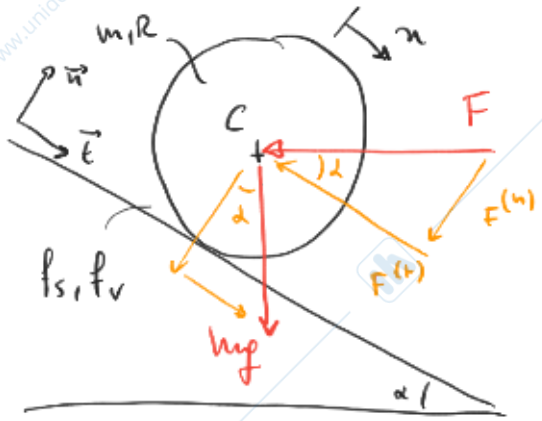
Dinamica del disco in discesa



Calcolare $x, \dot{x}, \ddot{x}$

Bilancio di Potenze

$$\Sigma W = \frac{dE_c}{dt}$$

$$E_c = \frac{1}{2} m \dot{x}^2 + \frac{1}{2} J \omega^2$$

$$= \frac{1}{2} m \dot{x}^2 + \frac{1}{2} \left(\frac{1}{2} m R^2 \right) \omega^2$$

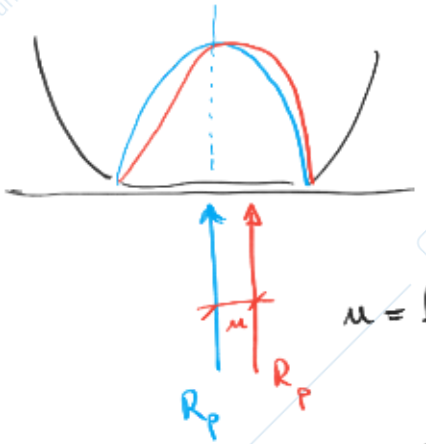
$$= \frac{1}{2} \left(m + \frac{1}{2} m R^2 / R^2 \right) \dot{x}^2$$

$$= \frac{1}{2} \left(\frac{3}{2} m \right) \dot{x}^2$$

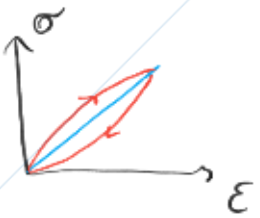
$$\frac{dE_c}{dt} = \frac{3}{2} m \ddot{x} \dot{x}$$

$$\Sigma W = m\vec{g} \cdot \dot{x}\vec{t} + \vec{F} \cdot \dot{x}\vec{t} - W_{rot}$$

$$= mg \sin\alpha \, \dot{x} - F \cos\alpha \, \dot{x} - W_{rot}$$



$u = f_v R$



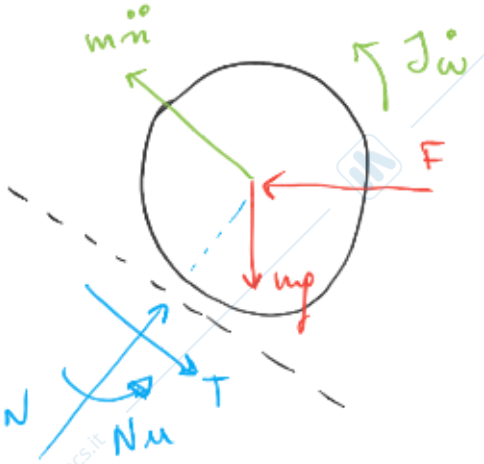
N reazione vincolare dovuta al contatto col piano

N_u coppia di resistenza al rotolamento

$$W_{rot} = N_u \omega$$

$$\Sigma W = mg \sin\alpha \, \dot{x} - F \cos\alpha \, \dot{x} - N_\mu w$$

↑ incognita



$$\Sigma F_n = 0 \qquad N - mg\cos\alpha - F\sin\alpha = 0$$

$$N = mg\cos\alpha + F\sin\alpha$$

$$\Sigma W = \frac{dE_c}{dt}$$

$$mg\sin\alpha \, \dot{x} - F\cos\alpha \, \dot{x} - (mg\cos\alpha + F\sin\alpha) f_v R \cdot \frac{\dot{x}}{R} = \frac{3}{2} m \ddot{x} \dot{x}$$

$$mg\sin\alpha - F\cos\alpha - (mg\cos\alpha + F\sin\alpha) f_v = \frac{3}{2} m \ddot{x}$$

$$\ddot{x} = \left(mg\sin\alpha - F\cos\alpha - (mg\cos\alpha + F\sin\alpha) f_v \right) \Big/ \frac{3}{2} m$$