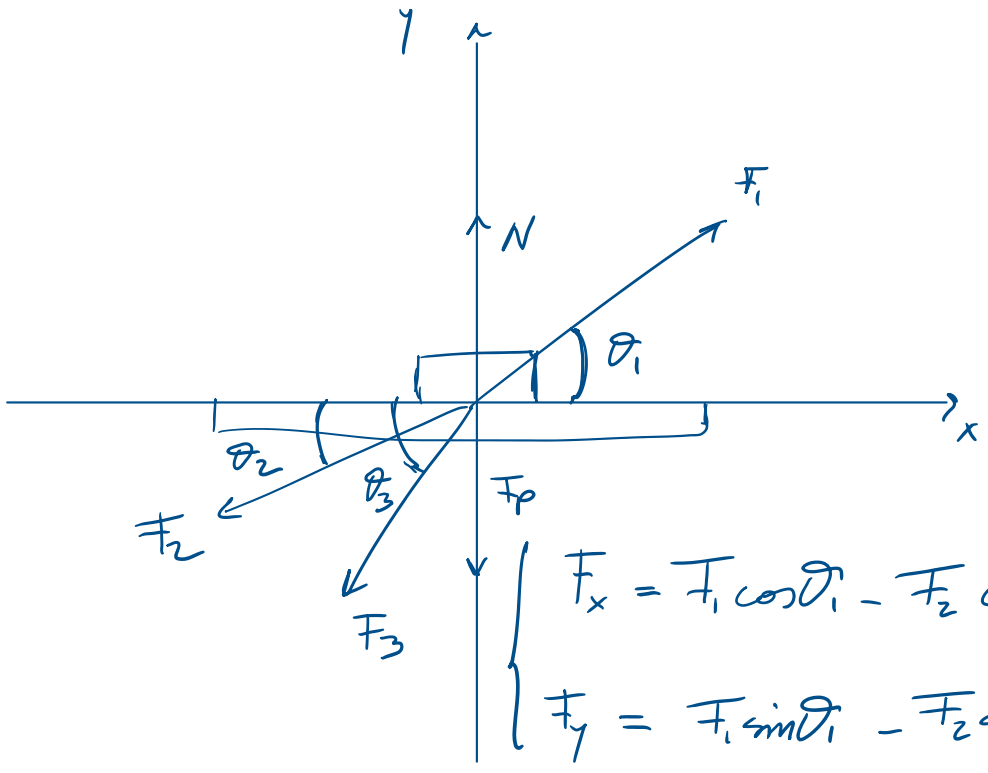
Lezione # 11

11/4/2023

SIMULAZIONE PROVA IN ITINERE I - SOLUZIONE:

Esercizio 1)

1)



$$\begin{cases} F_x = F_1\cos\vartheta_1 - F_2\cos\vartheta_2 - F_3\cos\vartheta_3 \\ F_y = F_1\sin\vartheta_1 - F_2\sin\vartheta_2 - F_3\sin\vartheta_3 + \\ \quad - mg + N = 0 \end{cases}$$

$$\begin{cases} F_x = 2{,}96\ N \\ F_y = 0 \end{cases}$$

$$|\vec{F}^{RIS}| = \sqrt{F_x^2 + F_y^2} = 2{,}96\ N$$

$$F^{ris} \simeq 3\ N \quad (1\ c.s.)$$ ✓

$$\theta^{ris} = \arctg\left(\frac{F_y}{F_x}\right) = 0°$$

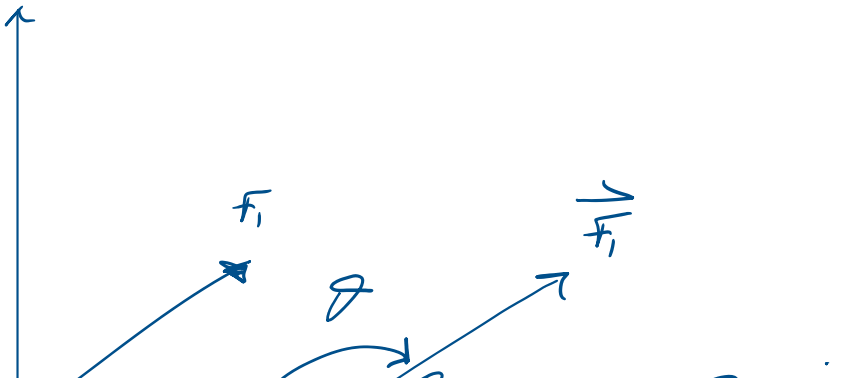
II^a LEGGE DI NEWTON $\vec{F} = m\vec{a} \Rightarrow \vec{a} = \frac{\vec{F}}{m}$

