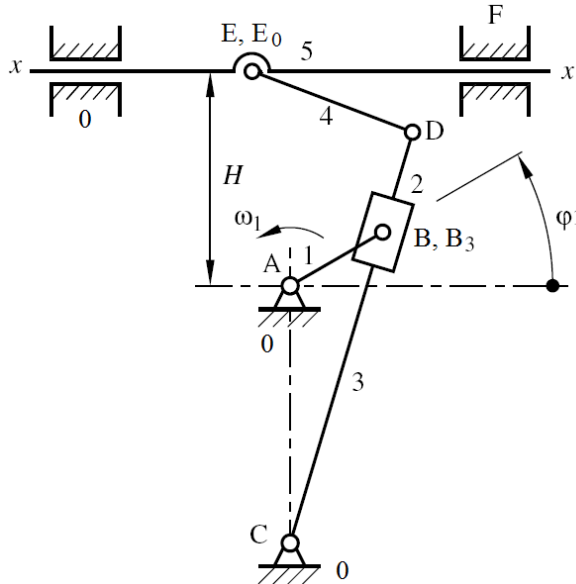


Ejemplo Sesión 06: Para el mecanismo dado, encontrar v_E y a_E



$$\begin{aligned} l_{AB} &= 0,050 \text{ m}; \\ l_{AC} &= 0,120 \text{ m}; \\ l_{CD} &= 0,200 \text{ m}; \\ H &= 0,100 \text{ m}; \\ l_{DE} &= 0,080 \text{ m}; \\ \varphi_1 &= 300^\circ; \\ \omega_1 &= 10 \text{ rad/s}. \end{aligned}$$

Utilizar

$$\begin{aligned} \mu_l &= 1 \text{ m/UnCAD}; \\ \mu_{\blacksquare} &= 0,080 \text{ (escala de los bloques en el dibujo CAD)} \\ \text{Tamaño letras} &= 0,01 \text{ UnCAD} \end{aligned}$$

Clasificación estructural

$$\begin{array}{ccc} I & II & II \\ 1 & 2,3 & 4,5 \\ R \rightarrow & RPR \rightarrow & RRP \\ A & BB_3C & DEE_0 \end{array}$$

Plano de posiciones: Resultado de control, coordenada obtenida punto E: X=-0.012243 Y=0.1 Z=0

Plano de velocidades

$$\begin{array}{c} I \\ \text{Mecanismo primario: } 1 \\ R \\ A \end{array}$$

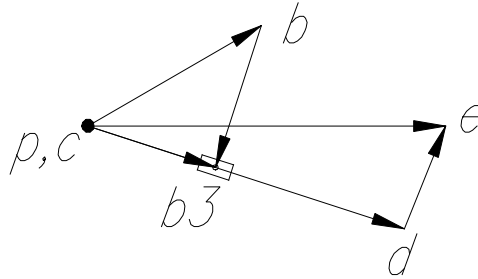
$$v_B = \omega_1 \cdot l_{AB} = 10 \cdot 0,050 = 0,050 \text{ m/s}$$

$pb = 0,050 \text{ UnCAD}$; (Se construye el plano en "escala de la manivela"), es decir:

$$\mu_v = \frac{v_B}{pb} = \frac{0,50}{0,050} = 10 \frac{\text{m/s}}{\text{UnCAD}}$$

$$\begin{array}{c} II \\ 2,3 \\ RPR \rightarrow \\ BB_3C \end{array} \rightarrow \begin{cases} \vec{v}_{B3} = \vec{v}_B + \vec{v}_{B3B} \parallel BC \\ \vec{v}_{B3} = \vec{v}_C + \vec{v}_{B3C} \perp BC \end{cases}$$

$$\begin{array}{l}
 II \\
 4,5 \\
 RRP \rightarrow \begin{cases} \vec{v}_E = \vec{v}_D + \vec{v}_{ED} \perp ED \\ \vec{v}_E = \vec{v}_{E0} + \vec{v}_{EE0} \parallel xx \end{cases} \\
 DEE_0
 \end{array}$$



$$v_E = pe \cdot \mu_v = 0,089107 \cdot 10 = 0,89 \text{ m/s}$$

$$\omega_3 = \frac{v_{B3C}}{l_{B3C}} = \frac{cb3 \cdot \mu_v}{CB_3 \cdot \mu_l} = \frac{0,033422 \cdot 10}{0,08067 \cdot 1} = 4,1430 \text{ rad/s}$$

$$\omega_4 = \frac{v_{ED}}{l_{ED}} = \frac{de \cdot \mu_v}{DE \cdot \mu_l} = \frac{0,027677 \cdot 10}{0,08 \cdot 1} = 3,459625 \text{ rad/s}$$

