

Ejemplo tornillo:

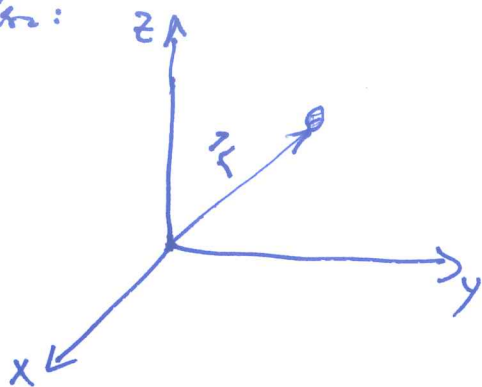
(2)

$$\omega \equiv \dot{\theta} = kt \quad \text{con } k = \text{cte.}$$

Ecuación de la hélice: $\rho = b$

$$\left. \begin{array}{l} 2\pi - L \\ \theta \rightarrow z \end{array} \right\} \theta = \left(\frac{2\pi}{L} \right) z$$

Posición:



$$\vec{r}(t) = \rho \hat{\rho} + z \hat{k}$$

$$\vec{r}(t) = b \hat{\rho} + \left(\frac{L}{2\pi} \right) \theta \hat{k}$$

$$\vec{v}(t) = b \dot{\theta} \hat{\theta} + \left(\frac{L}{2\pi} \right) \dot{\theta} \hat{k} \quad ; \quad \text{con } \dot{\theta} = kt$$

$$\vec{a}(t) = b \ddot{\theta} \hat{\theta} - b \dot{\theta}^2 \hat{\rho} + \left(\frac{L}{2\pi} \right) \ddot{\theta} \hat{k} \quad ; \quad \ddot{\theta} = k$$

$$\vec{a}(t) = bk \hat{\theta} - bk^2 t^2 \hat{\rho} + \left(\frac{L}{2\pi} \right) k \hat{k}$$

Cuando el tornillo gira una vuelta completa:

$$\text{de } \theta = 2\pi \quad \text{y } \dot{\theta} = kt \Rightarrow \theta(t) = \theta(0) + \frac{kt^2}{2}$$

↑
integrando

$$\text{en una vuelta: } t = T = \sqrt{\frac{4\pi}{k}} = 2\sqrt{\frac{\pi}{k}}$$