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Relativity formulæ

$\beta = \dfrac{v}{c}$ and $\gamma = \dfrac{m}{m_0}$ and $\gamma = \dfrac{1}{\sqrt{1-\beta^2}}$ so that $\beta\gamma = \sqrt{\gamma^2 - 1}$ and $d\gamma = \gamma^3 \beta \, d\beta$.

$E = m_0 \gamma c^2$ and $dE = m_0 c^2 \gamma^3 \beta \, d\beta$ so that $\dfrac{dE}{E} = \gamma^2 \beta^2 \dfrac{d\beta}{\beta}$.

$p = m_0 \gamma \beta c$ and $dp = m_0 c \gamma^3 d\beta$ so that $\dfrac{dp}{p} = \gamma^2 \dfrac{d\beta}{\beta}$ finally $\dfrac{dp}{p} = \dfrac{1}{\beta^2} \dfrac{dE}{E}$.

$E = m_0 \gamma c^2$ and $p = m_0 \gamma \beta c$ so that $\beta E = cp$ and $E \, d\beta + \beta \, dE = c \, dp$ finally $dE = c\beta \, dp$.

$E = \sqrt{E_0{}^2 + c^2 p^2}$ and $E_0 = m_0 c^2$ and $E = T + E_0$.

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