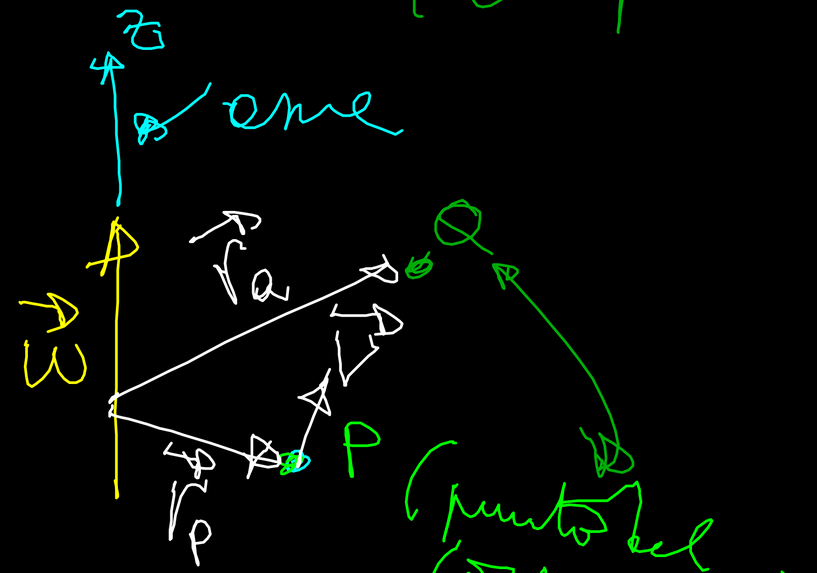
$\vec{\omega}$ → informazione completa sulla rotazione
(corpo rigido che ruota intorno a 1 asse)



$\vec{V}_Q = \vec{\omega} \times \vec{r}_Q$

$\vec{V}_P = \vec{\omega} \times \vec{r}_P$

$\vec{V}$ = Vel. di un punto qualsiasi del corpo rigido

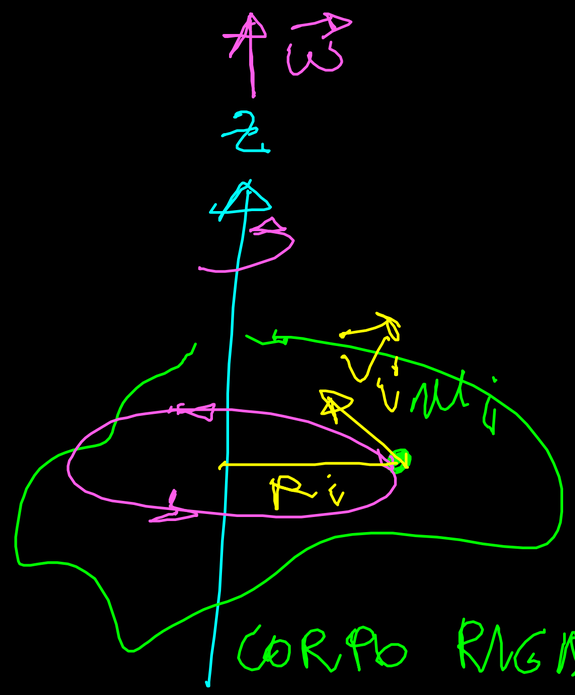
$= \vec{V}_{TRASL} + \vec{V}_P$

$= \vec{V}_{TR.} + \vec{\omega} \times \vec{r}_P$

3 parametri + 3 parametri

6 gradi di libertà

ENERGIA CINETICA DI ROTAZIONE



CORPO RIGIDO IN ROT. INTORNO A z FISSO

EN. CIN. DEL CORPO IN ROT.

$$K = \frac{1}{2}\sum_{i=1}^{N} m_i v_i^2 \qquad \omega = \omega_z$$

$$v_i = \omega R_i$$

$$K = \frac{1}{2}\sum_{i=1}^{N} m_i R_i^2 \omega^2 = \frac{1}{2}\omega^2 \sum_{i=1}^{N} m_i R_i^2$$

