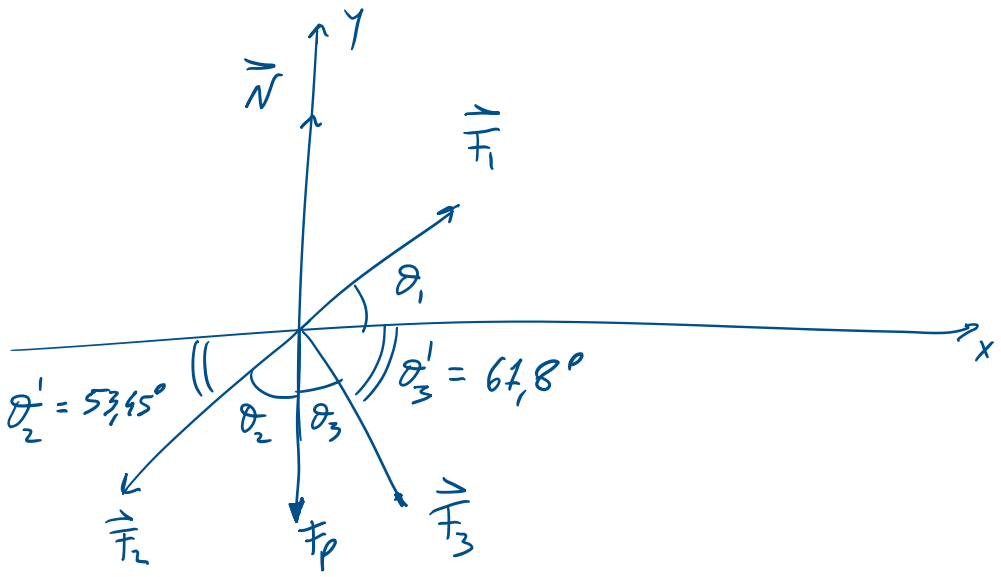
Lezione #11
16/4/2024

1)



$$\begin{cases} F_x = F_1\cos\vartheta_1 - F_2\cos\vartheta_2' + F_3\cos\vartheta_3' \\ F_y = F_1\sin\vartheta_1 - F_2\sin\vartheta_2' - F_3\sin\vartheta_3' - F_p + F_N = 0 \end{cases}$$

$$\begin{cases} F_x = 89{,}31\ N \\ F_y = 0 \end{cases}$$

$$|\vec{F}^{RIS}| = \sqrt{F_x^2 + F_y^2} = 89{,}31\ N$$

$$F^{RIS} \simeq 89{,}3\ N \quad (3\ cs)$$

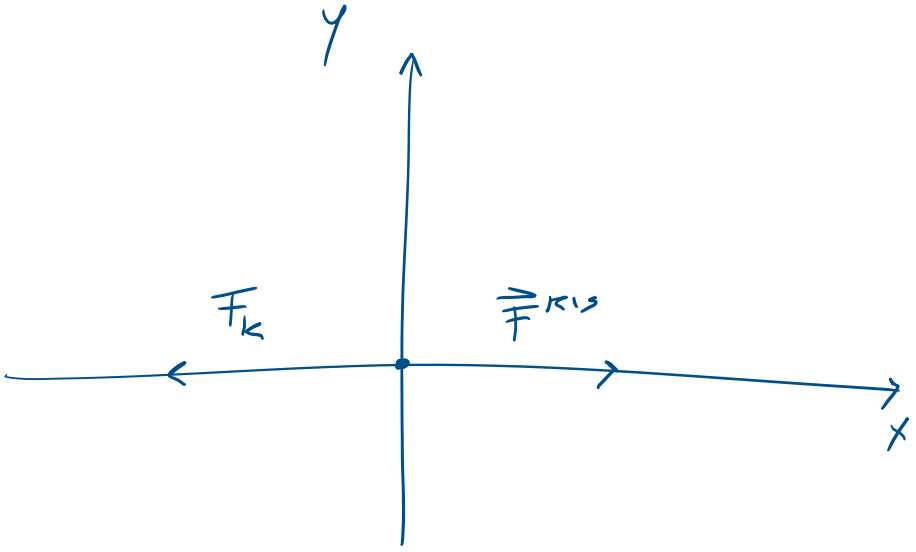
$$\vec{F} - m\vec{a} = 0$$

$a \rightarrow \vec{F} = m\vec{a} \Rightarrow a = \frac{F}{m}$

$a = \frac{89,31}{13,12} = 6,8072 \ m/s^2$

$a \simeq 6,81 \ m/s^2$

2)



$F_{IK} = \mu_K F_N$ $\quad F_N = ?$

$F_y = F_1 \sin\vartheta_1 - F_2 \sin\vartheta_2' - F_3 \sin\vartheta_3' - F_p + F_N = 0$

