

$$\vec{p} = m \cdot \vec{v} \quad \text{momentum / quant. di moto}$$

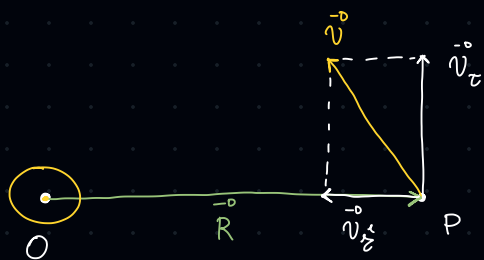
Scegliamo un'origine $O \rightarrow P(x, y, z) \quad \vec{r} = \vec{OP}$

$$\vec{L} = \vec{r} \wedge \vec{p} \quad \text{momento Angolare}$$

$$\rightarrow \vec{M} = \vec{r} \wedge \vec{F} \quad \text{Momento di una forza}$$

$$\vec{L} = \vec{r} \wedge \vec{p} \rightarrow \frac{d\vec{L}}{dt} = \frac{d}{dt} (\vec{r} \wedge \vec{p}) \Rightarrow \frac{d\vec{L}}{dt} = \frac{d\vec{r}}{dt} \wedge \vec{p} + \vec{r} \wedge \frac{d\vec{p}}{dt}$$

$$\rightarrow \frac{d\vec{L}}{dt} = \underbrace{\vec{v} \wedge \vec{p}}_{\vec{v} \parallel \vec{p}} + \vec{r} \wedge (m\vec{a}) \quad \vec{F} \rightarrow \frac{d\vec{L}}{dt} = \vec{r} \wedge \vec{F} \rightarrow \frac{d\vec{L}}{dt} = \vec{M}$$



$$\vec{L} = \vec{r} \wedge \vec{p} = \vec{r} \wedge m \cdot \vec{v} = \vec{r} \wedge (\vec{v}_\tau + \vec{v}_z) m$$

$$\vec{L} = m(\vec{r} \wedge \vec{v}_\tau) + \underbrace{\vec{r} \wedge \vec{v}_z}_{\parallel} \cdot m$$

$$\vec{v}_\tau = 0 \Rightarrow \vec{L} = 0$$

$$|\vec{L}| = m \cdot r \cdot v \rightarrow |\vec{L}| = m \cdot r^2 \omega$$

$m r^2 = m$ ← massa inerziale
← momento d'inerzia

$$\omega = \frac{d\alpha}{dt} \rightarrow \alpha(t) = \omega \cdot t \rightarrow v = R \cdot \omega$$

