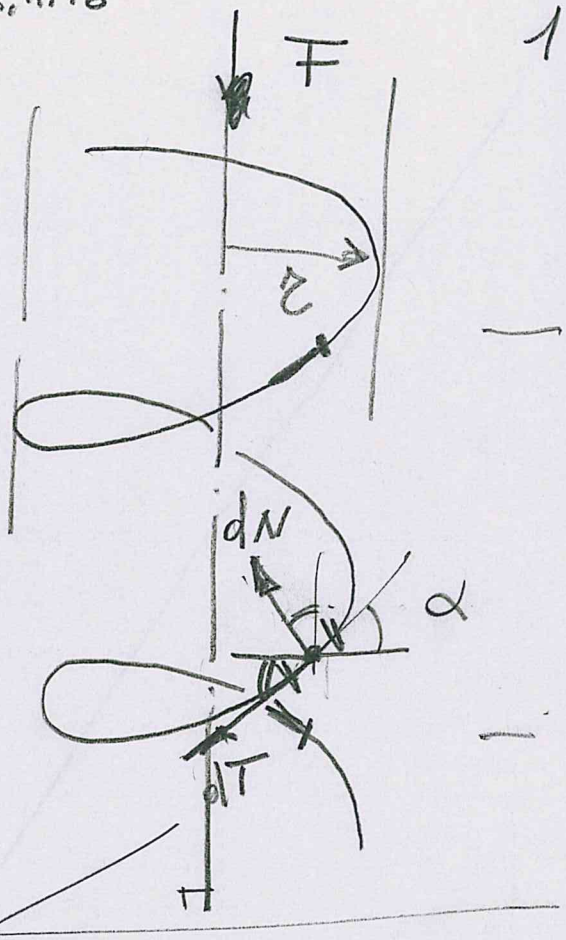
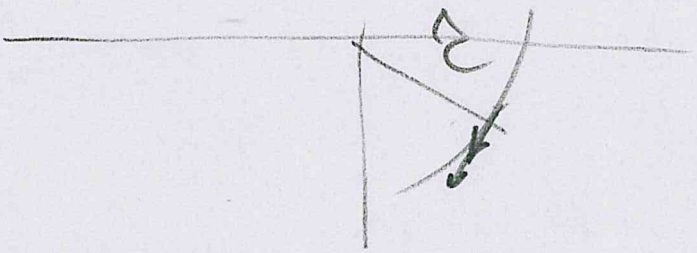
$$\begin{cases} F = N\cos\alpha - T\sin\alpha \\ C = \tau N\sin\alpha + \tau T\cos\alpha \\ f = T/N = \operatorname{tg}\varphi = \dfrac{\sin\varphi}{\cos\varphi} \end{cases}$$




$$\frac{C}{F} = \tau\,\frac{N\left(\sin\alpha + \dfrac{\sin\varphi}{\cos\varphi}\cos\alpha\right)}{N\left(\cos\alpha - \dfrac{\sin\varphi}{\cos\varphi}\sin\alpha\right)}$$

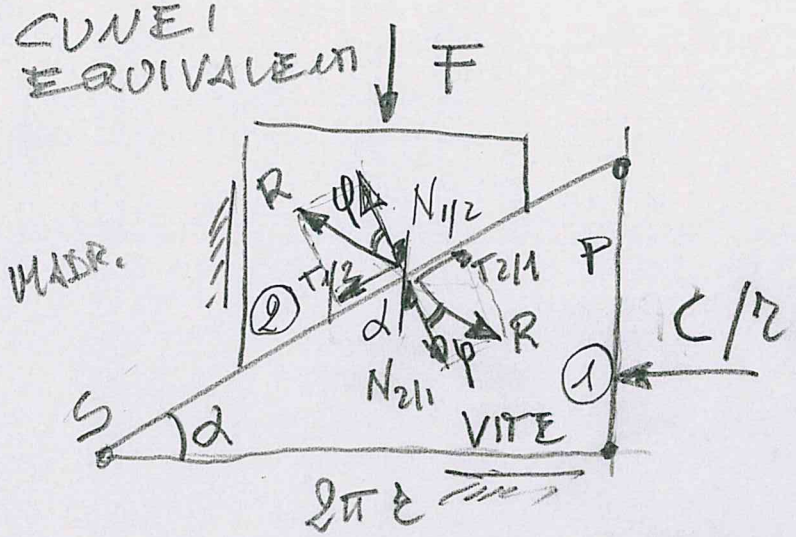
$$= \tau\,\frac{\dfrac{\sin\alpha\cos\varphi + \sin\varphi\cos\alpha}{\cancel{\cos\varphi}}}{\dfrac{\cos\alpha\cos\varphi - \sin\alpha\sin\varphi}{\cancel{\cos\varphi}}} =$$