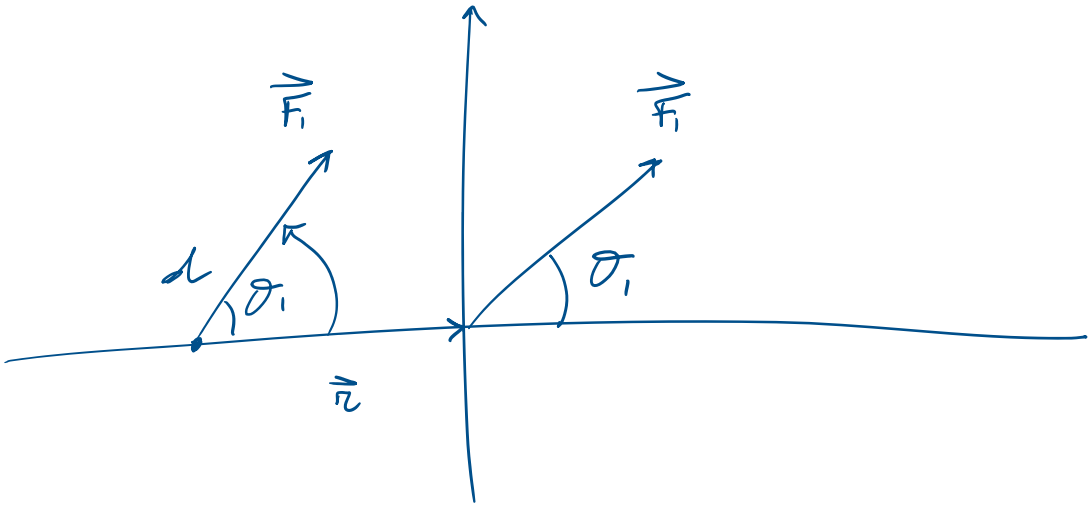
$$F_N = F_p - F_1 \sin\vartheta_1 + F_2 \sin\vartheta_2' + F_3 \sin\vartheta_3'$$

$$F_N = 164{,}62 \quad N$$

$$F_k = \mu_k F_N = 0{,}3777 \cdot 164{,}62 = 62{,}0618 \; N$$

$$\boxed{F_k \simeq 62{,}1 \; N \quad (3\,cs)}$$

3)



$$M_1 = 2_1 F_1 \sin\vartheta_1 = 67{,}43 \; Nm \qquad \odot$$

$$\boxed{M_1 \simeq 67{,}4 \; Nm}$$

Esercizio #2

1)

$$F_P = F_S$$

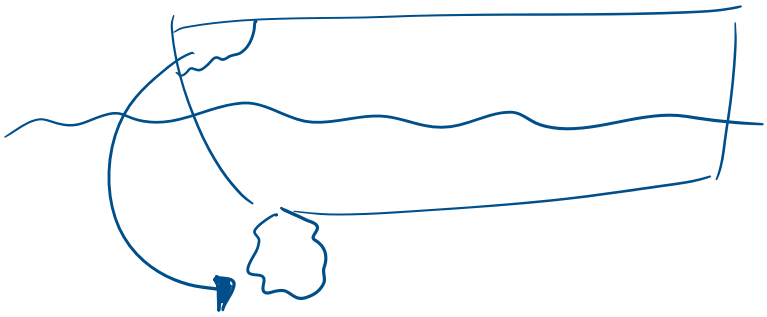
$$m_G g = \rho_F V_I g$$

ρ_{H_2O} dolce

ρ_{H_2O} salata

$$V_I = \frac{m_G}{\rho_F} = \begin{cases} \frac{350}{1000} = 0{,}35\ m^3 \\ \frac{350}{1030} = 0{,}34\ m^3 \end{cases}$$

2)



$$F_P = F_S = F_{S,\,GONDOLA} + F_{S,\,PARETE\ SEP.}$$

$$m_G g = \rho_F V_{I,G} g + \rho_F V_{I,\,P.S.} g$$

$$m_G = \rho_F V_{I,G} + \rho_F \frac{1}{5} V_{GONDOLA}$$

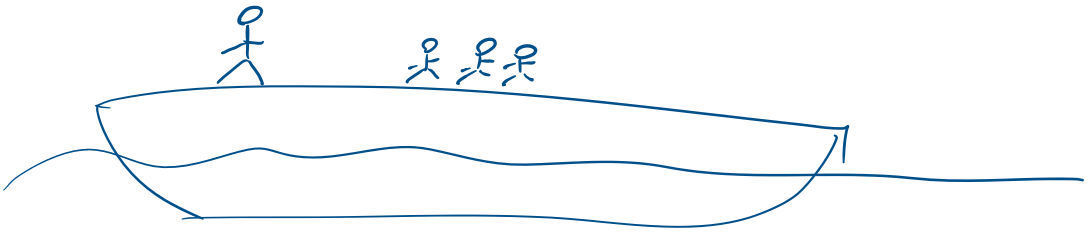
$$\rho_F \, V_{I,G} = \left(m_G - \rho_F \frac{1}{5} V_{GONDOLA} \right) \frac{1}{\rho_F}$$

$$V_{GONDOLA} = \frac{m_G}{\rho_G} \quad <$$

$$V_{I,G} = \left(\frac{1}{m_G} - \rho_F \frac{1}{5} \frac{m_G}{\rho_G} \right) \frac{m_G}{\rho_F}$$

$$V_{I,G} = 0{,}22 \ m^3$$

3)



$$F_P = F_S$$

$$m_{VUOTO} g + n \cdot m_{BAMB} g + m_{GONDOLA} g = \rho_F V_{GONDOLA} g$$

$$n \, m_{BAMB} = \left(\rho_F V_{GONDOLA} - m_{GONDOLA} - m_{VUOTO} \right)$$

$$m_{BAMB}$$

$n = 4,33 \simeq 4$ Bambini