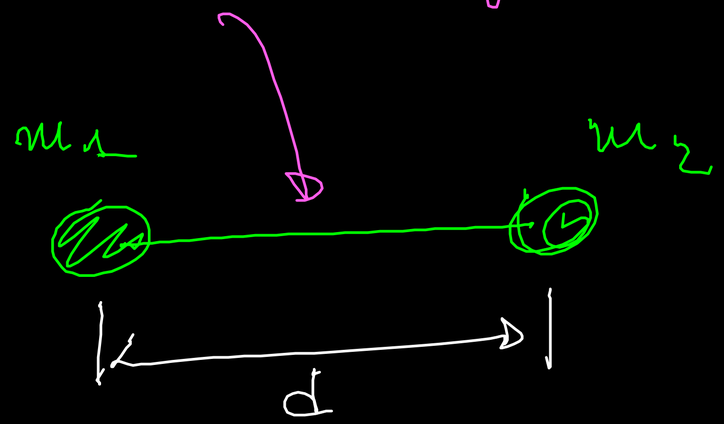
$$I_z = \sum_{i=1}^{N} m_i R_i^2$$

→ MOMENTO DI INERZIA RISPETTO ALL'ASSE z

$$K = \frac{1}{2} I_z \omega^2$$

EN. CINETICA DI ROTAZ.

