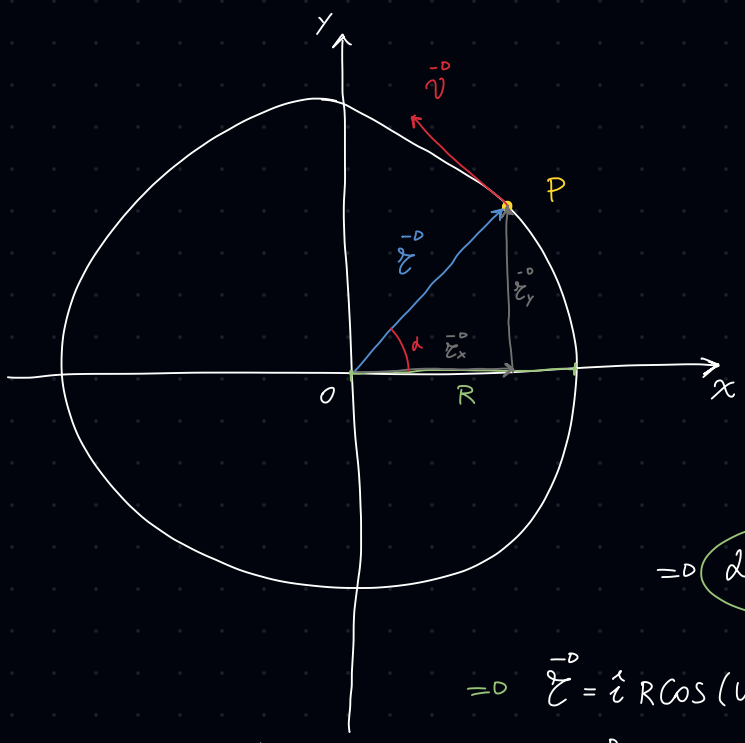


$$\vec{r} = \vec{r}_x + \vec{r}_y = R\cos\alpha + R\sin\alpha$$

Definisco $\quad \vec{\omega} = \dfrac{d\alpha}{dt}$

$$\Rightarrow \omega\,dt = d\alpha \;\rightarrow\; \int_{t_0}^{t_f} \omega\,dt = \int_{\alpha_0}^{\alpha_f} d\alpha$$

$$\Rightarrow \omega(t_f - t_0) = \alpha_f - \alpha_0 \qquad \text{pongo } \alpha_0 = t_0 = \emptyset$$

$$\Rightarrow \boxed{\alpha(t) = \omega \cdot t}$$

$$\Rightarrow \vec{r} = \hat{i}\,R\cos(\omega t) + \hat{j}\,R\sin(\omega t)$$

Siccome $\quad \vec{v} = \dfrac{d\vec{s}}{dt} \Rightarrow \vec{v} = \dfrac{d\vec{r}}{dt} = -\omega R\sin(\omega t)\hat{i} + \omega R\cos(\omega t)\hat{j} = \omega R\left[\cos(\omega t)\hat{j} - \sin(\omega t)\hat{i}\right]$

$$\vec{a} = \frac{d\vec{v}}{dt} = -\omega^2 R\cos(\omega t)\hat{i} - \omega^2 R\sin(\omega t)\hat{j} = -\omega^2 R\underbrace{\left[\cos(\omega t)\hat{i} + \sin(\omega t)\hat{j}\right]}_{\vec{r}}$$

$$= -\omega^2 R\,\vec{r} \quad (1) \quad \vec{a}$$

$$|\vec{v}| = \sqrt{\omega^2 R^2\underbrace{\left[\cos^2(\omega t) + \sin^2(\omega t)\right]}_{1}} = \sqrt{\omega^2 R^2} = \boxed{\omega R} \quad |\vec{v}| \rightarrow v = \omega R \Rightarrow \omega = \frac{v}{R}$$

