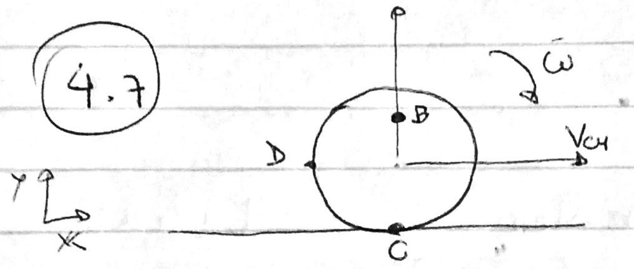
$\widehat{x\,y\,z}$ $+1$ $\widehat{z\,x\,y}$ $+1$ $\widehat{z\,y\,x}$ $-1$

$\bar{V} = \bar{\omega} \times \bar{R}$

## 4.7



$\bar{v}_o = \bar{v}_{o'} + \bar{R}_{oo'} \times \bar{\omega}$

P/ C: $\bar{v}_C = \bar{v}_{cm} + \bar{R}_{cm} \times \bar{\omega} = \bar{v}_{cm} + R\hat{y} \times \underbrace{\omega(-\hat{z})}_{-\hat{x}} \overset{\text{rodadura}}{=} 0 \Rightarrow \underline{\bar{v}_{cm} = R\omega\hat{x}}$

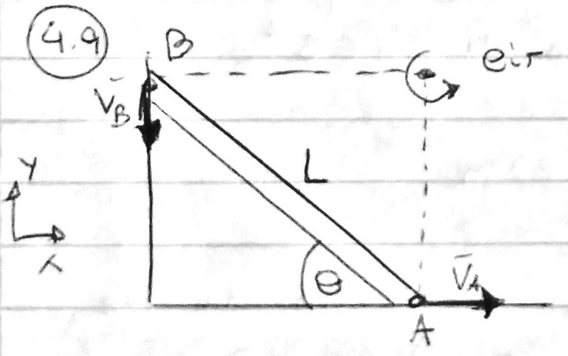
$|v_{cm}| = |\omega R| \Rightarrow \omega = 8s^{-1}$ $(\bar{\omega} = -8s^{-1}\hat{z})$

P/ B: $\bar{v}_B = \bar{v}_{cm} + \omega(-\hat{z}) \times R_b\hat{y} = 2m/s\ \hat{x}.$ $R_b = 0{,}1m\ \hat{y}$

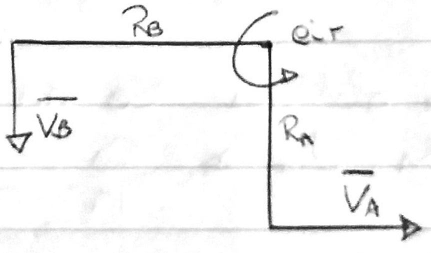
P/ D: $\bar{v}_D = \bar{v}_{cm} + \omega(-\hat{z}) \times R(-\hat{x}) = 1{,}2\hat{x} + 1{,}2\hat{y}$

$|\bar{v}_D| = 1{,}7 m/s$

## 4.9



$V_A = 3m/s\ \hat{x}$ $V_B = ?$



$\bar{\omega} = \omega\hat{z}$

$\bar{v} = \bar{\omega} \times \bar{R}$

$R_A = L\ \text{sen}\,\theta = 1m$ (en $\hat{y}$)

$R_B = L \cos\theta = 1{,}73m$ (en $\hat{x}$)

a) $R_{eir} = (1{,}73 ; 1)m$

b) ω es común a todo el sólido rígido $\Rightarrow \omega_A = \omega_B$

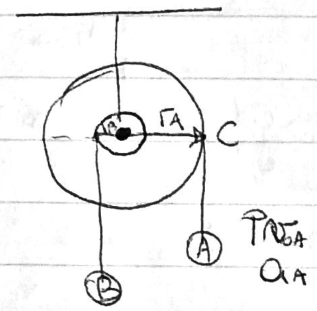
$$\omega_A = \frac{V_A}{R_A} = \frac{V_B}{R_B} \Rightarrow V_B = \frac{R_B}{R_A} . V_A = 5{,}19 m/s$$

④.1 $\theta = t^3 - 2t^2 - 4t + 10$

$\dot{\theta} = \omega = 3t^2 - 4t - 4$ $\rightarrow \theta(t=0), \dot{\theta}(t=0), \ddot{\theta}(t=0)$

$\ddot{\theta} = \alpha = 6t - 4$

(4.2)



a) $\# \text{vueltas} = \frac{\Delta\theta}{2\pi} = \frac{\omega_0 t + 1/2\, \alpha t^2}{2\pi}$

$\alpha ?\ \omega_0 ?$

$a_T = \alpha \cdot r \Rightarrow \alpha = \frac{a_{TA}}{r_A} = 6\ s^{-2}$

$v = \omega r \Rightarrow \omega = \frac{v_{0A}}{r_A} = 3\ s^{-1}$

Veo todo desde el eje

$\# \text{vueltas} = \frac{\Delta\theta(t=3s)}{2\pi} = 5,72$ vueltas.

b) $V_B$ y $S_B$? Pero $V_B$ es variable ya que $\omega$ es variable.

$\omega(t) = \omega_0 + \alpha t$ con $\omega_0 = 3 s^{-1}$ y $\alpha = 6 s^{-2}$

$\omega(t=3) = \omega_0 + \alpha . 3 = 21\ s^{-1}$.

$\Rightarrow v_B(t=3) = \omega(3) \cdot r_B = 0,63 m$.

Para obtener $S_B$ me falta $a_B$ $\Rightarrow$ uso $\alpha_A = \alpha_B$

$\alpha_A = \alpha_B \Rightarrow \frac{a_A}{r_A} = \frac{a_B}{r_B} \Rightarrow a_B = \frac{r_B}{r_A} a_A. = 0,18\ m/s^2$

$S_B = v_{0B} . t + \frac{1}{2} a_B t^2$

$S_B(t=3) = 1,08 m$.

c) La aceleración en el punto C posee componentes tangencial y normal (debido al movimiento giratorio).

$a_{TOTAL C} = \sqrt{a_{Tg}^2 + a_n^2}$, $\theta = \text{arctg}\left(\frac{a_{Tg}}{a_n}\right)$

$a_{tg} = \alpha r = a_{0A}$ $\Rightarrow a_{TOTAL C} = 0,54\ m/s^2$

$a_n = v^2/r = v_{0A}^2/r_A$ $\theta = 33,69°$

NOTA