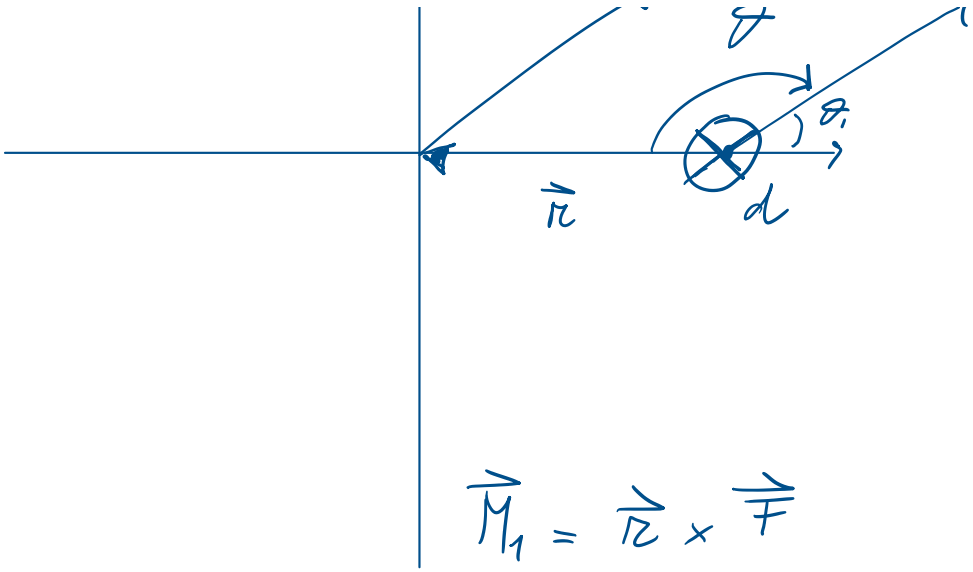
$$a = \frac{F^{ris}}{m} = \frac{2,96}{5,89} = 0,5025\ m/s^2$$

5/5

$$a \simeq 0,5\ m/s^2$$ ✓

2)





$\vartheta = 180° - \vartheta_1$

$= 180° - 21°$

$\vartheta = 159°$ ✓

r ⊇ F s. orario

$M_1 < 0$

$\vec{M}_1 = \vec{r} \times \vec{F}$

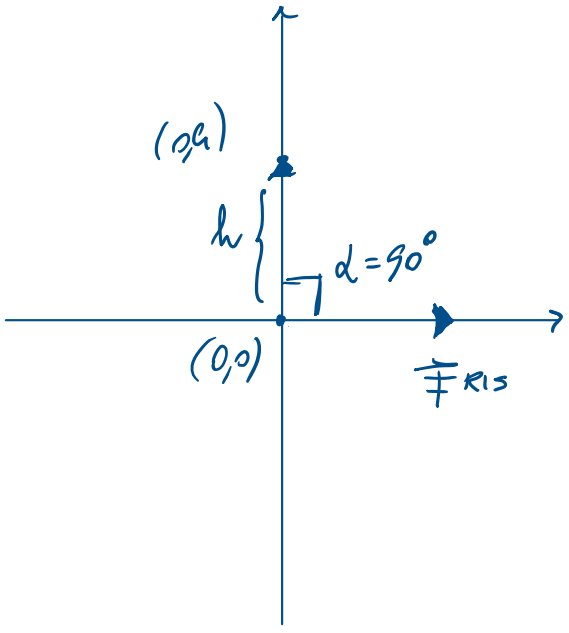
$M_1 = 2F \sin\vartheta = -2{,}5 \cdot 11 \cdot \sin(159°)$

