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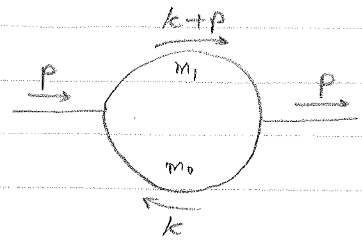
Imaginary part of B_0 — direct determination



From general formula,

$$\mathrm{Im}\, B_0(p^2; m_0, m_1) = \mathrm{Im}\left[\frac{\sqrt{\lambda(p^2, m_0^2, m_1^2)}}{p^2}\ln\left(\frac{2m_0 m_1}{-p^2+m_0^2+m_1^2-\sqrt{\lambda(p^2,m_0^2,m_1^2)}}+i\varepsilon\right)\right]$$

Singularities at:

$p^2 = 0$ $\quad$ 2^{nd}-type singularity ← pole appears on unphysical sheet.

$p^2 = (m_0 - m_1)^2$ $\quad$ "Pseudothreshold" ← cut appears on unphysical sheet.

$p^2 = (m_0 + m_1)^2$ $\quad$ Normal threshold.

For $p^2 > (m_0+m_1)^2$,

$\lambda(p^2, m_0^2, m_1^2)$ is positive, and argument of log is negative.

$\Longrightarrow$ Imaginary part all from $\ln(\text{—})$

$$\mathrm{Im}\, B_0(p^2; m_0, m_1) = \frac{\sqrt{\lambda(p^2, m_0^2, m_1^2)}}{p^2} \times \pi\ \theta(p^2 - (m_0+m_1)^2) = \mathrm{Im}\ \Lambda(p^2; m_0, m_1)$$