Result $\quad d = D - 2\epsilon$

$$\boxed{(T_N)_{\underbrace{\underbrace{0\cdots0}_{2r}\,\underbrace{1\cdots1}_{n_1}\,\underbrace{2\cdots2}_{n_2}\cdots}_{P}} = \mu^{2\epsilon}\frac{(-1)^{N+\overbrace{P}^{P=n_1+\cdots+n_{N-1}+2r}-r}}{2^r}\, e^{\gamma_E\epsilon}\,\Gamma\!\left(N-\tfrac{d}{2}-r\right)\int_0^1 dx_1\cdots dx_N\,\delta\!\left(1-\textstyle\sum_i x_i\right)\frac{x_1^{n_1}\cdots x_{N-1}^{n_{N-1}}}{(\Delta)^{N-\frac{d}{2}-r}}}$$

$\boxed{\text{Special cases:}}$

if $d = 4-2\epsilon$

$$A_{\underbrace{0\cdots0}_{2r}}(m_0) = \mu^{2\epsilon}\frac{(-1)^{1+r}}{2^r}\, e^{\gamma_E\epsilon}\,\Gamma\big(\overbrace{1-\tfrac{d}{2}-r}^{-1+\epsilon}\big)\left(\frac{1}{\Delta}\right)^{1-\frac{d}{2}-r} \qquad \Delta = m_0^2 - i\epsilon$$

$$B_{\underbrace{0\cdots0}_{2r}\,\underbrace{1\cdots1}_{n_1}}(p^2; m_0, m_1) = \mu^{2\epsilon}\frac{(-1)^{2+r+n_1}}{2^r}\, e^{\gamma_E\epsilon}\,\Gamma\big(\overbrace{2-\tfrac{d}{2}-r}^{\epsilon}\big)\int_0^1 dx\,\frac{x^{n_1}}{(\Delta)^{2-\frac{d}{2}-r}}$$

where $\Delta = p^2x^2 + (-p^2+m_1^2-m_0^2)x + m_0^2 - i\epsilon$

$$C_{\underbrace{0\cdots0}_{2r}\,\underbrace{1\cdots1}_{n_1}\,\underbrace{2\cdots2}_{n_2}}(p_1^2, q^2, p_2^2; m_0, m_1, m_2)$$
$$= \mu^{2\epsilon}\frac{(-1)^{3+r+n_1+n_2}}{2^r}\, e^{\gamma_E\epsilon}\,\Gamma\big(\overbrace{3-\tfrac{d}{2}-r}^{1+\epsilon}\big)\int_0^1 dy\int_0^{1-y} dz\,\frac{y^{n_1}z^{n_2}}{(\Delta)^{3-d/2-r}}$$

where $\Delta = p_1^2y^2 + p_2^2z^2 + (-q^2+p_1^2+p_2^2)yz + (-p_1^2+m_1^2-m_0^2)y + (-p_2^2+m_2^2-m_0^2)z + m_0^2 - i\epsilon$

and $q^2 = (p_2-p_1)^2$.

$3 - \frac{4-2\epsilon}{2} - r$

$= 1+\epsilon-r$

$$D_{\underbrace{0\cdots 0}_{2r}\underbrace{1\cdots 1}_{n_1}\underbrace{2\cdots 2}_{n_2}\underbrace{3\cdots 3}_{n_3}} = \mu^{2\epsilon}\frac{(-1)^{4+r+n_1+n_2+n_3}}{2^r} e^{\gamma_E \epsilon}\,\Gamma(2+\epsilon-r)$$

$$\times\int_0^1 dx\int_0^{1-x} dy\int_0^{1-x-y} dz\; x^{n_1} y^{n_2} z^{n_3}\,\Delta(x,y,z)^{-2-\epsilon+r}$$

$$\Delta(x,y,z) = ax^2 + by^2 + cz^2 + dxy + exz + fyz + gx + hy + iz + j$$

$$\begin{aligned}
a &= p_1^2 && = s_1\\
b &= p_2^2 && = s_{12}\\
c &= p_3^2 && = s_4\\
d &= 2p_1\cdot p_3 && = (s_{12}+s_1-s_2)\\
e &= 2p_1\cdot p_3 && = (-s_{23}+s_1+s_4)\\
f &= 2p_2\cdot p_3 && = (s_{12}+s_4-s_3)\\
g &= (-p_1^2+m_1^2-m_0^2) && = -s_1+m_1^2-m_0^2\\
h &= (-p_2^2+m_2^2-m_0^2) && = -s_{12}+m_2^2-m_0^2\\
i &= (-p_3^2+m_3^2-m_0^2) && = -s_4+m_3^2-m_0^2\\
j &= m_0^2-i\epsilon && = m_0^2-i\epsilon
\end{aligned}$$