

$$I_4^{\{D=4-2\epsilon\}}(0, m_3^2, 0, p_4^2; s, t; 0, 0, m_3^2, m_4^2)$$

Page contributed by **R.K. Ellis**

$$\begin{aligned} I_4^{\{D=4-2\epsilon\}}(0, m_3^2, 0, p_4^2; s, t; 0, 0, m_3^2, m_4^2) &= \frac{1}{(t - m_4^2)(s - m_3^2)} \left[\frac{1}{2\epsilon^2} - \frac{1}{\epsilon} \left[\ln \left(\frac{m_4^2 - t}{m_4^2 - p_4^2} \right) \right. \right. \\ &\quad \left. \left. + \ln \left(\frac{m_3^2 - s}{m_3\mu} \right) \right] + \ln^2 \left(\frac{m_3^2 - s}{m_3\mu} \right) - \frac{\pi^2}{12} + 2 \ln \left(\frac{m_3^2 - s}{m_3\mu} \right) \ln \left(\frac{m_4^2 - t}{m_4^2 - p_4^2} \right) \right. \\ &\quad \left. + \text{Li}_2 \left(1 + \frac{s - m_3^2}{m_4^2 - p_4^2} \right) + \text{Li}_2 \left(1 + \frac{m_4^2(s - m_3^2)}{m_3^2(m_4^2 - p_4^2)} \right) - 2\text{Li}_2 \left(1 + \frac{m_4^2 - p_4^2}{t - m_4^2} \right) \right] + \mathcal{O}(\epsilon) \end{aligned}$$

Integral obtained from Eq.(B7) of ref. [1]. This result apparently agrees with $I_4^{\{D=4-2\epsilon\}}(0, m_3^2, 0, m_3^2; t, u; 0, 0, m_4^2, m_3^2)$ from Eq.6.76 of Ref. [2], which is obtained by taking the limit $p_4^2 \rightarrow m_1^2$.

Analytic continuation by the replacements $s_{ij} \rightarrow s_{ij} + i\epsilon, p_j^2 \rightarrow p_j^2 + i\epsilon$.

[Return to general page on boxes](#)

References

- [1] E. L. Berger, M. Klasen and T. M. P. Tait, Phys. Rev. D **62**, 095014 (2000) [[arXiv:hep-ph/0005196](#)]
- [2] R. Höpker, Hadroproduction and decay of squarks and gluinos, (in german), DESY Internal report DESY-T-96-02, ([Relevant excerpt](#))