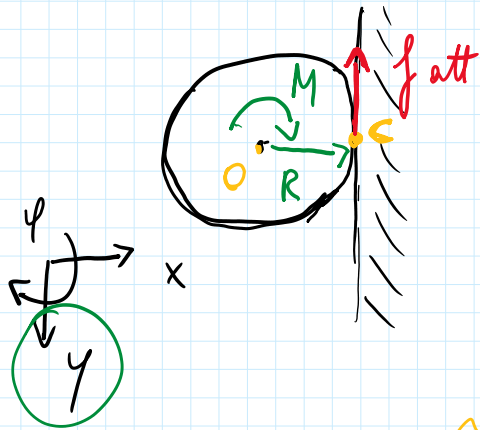


7, 4 b



$$m = 5 \text{ Kg} \quad r = 10 \text{ cm} \\ = 0,1 \text{ m}$$

$$\mu = 0,7 [-]$$

$$M = 6 \text{ Nm} \quad R = ?$$

PURo ROTOLAMENTO

$$\leadsto v_C^R = 0$$

$$\left. \begin{array}{l} m \cdot g - f_{att} = -m \cdot a_{CM} \\ m \cdot g - R \mu = -m \cdot a_{CM} \end{array} \right\} \sum F = m a_{CM}$$

$$\left. \begin{array}{l} -f \cdot r + M = I \alpha \\ -R \cdot \mu \cdot r + M = \frac{2}{5} m r^2 \frac{a_{CM}}{r} \end{array} \right\} \sum M_o = I \alpha$$

$\frac{2}{5} m r^2 \leadsto$ INERZIA SPERA

$\frac{a_{CM}}{r} \leadsto \alpha$

$$\left\{ \begin{array}{l} \sum F = m a \\ \sum M_o = I \alpha \end{array} \right. \text{DINAMICO}$$

$$\left\{ \begin{array}{l} \sum F = 0 \\ \sum M_o = 0 \end{array} \right. \text{STATICO}$$

$$\left\{ \begin{array}{l} m g - R \mu = -m a_{CM} \\ -R \cdot \mu \cdot r + M = \frac{2}{5} m r^2 \frac{a_{CM}}{r} \end{array} \right.$$

$\underbrace{\quad}_{f_{att}}$

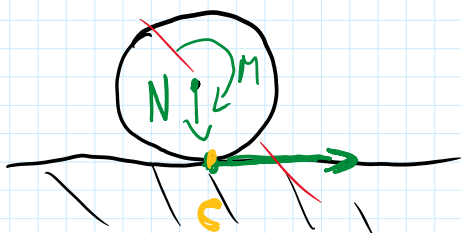
$$\begin{cases} 5 \cdot 9,81 - R \cdot 0,7 = -5 \text{ a cm} \\ -R \cdot 0,7 \cdot 0,1 + 6 = 0,2 \text{ a cm} \end{cases}$$

$$\begin{cases} \text{''} \\ -1,75R + 150 = 5 \text{ a cm} \end{cases} \quad \begin{cases} -1,75R + 150 = -49,05 + 0,7R \end{cases}$$

$$\begin{cases} \text{''} \\ -2,45R = 199,05 \end{cases} \quad \begin{cases} a_{cm} = 1,6 \text{ m/s}^2 \\ R = 81,25 \text{ N} \end{cases}$$

$f_{att} = R \cdot 0,7$
 $= 57 \text{ N}$

R MINIMO per puro rotolamento



~~$$M - N \cdot \mu \cdot r \leq 0$$~~

~~$$M \leq N \cdot \mu \cdot r$$~~

~~VALORE LIMITE $\leadsto M = N \cdot \mu \cdot r$~~

ERRORE

~~$$M \leq R \cdot \mu \cdot r \xrightarrow{\text{MINIMO}} M = R \cdot \mu \cdot r$$~~

