$I_4^{\{D=4-2\epsilon\}}(0,m_1^2,0,m_1^2;t,u;0,0,m_2^2,m_1^2)$

Page contributed by R.K. Ellis

This integral has been given in Eq. (6.74) of ref [1].

$$I_4^{\{D=4-2\epsilon\}}(0,m_1^2,0,m_1^2;t,u;0,0,m_2^2,m_1^2) = \frac{1}{(t-m_2^2)(u-m_1^2)}\Big(\frac{\mu^2}{m_1^2}\Big)^\epsilon$$
$$\Bigg[\frac{1}{2\epsilon^2} - \frac{1}{\epsilon}\Big[\ln\Big(\frac{m_2^2-t}{m_2^2-m_1^2}\Big) + \ln\Big(\frac{m_1^2-u}{m_1^2}\Big)\Big] + \ln^2\Big(\frac{m_1^2-u}{m_1^2}\Big) - \frac{\pi^2}{12} + 2\ln\Big(\frac{m_1^2-u}{m_1^2}\Big)\ln\Big(\frac{m_2^2-t}{m_2^2-m_1^2}\Big)$$
$$+ \quad \mathrm{Li}_2\Big(1+\frac{u-m_1^2}{m_2^2-m_1^2}\Big) - \mathrm{Li}_2\Big(1+\frac{m_2^2(u-m_1^2)}{m_1^2(m_2^2-m_1^2)}\Big) - 2\,\mathrm{Li}_2\Big(1+\frac{m_2^2-m_1^2}{t-m_2^2}\Big)\Bigg] + \mathcal{O}(\epsilon)$$

For Li_2 etc, see the file on notation.

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References

[1] R. Höpker, Hadroproduction and decay of squarks and gluinos, (in german), DESY Internal report DESY-T-96-02, (Relevant excerpt)