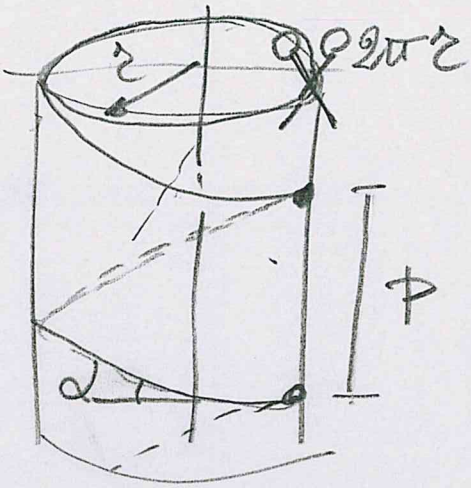


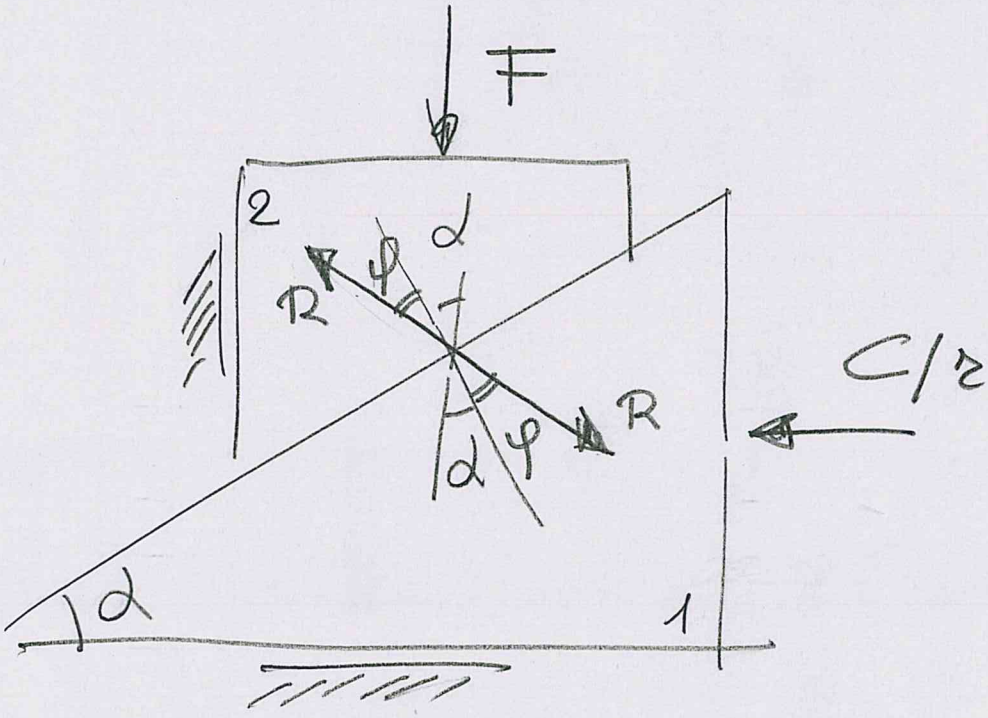

$$= \tau\,\frac{\sin(\alpha+\varphi)}{\cos(\alpha+\varphi)} =$$

$$= \tau\,\operatorname{tg}(\alpha+\varphi)$$

CUNEI EQUIVALENTI



