

no eixo z

$$\begin{aligned}\hat{x} &= \cos\theta \hat{\rho} + \sin\theta \hat{k} \\ \hat{y} &= -\sin\theta \hat{\rho} + \cos\theta \hat{k}\end{aligned}$$

logo

$$\begin{aligned}\vec{v} &= R\omega_0 \hat{\phi} - \frac{v_0}{r} \hat{\phi} \times r \hat{x} \\ &= R\omega_0 \hat{\phi} + v_0 \cos\theta \hat{k} - v_0 \sin\theta \hat{\rho}\end{aligned}$$

que $\hat{\phi} \times \hat{\rho} = -\hat{k}$ e $\hat{\phi} \times \hat{k} = \hat{\rho}$

$$\vec{v} = R\omega_0 \hat{\phi} + v_0 \cos\theta \hat{k} - v_0 \sin\theta \hat{\rho}$$

C/r do sistema cilindrico ϕ, θ

) \vec{F}_{net} = $-N \hat{x} + F \hat{y}$

$$\vec{F}_{\text{net}} = m \vec{a} = m \vec{a}_0 + m \vec{a}' + m \vec{\omega} \times (\vec{\omega} \times \vec{r}') + 2m \vec{\omega} \times \vec{v}'$$

$$\vec{a}_0 = 0 \quad \text{e} \quad \vec{v}' = 0 \quad (\text{sistema solidário } s')$$

$$\vec{a}_0 = (\ddot{\rho} - \rho \dot{\theta}^2) \hat{\rho} + (\rho \ddot{\theta} + 2\dot{\rho} \dot{\theta}) \hat{\phi} = -R\omega_0^2 \hat{\rho}$$

$$\omega = -\frac{v_0}{R} \quad \text{e} \quad \vec{v}' = R \cos\theta \hat{\rho} + R \sin\theta \hat{k}$$

$$-N \hat{x} = -N (\cos\theta \hat{\rho} + \sin\theta \hat{k})$$

$$F \hat{y} = F (-\sin\theta \hat{\rho} + \cos\theta \hat{k})$$