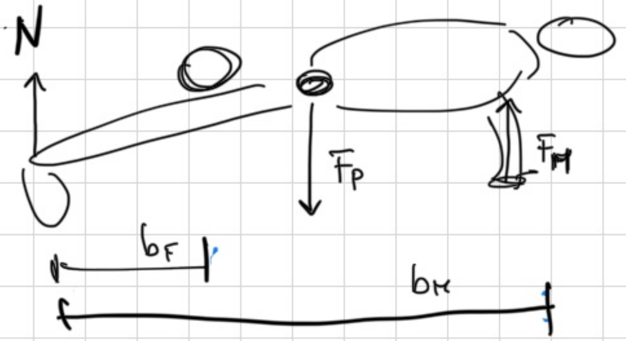
SOLUZIONE

1)



F_P → FORZA PESO

F_M → FORZA MOTRICE

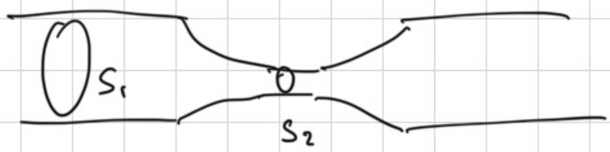
N → FORZA VINCOLARE

- LEVA SECONDO TIPO (CARIOLA)

- SUI PIEDI PER AUMENTARE BRACCIO FORZA MOTRICE E QUINDI IL GUADAGNO

$$G = \frac{b_M}{b_R}$$

2)



$$\Delta p = P_1 - P_2 = 40\,Pa = 40\,\frac{kg}{m s^2}$$

DAL TEOREMA DI BERNOULLI

$$P_1 - P_2 = \frac{1}{2}\rho v_2^2 - \frac{1}{2}\rho v_1^2$$

$$P_1 - P_2 = \frac{1}{2}\rho\left(v_2^2 - v_1^2\right)$$

PER CONTINUITÀ

$$S_1 v_1 = S_2 v_2$$

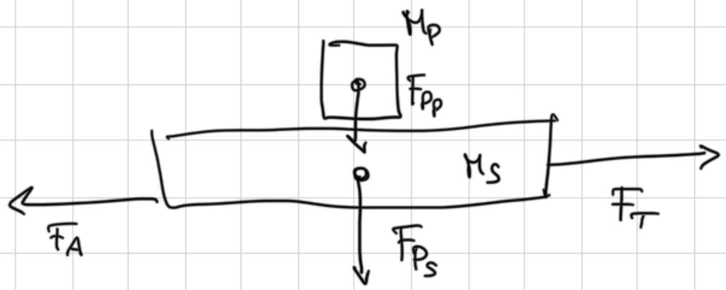
$$v_2 = \frac{S_1}{S_2} v_1$$

DA CUI

$$\Delta p = \frac{1}{2}\rho\left(\frac{S_1^2}{S_2^2} - 1\right) v_1^2$$

$$v_1 = 9 \text{ cm } s^{-1}$$

3)



PER SISTEMA SOLIDALE

$$\vec{F} = m\vec{a}$$

$$\vec{F_T} - \vec{F_A} = (M_P + M_S)\,\vec{a}$$

DOVE

$$\vec{F_A} = \left(\vec{F_{P_P}} + \vec{F_{P_S}}\right)\mu$$

$$\vec{F_A} = \mu\vec{g}\,(M_P + M_S)$$

$$a = \frac{F_T - \mu g\,(M_P + M_S)}{M_P + M_S}$$

CONSIDERANDO SOLO IL PESO, LA ACCELERAZIONE SOLIDALE a PORTA A

$$\vec{F}' = M_p \vec{a}$$

IL PESO NON SI SPOSTA SE

$$\mu_s M_p g > M_p a$$

SOSTITUENDO ACCELERAZIONE

$$\mu_s g > \frac{F_T - \mu g (M_p + M_s)}{M_p + M_s}$$

CHE PUÒ ESSERE RISOLTA PER F_T.

4) $$Q(\text{CEDUTO TE}) = Q(\text{ASSORBITO SOGGETTO})$$

$$Q = c\, m\, \Delta T$$

$$C_1 m_{TE} (T_{TE\,i} - T_x) = C_2 (m_{TE} + m_{socc})(T_x - T_{socc\,i})$$

$$C_1 = 1\ cal/g$$

VALUTANDO CON $m_{TE} = 0.236\ kg$

$$(1L = 10^{-3} m^3)$$

E $T = [273 + C]\ K$

$$T = 37.09\ °C$$

5) $F_c = k \dfrac{q_1 q_2}{R^2} = 0{,}37\ N$

$$k = 9 \times 10^9\ N m^2 C^{-2}$$

$$F_g = G \frac{m_1 m_2}{R^2} = 2.98 \times 10^{-37}\ N$$

$$G = 6{,}67 \times 10^{-11}\ N m^2 kg^{-2}$$

PER ESSERE UGUALI

$$m = \sqrt{\frac{F_c R^2}{G}} = \sqrt{\frac{k}{G}}\ q$$

6)

- POICHÉ $\lambda \nu = V$

$$\nu = \frac{1568 \ \frac{m}{s}}{8 \times 10^{-3} \ m} = 196\,000 \ \frac{1}{s} = 0.2 \ MHz$$

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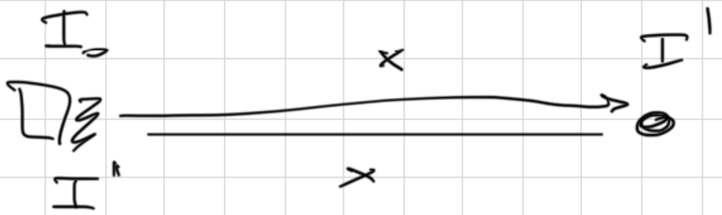

$$I' = I_0 \, e^{-\alpha_1 \nu x}$$

$$I'' = I' \, e^{-\alpha_1 \nu x}$$

$$I'' = I_0 \, e^{-2\alpha_1 \nu x}$$

$$I'' = I_1$$

$$\frac{I_1}{I_0} = e^{-2\alpha_1 \nu x}$$

$$\ln\left(\frac{I_1}{I_0}\right) = -2\alpha_1 \nu x$$

$$x = \frac{1}{2\alpha_1 \nu} \ln\left(\frac{I_0}{I_1}\right)$$

$$x = vt$$

$$t_1 = \frac{2x}{v}$$

$v = 1568$ m/s
$x = 10$ cm