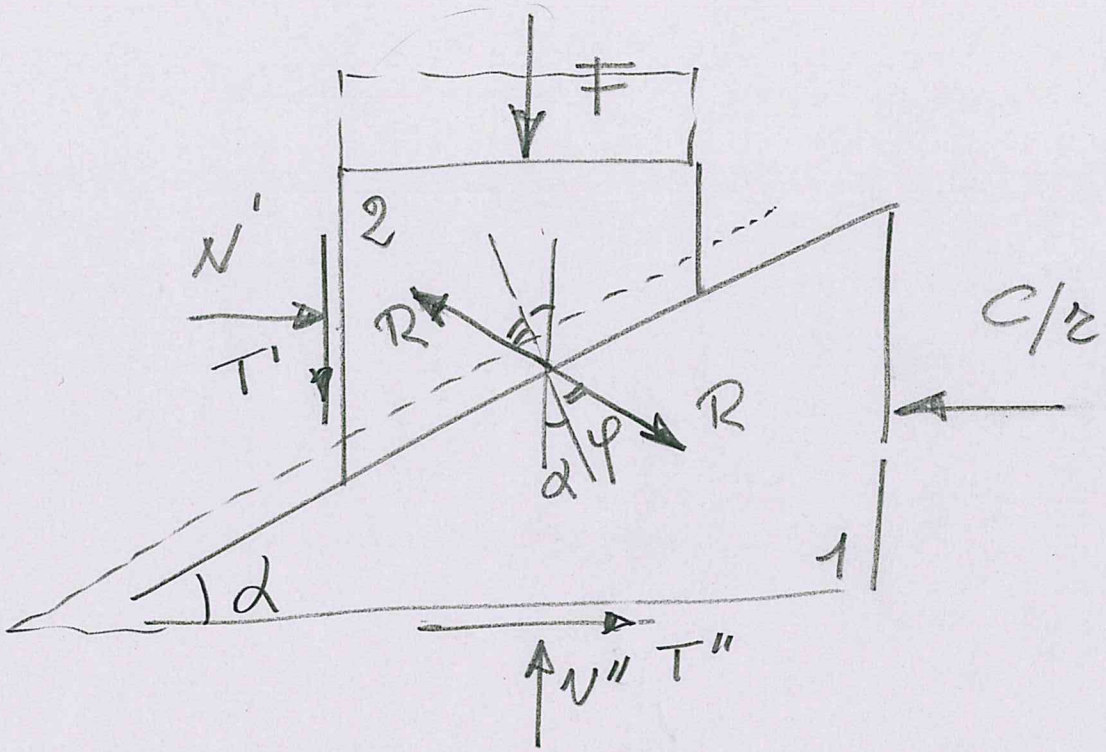




$$F = R\cos(\alpha+\varphi)$$

$$\frac{C}{r} = R\,\mathrm{sen}(\alpha+\varphi)$$

$$\frac{C}{F} = r\,\frac{\mathrm{sen}(\alpha+\varphi)}{\cos(\alpha+\varphi)} = r\,\mathrm{tg}(\alpha+\varphi)$$