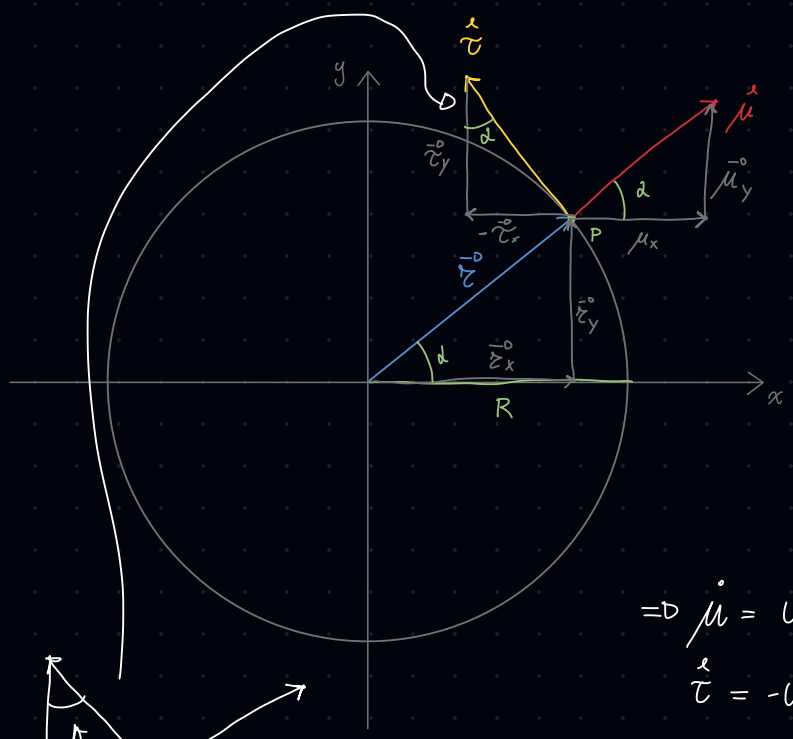
$$|\vec{a}| = \sqrt{\omega^4 R^2[\ldots]} = \omega^2 R \quad \text{mod}$$

$$a = \omega^2 R = \frac{v^2}{R^2}R = \boxed{\frac{v^2}{R}}\,|\vec{a}|_{cp}$$

OSS.

(1) $\vec{a} = \boxed{-}\omega^2 R\,\vec{r} \Rightarrow$ Acc rivolta verso l'interno!

Riferimento in movimento



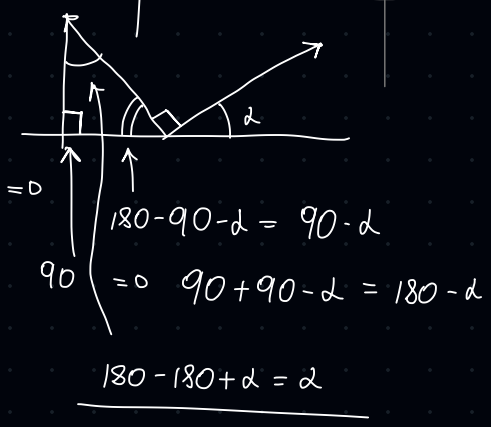
$$\begin{cases} \hat{\mu} = \hat{i}\cos\alpha + \hat{j}\sin\alpha \\ \hat{\tau} = -\hat{i}\sin\alpha + \hat{j}\cos\alpha \end{cases}$$

$$\omega = \frac{d\alpha}{dt} \Rightarrow \alpha(t) = \omega t$$

$$\Rightarrow \begin{cases} \frac{d\mu}{dt} = -\hat{i}\,\omega\sin(\omega t) + \omega\hat{j}\cos(\omega t) \\ \frac{d\hat{\tau}}{dt} = -\omega\hat{i}\cos(\omega t) - \omega\hat{j}\sin(\omega t) \end{cases}$$

$$\Rightarrow \dot{\mu} = \omega\left[\hat{j}\cos(\alpha) - \hat{i}\sin(\alpha)\right] = \omega\hat{\tau}$$

$$\dot{\hat{\tau}} = -\omega\left[\hat{i}\cos(\alpha) + \hat{j}\sin(\alpha)\right] = -\omega\hat{\mu}$$



$$\vec{\tau} = iR\cos\alpha + R\hat{j}\sin\alpha = R\left[\hat{i}\cos\alpha + \hat{j}\sin\alpha\right]$$

$$= R\hat{\mu}$$

$$\Rightarrow \frac{d\vec{\tau}}{dt} = R\omega\hat{\tau} \quad \vec{v}$$

$$\frac{d\vec{v}}{dt} = R\omega\left[-\omega\hat{\mu}\right] = -R\omega^2\hat{\mu} \quad \text{Acc cp.}$$

Se $\omega \neq \text{cost} \Rightarrow \frac{d\vec{v}}{dt} = R\frac{d\omega\hat{\tau}}{dt} = R\left[\dot{\omega}\hat{\tau} + \omega\dot{\hat{\tau}}\right]$

$\dot{\omega}\hat{\tau} = \vec{a}_{tg}$; $\omega\dot{\hat{\tau}} = \vec{a}_{cp} \rightarrow -R\omega^2\hat{\mu}$