~~$$f \leq \mu_s R$$~~

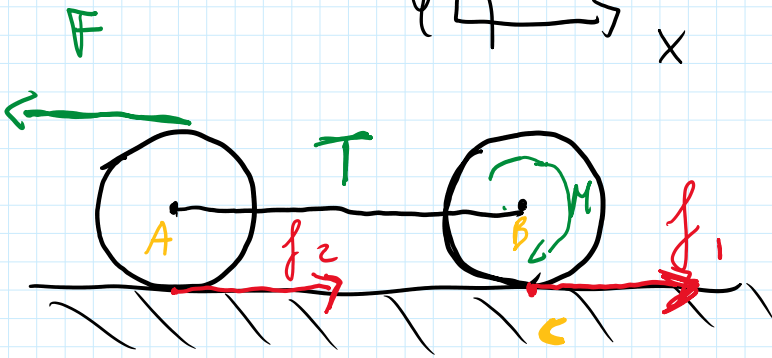
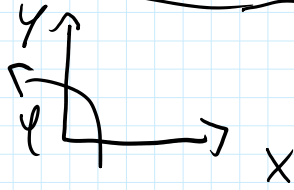
~~$$R = \frac{M}{\mu} = 85,7 \text{ N}$$~~

$$f = \mu_s R$$

$$R = \frac{M}{r} = 85,7 \text{ N}$$

$$R \geq \frac{f}{\mu_s} \rightarrow \text{LIMITE} \quad R = f \approx 82 \text{ N}$$

7.50



È IN EQUILIBRIO

$$m = 40 \text{ kg}$$

$$r = 0,25 \text{ m}$$

$$M = 16 \text{ Nm}$$

$$F = ?$$

attit: ?

Tensione ?

$$\begin{cases} \sum F = 0 \\ \sum M = 0 \end{cases}$$

4 INCONNITE \rightarrow 4 equazioni INDIPENDENTI

$$\begin{pmatrix} f_1 & f_2 \\ T & F \end{pmatrix}$$

$$\sum F = 0$$

$$\sum M = 0$$

Globale:

Globale rispetto B

$$-F + f_2 + f_1 = 0$$

$$(-M + f_1 r + f_2 r + Fr = 0)$$

PUNTA DESTRA

PUNTA DESTRA ...

RUOTA DESTRA

$$f_1 - T = 0$$

RUOTA SINISTRA

$$T + f_2 - F = 0$$

RUOTA DESTRA rispetto B

$$-M + f_1 r = 0$$

RUOTA SINISTRA rispetto A

$$F r + f_2 r = 0$$

$$\begin{cases} -F + f_1 + f_2 = 0 \\ T = f_1 \\ T + f_2 - F = 0 \\ M = f_1 r \end{cases}$$

$$\begin{cases} -F + T + f_2 = 0 \\ T = f_1 \\ T + f_2 - F = 0 \\ M = T r \end{cases}$$

DIP.
SOSTITUISCO
UNA DELLE
DUE

$$\begin{cases} T = f_1 \\ T + f_2 - F = 0 \\ M = f_1 r \\ F r = -f_2 r \end{cases}$$

$$\begin{cases} T + f_2 - F = 0 \\ M = T \cdot r \\ F r = -f_2 r \end{cases}$$

$$\begin{cases} T = f_1 \\ T = -f_2 - f_2 \\ M = T \cdot r \\ F = -f_2 \end{cases}$$

$$\begin{cases} T = f_1 \\ T = -2 f_2 \\ M = T \cdot r \\ F = -f_2 \end{cases}$$

$$\begin{cases} T = f_1 \\ T = -2 f_2 \\ T = \frac{M}{r} = \frac{16}{0,25} = 64 \text{ N} \\ F = 0 \end{cases}$$

$$\left(F = -f_2 \right) \quad \left(F = -f_2 \right) \quad \left(F = -f_2 \right) \quad r \quad 0,25$$

$$\left\{ \begin{array}{l} T = f_1 = 64 \text{ N} \\ f_2 = -\frac{T}{2} = -32 \text{ N} \\ T = 64 \text{ N} \\ F = -f_2 = 32 \text{ N} \end{array} \right.$$

$$\left\{ \begin{array}{l} T = 64 \text{ N} \\ f_1 = 64 \text{ N} \\ f_2 = -32 \text{ N} \rightarrow \left(\begin{array}{l} \text{verso opposto} \\ \text{a quello} \\ \text{disegnato} \end{array} \right) \\ F = 32 \text{ N} \end{array} \right.$$