$$F - R\cos(\alpha+\varphi) + T' = 0$$

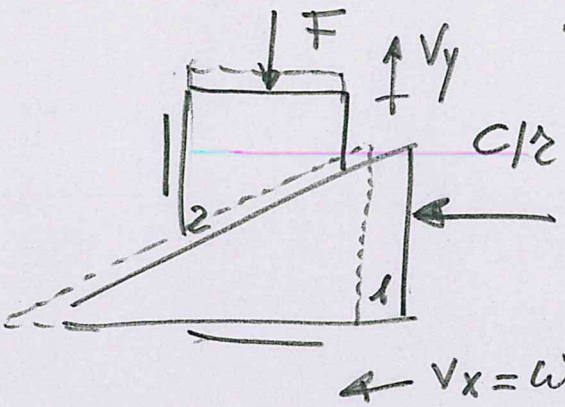
$$N' - R\sin(\alpha+\varphi) = 0$$

$$T' = f' N'$$

$$\frac{C}{2} - R\sin(\alpha+\varphi) - T'' = 0$$

$$N'' - R\cos(\alpha+\varphi) = 0$$

$$T'' = f'' N''$$

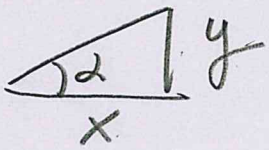



RENDIMENTO IN SALITA

$$\eta = \frac{F V_y}{C \omega} =$$

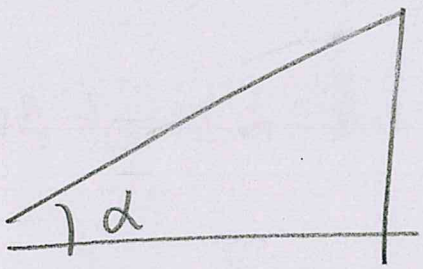
$$= \frac{F V_y}{\frac{C}{z} \omega z} =$$

$$\eta = \frac{F V_y}{\frac{C}{z} V_x} = \frac{1}{tg(\alpha+\varphi)} \cdot \frac{V_y}{V_x}$$




$$\frac{V_y}{V_x} = tg\,\alpha$$

$$\eta = \frac{1}{tg(\alpha+\varphi)} tg\,\alpha$$




$z = 0{,}5\,cm = 0{,}5 \cdot 10^{-2}\,m$

$P = 1\,mm = 1 \cdot 10^{-3}\,m$

$\alpha = \operatorname{atan} \frac{P}{2\pi z} = 1{,}82°$

$f = 0{,}15 \quad \varphi = \operatorname{atan} f = 8{,}5°$

$$\eta = \frac{tg\,\alpha}{tg(\alpha+\varphi)} = \frac{0{,}032}{0{,}18}$$

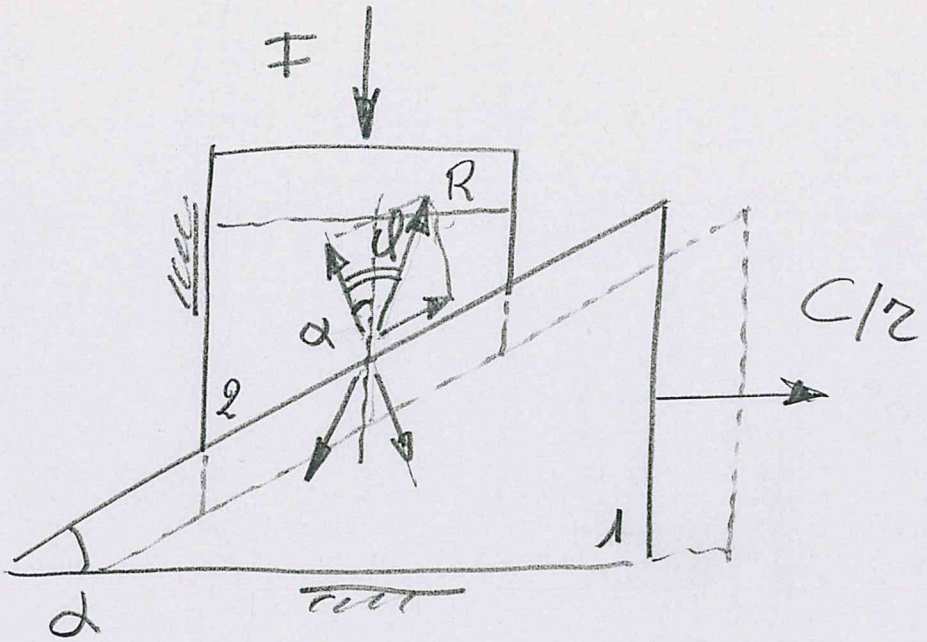
$$\eta = 0{,}17$$

$$\frac{C}{F} = z\, tg(\alpha+\varphi) = 0{,}5 \cdot 10^{-2}\, tg(1{,}82+8{,}5)$$

