$$p_x = P_x/P_0 \quad \zeta = \beta \cdot (s/\beta_0 - c \cdot t)$$

$$p_y = P_y/P_0 \quad \delta = (P - P_0)/P_0$$

Note : $\beta = v/c, \beta_0 = v_0/c$

Note : $P_0, \beta_0, v_0 \ldots$ Ref. Particle