + 2E(p)m_N + m_N^2 - p_1^2 - p_2^2 + 3p_3^2)}{(2E(p)(E(p)+m_N))}$$

$$O_4^{A(6,4),1} = O_{1,4} + O_{4,1}$$
$$K_4^{A(6,4),1} = \frac{-p_1p_3(2E(p)+m_N)}{(E(p)(E(p)+m_N))}$$

$$O_5^{A(6,4),1} = O_{2,4} + O_{4,2}$$
$$K_5^{A(6,4),1} = \frac{-p_2p_3(2E(p)+m_N)}{(E(p)(E(p)+m_N))}$$

$$O_6^{A(6,4),1} = O_{3,4} + O_{4,3}$$
$$K_6^{A(6,4),1} = \frac{(-E(p)^3 - 2E(p)^2m_N - E(p)m_N^2 + E(p)p_1^2 + E(p)p_2^2 - 3E(p)p_3^2 - 2m_Np_3^2)}{(2E(p)(E(p)+m_N))}$$