$$\frac{C}{F} = 9{,}1 \cdot 10^{-4}\ m \quad \text{SE } F = 1000\ N$$

$$C = 9{,}1 \cdot 10^{-1}\ N \cdot m$$

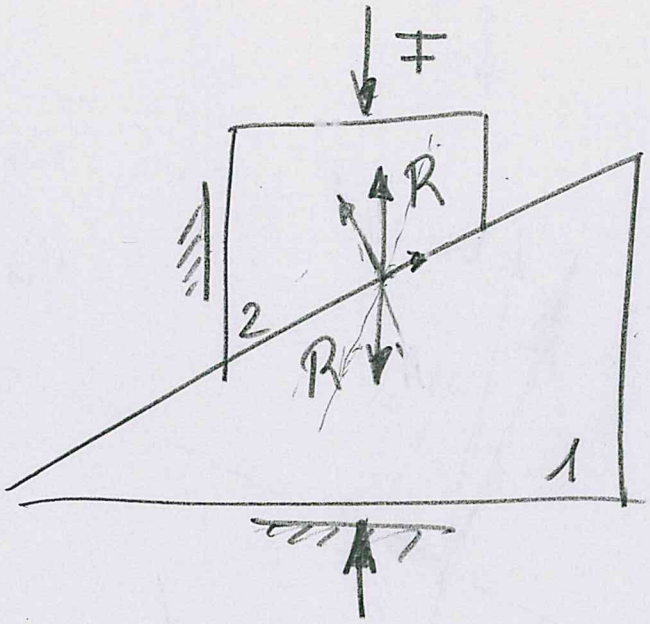
SE $V_y = 0{,}1\ m/s$ $\quad V_x = V_y / tg\,\alpha = 3{,}15\ m/s$; $\omega = \frac{V_x}{z} = 629{,}4\ \frac{1}{s}$




$$F = R\cos(\varphi - \alpha)$$

$$\frac{C}{2} = R\sin(\varphi - \alpha)$$

$$\frac{C}{F} = 2\,\mathrm{tg}(\varphi - \alpha)$$

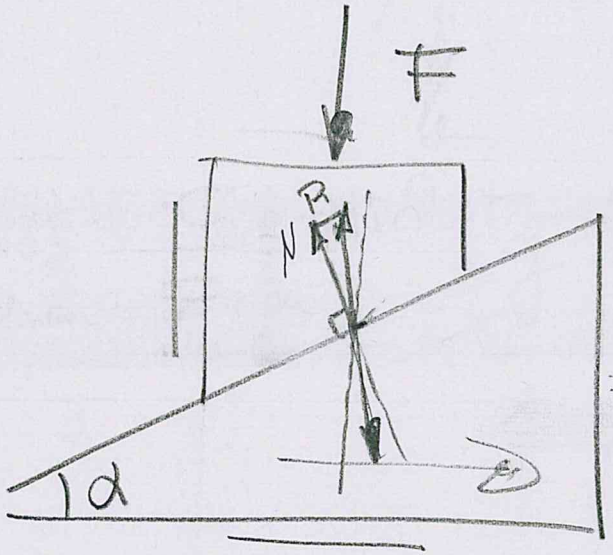



$T = fN$

$T \leq f_a N$

$f_a$ Piccolo
Basso

REVERSIBILE




$\varphi_a = \alpha$ CONFINE
LIMITE

$\varphi_a > \alpha$

IRREVERSIBILE

($\varphi$)