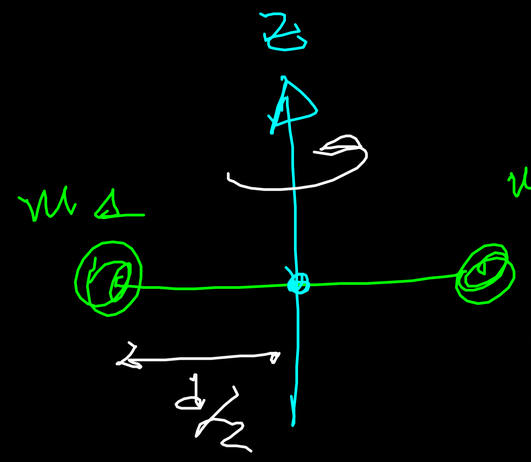
asta rigida con massa



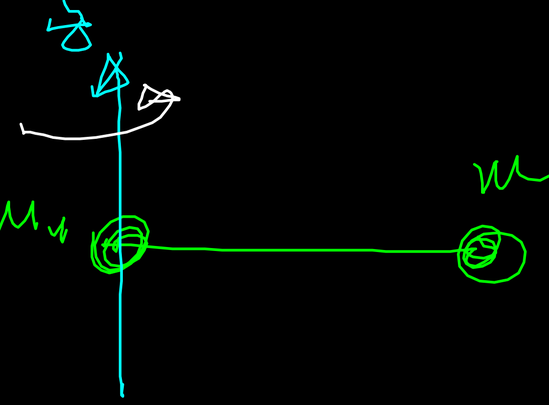
$M = m_1 + m_2$

$I = ?$ → definire l'asse

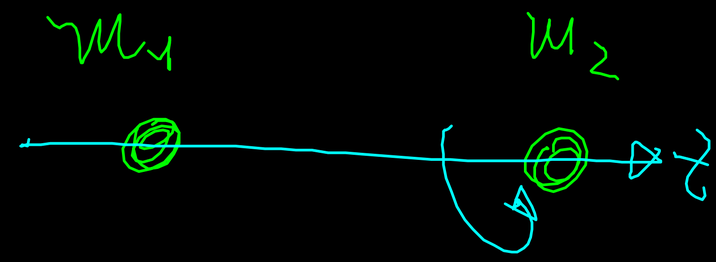
$$I_z = \sum_{i=1}^{N} m_i R_i^2$$



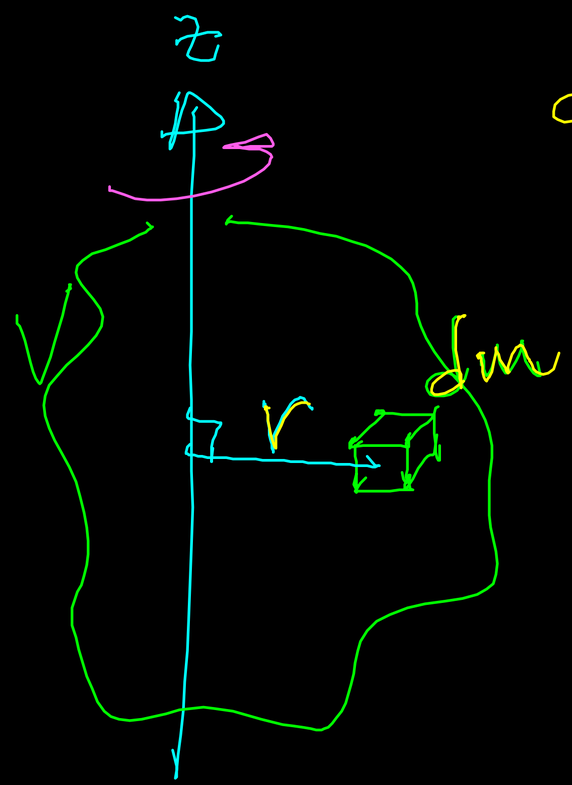
$$I_z = m_1\left(\frac{d}{2}\right)^2 + m_2\left(\frac{d}{2}\right)^2 = \frac{d^2}{4}(m_1+m_2) = M\frac{d^2}{4}$$



$$I_z = m_2 d^2$$



$$I_z = 0$$



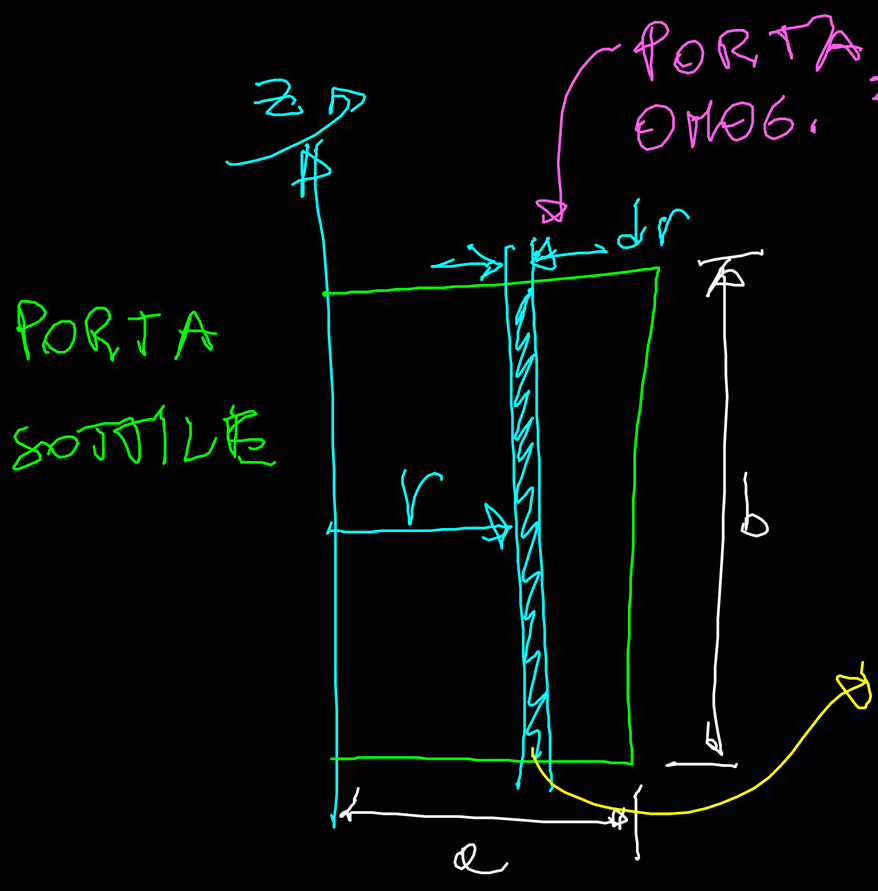
$$dI_z = r^2 dm = r^2 \rho dV$$

$$I_z = \int_{\text{corpo}} r^2 dm = \int_{\text{Volume del corpo}} r^2 \rho dV$$

$$dm = dV \rho$$

densità

PORTA OMOG. → ρ è costante



I_z?

$$I_z = \int_{Vol.} r^2 \rho \, dV$$

$dV = dr\, b\, \Delta d$

Momento M