

ESERCIZIO 1

$$n = 100 \cdot 10^3 \text{ m}$$

$$t = 200 \mu\text{s} = 200 \cdot 10^{-6} \text{ s}$$

S'

$$v_t = 0,950c \Rightarrow \beta = 0,950$$

$$n' = \gamma (n - v_t t) = \frac{100 \cdot 10^3 \text{ m} - 0,950c \cdot 200 \cdot 10^{-6} \text{ s}}{\sqrt{1 - (0,950)^2}} =$$

$$= 137,84 \cdot 10^3 \text{ m}$$

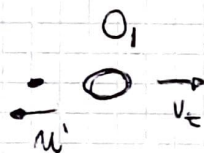
$$t' = \gamma \left(t - \frac{n v_t}{c^2} \right) = \frac{200 \cdot 10^{-6} \text{ s} - (100 \cdot 10^3 \text{ m} \cdot 0,950c) / c^2}{\sqrt{1 - (0,950)^2}} =$$

$$= -3,74 \cdot 10^{-4} \text{ s}$$

ESERCIZIO 2

$$v_t = 0,100c$$

$$u' = -0,560c$$



$$u = \frac{u' + v_t}{1 + \frac{u' v_t}{c^2}} = \frac{-0,560 + 0,100}{1 + 0,100 \cdot 0,560} \cdot c = -0,49c$$

ESERCIZIO 3

$$\Delta\gamma = 2,52 \cdot 10^{-8} \text{ s} = \Delta t'$$

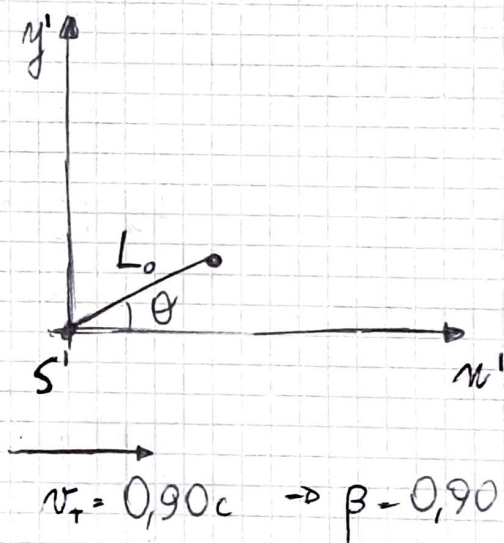
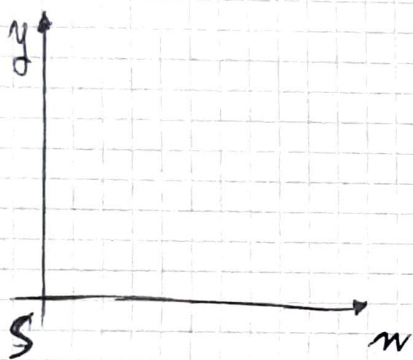
$$v_t^* = 0,27c \Rightarrow \beta = 0,27$$

$$\Delta n = ?$$

$$v_t = \frac{\Delta n}{\Delta t}$$

$$\Delta n = v_t \cdot \Delta t - v_t \cdot \gamma \Delta\gamma = \frac{0,27c \cdot 2,52 \cdot 10^{-8} \text{ s}}{\sqrt{1 - (0,27)^2}} = 2,12 \text{ m}$$

ESERCIZIO 4



$$L_0 = 1 \text{ m}$$

$$\theta = 30^\circ$$

$L_0 \rightsquigarrow$ lunghezza propria

$$L_0 \cdot \sin \theta = L_y$$

$$L_n = \frac{L_0 \cdot \cos \theta}{\gamma} = L_0 \cdot \cos \theta \cdot \sqrt{1 - (0,90)^2}$$

$$L = \sqrt{L_n^2 + L_y^2} = L_0 \cdot \sqrt{\cos^2 30^\circ \cdot (1 - 0,90^2) + \sin^2 30^\circ} = 1 \text{ m} \cdot (0,63) = 0,63 \text{ m}$$