Plano de aceleraciones

$$\begin{array}{l}
 I \\
 \text{Mecanismo primario: } \frac{1}{R} \\
 A
 \end{array}$$

$$a_B = \omega_1^2 \cdot l_{AB} = 10^2 \cdot 0,050 = 5,0 \text{ m/s}^2$$

$\pi b = 0,050 \text{ UnCAD}$; (Se construye el plano en “escala de la manivela”), es decir:

$$\mu_a = \frac{a_B}{\pi b} = \frac{5,0}{0,050} = 100 \frac{\text{m/s}^2}{\text{UnCAD}}$$

$$\begin{array}{l}
 II \\
 2,3 \\
 RPR \\
 BB_3C \rightarrow \begin{cases} \vec{a}_{B3} = \vec{a}_B + \begin{matrix} \vec{a}_{B3B}^c \\ (\perp v_{B3B}) \end{matrix} + \begin{matrix} \vec{a}_{B3B}^r \\ \parallel BC \end{matrix} \\ \vec{a}_{B3} = \vec{a}_C + \begin{matrix} \vec{a}_{B3C}^n \\ \parallel BC \end{matrix} + \begin{matrix} \vec{a}_{B3C}^t \\ \perp BC \end{matrix} \end{cases}
 \end{array}$$

$$a_{B3B}^c = 2|\omega_2| \cdot v_{B3B} = 2 \cdot 4,1430 \cdot 0,37188 = 3,0814 \text{ m/s}^2 \text{ Donde}$$

$$\omega_2 = \omega_3 = 2 \cdot 4,1430 \cdot 0,3719 = 3,0814 \text{ m/s}^2$$

$$v_{B3B} = bb3 \cdot \mu_v = 0,037188 \cdot 10 = 0,37188 \text{ m/s}$$

$$bk = \frac{a_{B3B}^c}{\mu_a} = \frac{3,0814}{100} = 0,030814 \text{ UnCAD}$$

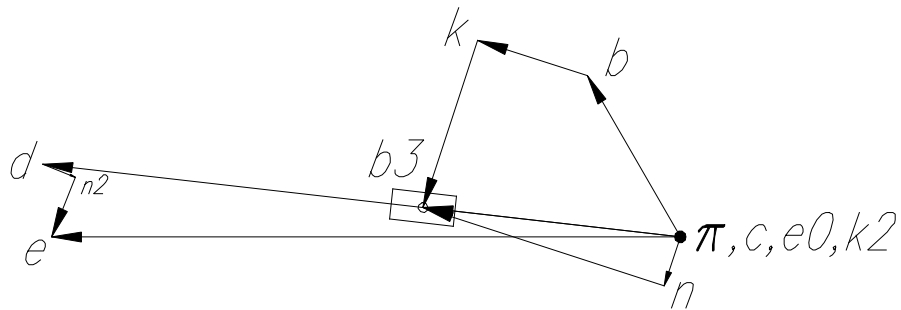
$$a_{B3C}^n = \omega_3^2 \cdot l_{B3C} = 4,1430^2 \cdot 0,08067 = 1,38466 \text{ m/s}^2$$

$$\pi n = \frac{a_{B3C}^n}{\mu_a} = \frac{1,38466}{100} = 0,0138466 \text{ UnCAD}$$

$$\begin{array}{l} II \\ 4,5 \\ RRP \\ DEE_0 \end{array} \rightarrow \begin{cases} \vec{a}_E = \vec{a}_D + \vec{a}_{ED}^n + \vec{a}_{ED}^t \\ \vec{a}_E = \vec{a}_{E0} + \vec{a}_{EE0}^c + \vec{a}_{EE0}^r \\ \quad \quad \quad = 0 \quad \quad \parallel xx \end{cases}$$

$$a_{ED}^n = \omega_4^2 \cdot l_{ED} = 3,459625^2 \cdot 0,08 = 0,95752 \text{ m/s}^2$$

$$dn2 = \frac{a_{ED}^n}{\mu_a} = \frac{0,95752}{100} = 0,0095752 \text{ UnCAD}$$



$$a_E = \pi e \cdot \mu_a = 0,16867 \cdot 100 = 16,867 \text{ m/s}^2$$

Fin de ejercicio