$= -9{,}8551$ Nm

$M_1 \simeq -10$ Nm

4/4

3)



$L = \vec{F}^{RIS} \cdot \vec{d}$

$= F^{RIS} d \cos\alpha$

$(\alpha = 90°)$

$L = 0$ J

4/4

4

Esercizio 2)

1)

$$F_P = F_S$$

$$m_G g = \rho_F V_I g$$

$$V_I = \frac{m_G}{\rho_F}$$

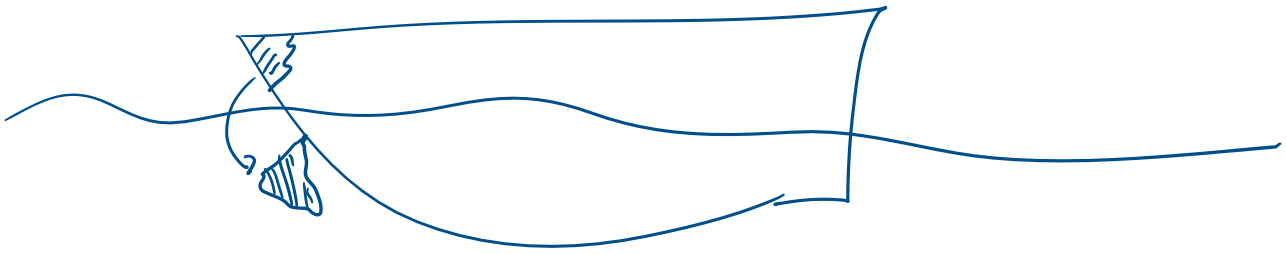
H_2O dolce $= \frac{350}{1000} =$

H_2O salata $= \frac{350}{1030} =$

$V_{I,\,H_2O\ dolce} = 0{,}35\ m^3$; $V_{I,H_2O\ salata} = 0{,}339\ m^3$

$V_{I,H_2O\ dolce} \simeq 0{,}4\ m^3$; $V_{I,H_2O\ s.} = 0{,}3\ m^3$

2)



$$F_P = F_S$$

$$m_G g = \left(\rho_F \frac{1}{5} V_{TOT} g + \rho_F V_I' g \right)$$

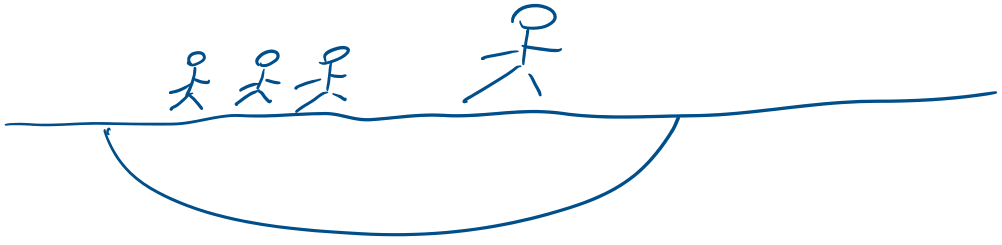
$$\left[V_{TOT} = \frac{m_G}{\rho_G} \right]$$

$$\rho_F V_I' = \left(m_G - \frac{1}{5} \rho_F V_{TOT} \right) \frac{1}{\rho_F}$$

$$= 0{,}65\ m^3$$

$$\boxed{V_I' = 0{,}22\ m^3 \simeq 0{,}2\ m^3}$$

3)



$$F_P = F_S$$

$$m_G \cancel{g} + m_{GOND.} \cancel{g} + n\, m_{BAMB} \cancel{g} = \rho_F V_{TOT} \cancel{g}$$

$$n\, m_{BAMB} = \left(\rho_F V_{TOT} - m_{GOND} - m_G \right) \frac{1}{m_{BAMB}}$$

$$\boxed{n = 7{,}33 \simeq 7 \text{ BAMBINI}} \quad \checkmark$$