\[ x^\mu, (W^\mu) \]
\[ x^\mu = g_{\mu\nu} x^\nu \]
\[ \Delta^\nu = (\Delta^\mu)(\Delta^\nu) \rightarrow \left( \begin{array}{c} x^\mu' \\ x^\nu' \end{array} \right) \]
\[ (ds^2) = dx^\mu dx^\nu = g_{\mu\nu} dx^\mu dx^\nu \]
\[ dV = \frac{1}{V_c} \]
\[ \vec{F}_V = \frac{V_c}{V} \]
\[ V^0 = \frac{1}{V_c} \]
\[ V^1 = -\beta_x V^0 \]
\[ V^2 = -\beta_y V^0 \]
\[ V^3 = -\beta_z V^0 \]
\[ \gamma = \frac{1}{\sqrt{1-V^2}} \]
\[ \gamma V^0 = x^0 - \frac{x^0 V^0}{V^2} \]
\[ \gamma V^1 = x^1 - \frac{x^1 V^0}{V^2} \]
\[ \gamma V^2 = x^2 - \frac{x^2 V^0}{V^2} \]
\[ \gamma V^3 = x^3 - \frac{x^3 V^0}{V^2} \]
\[ \frac{d\xi}{dt} = \frac{1}{\sqrt{1-V^2}} \]
\[ \xi = \frac{1}{c} t \]
\[ \frac{dx^\mu}{d\xi} = \frac{1}{c} \]
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\[ \vec{a} \rightarrow \sum \rightarrow \vec{b} \rightarrow \vec{p}_{a,i} \rightarrow \vec{p}^N_{\text{tot},i} \rightarrow \vec{p}_{\text{tot},i}^N \rightarrow \vec{p}_{\text{tot},i}^N = \frac{m_{\text{tot}}^2 c^2}{E_{\text{tot}}} \]

\[ \Rightarrow \text{c.o.m.:} \quad \vec{p}_{\text{tot},i}^N = (m_{\text{tot}}^2 c^2, 0, 0, 0) \]

\[ P_{\text{tot},i}^o = \Gamma \left[ (P_{\text{inv}})^c \right] \]

\[ \vec{P}_{\text{tot},i}^o = \vec{\Gamma} \vec{P}_{\text{inv}} \left( (P_{\text{inv}})^c \right) \]

\[ P_{\text{tot}}^N = \sum_i P_{\text{tot},i}^N \quad \text{conserved (indep. of time)} \]

Invariant (indep. of coordinate system)

Center of mass frame