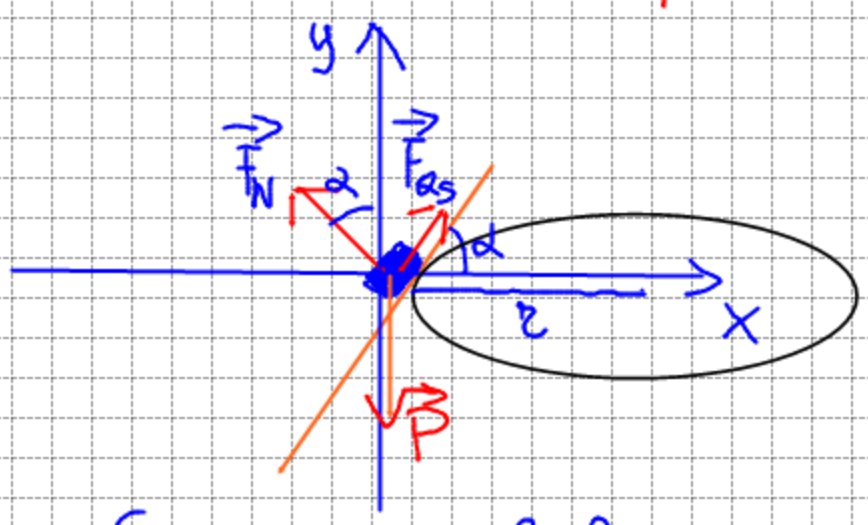
ESERCIZIO N 57 PAG 114



$r = 11,0\ m$

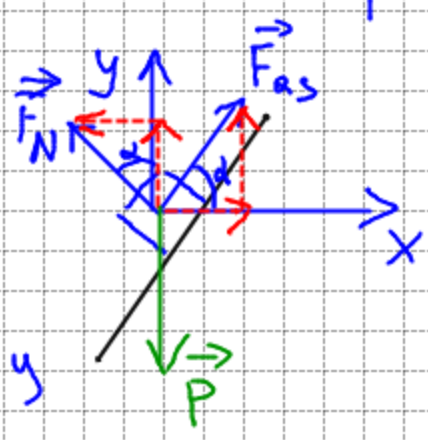
$\mu_s = 0,760$

$\alpha = 36,0°$

Scomponiamo le forze applicate alla valigia lungo gli assi x e y.

$$F_c = m\frac{v^2}{r} \qquad v = \frac{2\pi r}{T}$$

$$F_c = m\frac{\left(\frac{2\pi r}{T}\right)^2}{r} \qquad F_c = \frac{m\,4\pi^2 r}{T^2}$$



$$\begin{cases} x: & F_c = F_{as}\cos\alpha - F_N \operatorname{sen}\alpha \\ y: & F_N\cos\alpha + F_{as}\operatorname{sen}\alpha - mg = ma_y \end{cases}$$

$a_y = 0$

$$\begin{cases} F_c = \mu_s F_N \cos\alpha - F_N \operatorname{sen}\alpha \\ F_N\cos\alpha + \mu_s F_N \operatorname{sen}\alpha - mg = 0 \end{cases}$$

$$\begin{cases} F_c = F_N(\mu_s\cos\alpha - \operatorname{sen}\alpha) \\ F_N = \dfrac{mg}{\cos\alpha + \mu_s \operatorname{sen}\alpha} \end{cases}$$

$$\begin{cases} F_c = \dfrac{mg}{\cos\alpha + \mu_s\operatorname{sen}\alpha}(\mu_s\cos\alpha - \operatorname{sen}\alpha) \\ F_N = \dfrac{mg}{(\cos\alpha + \mu_s\operatorname{sen}\alpha)} \end{cases}$$

$$F_c = \frac{4\pi^2 m r}{T^2} \rightarrow T = \sqrt{\frac{4\pi^2 m r}{F_c}}$$

$$T = \sqrt{\frac{4\pi^2 m r}{\frac{mg(\mu_s\cos\alpha - \operatorname{sen}\alpha)}{(\cos\alpha + \mu_s\operatorname{sen}\alpha)}}} = \sqrt{\frac{4\pi^2 r(\cos\alpha + \mu_s\operatorname{sen}\alpha)}{(\mu_s\cos\alpha - \operatorname{sen}\alpha)g}} =$$

$$= \sqrt{\frac{4\pi^2\ 11,0\ m\left(\cos 36° + 0,760\operatorname{sen}36°\right)}{9,80\ \frac{m}{s^2}\left(0,760\cos 36° - \operatorname{sen}36°\right)}} =$$

$$= 45\ s$$