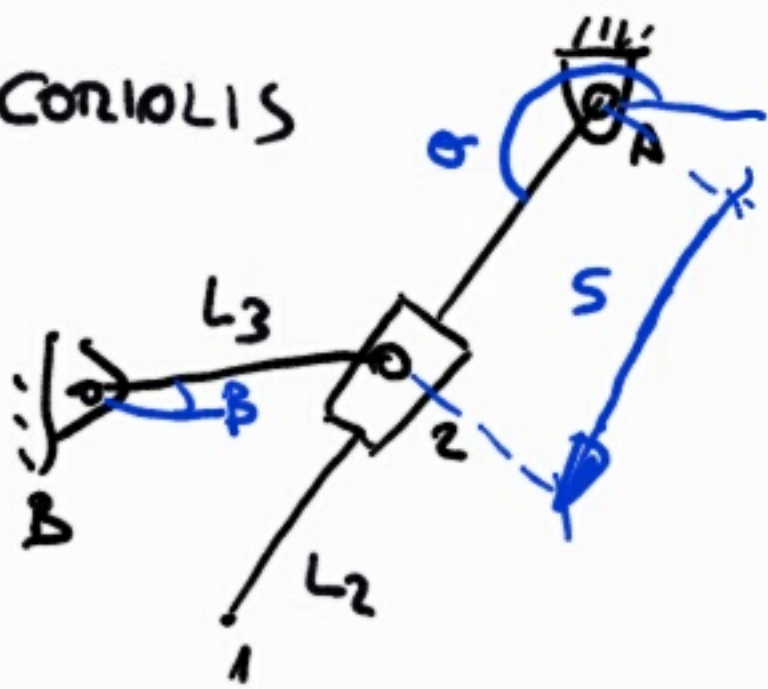


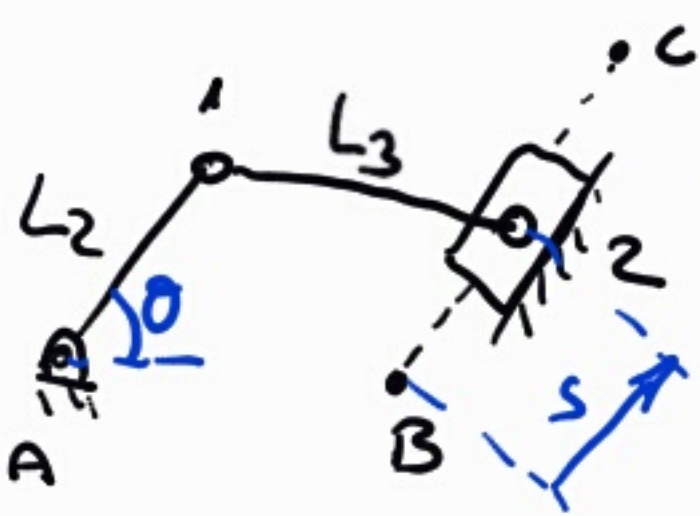
CORIOOLIS



$$q = \begin{bmatrix} x_1 \\ y_1 \\ x_2 \\ y_2 \\ \theta \\ s \\ \beta \end{bmatrix}$$

$$\Phi = \begin{bmatrix} (x_A - x_1)^2 + (y_A - y_1)^2 - L_2^2 \\ (x_2 - x_B)^2 + (y_2 - y_B)^2 - L_3^2 \\ \{(y_1 - y_A) - L_2 \sin \theta\} \\ \{(x_1 - x_A) - L_2 \cos \theta\} \\ (x_2 - x_A)^2 + (y_2 - y_A)^2 - s^2 \\ \{(y_2 - y_B) - L_3 \sin \beta\} \\ \{(x_2 - x_B) - L_3 \cos \beta\} \end{bmatrix}$$

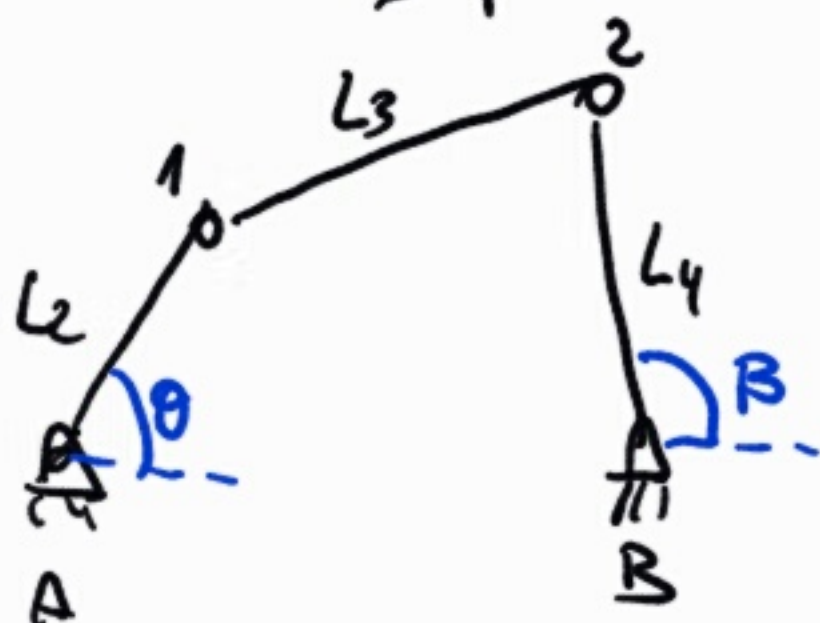
SLIDERCRAWK



$$q = \begin{bmatrix} x_1 \\ y_1 \\ x_2 \\ y_2 \\ \theta \\ s \end{bmatrix}$$

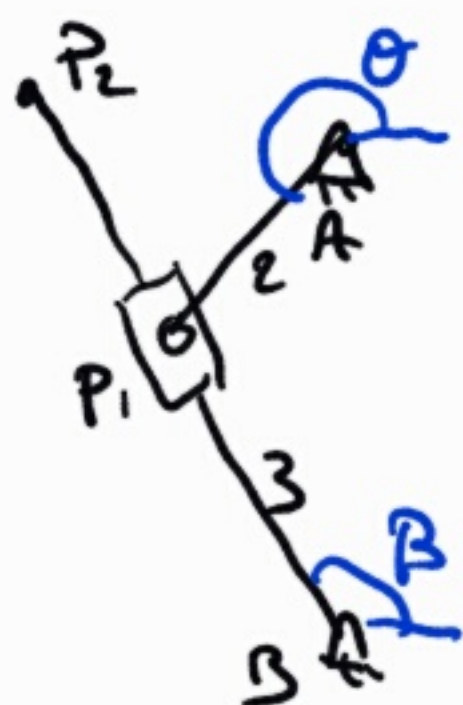
$$\Phi = \begin{bmatrix} (x_A - x_1)^2 + (y_A - y_1)^2 - L_2^2 \\ (x_1 - x_2)^2 + (y_1 - y_2)^2 - L_3^2 \\ (x_C - x_B)(y_2 - y_B) - (y_C - y_B)(x_2 - x_B) \\ \{(y_1 - y_A) - L_2 \sin \theta\} \\ \{(x_1 - x_A) - L_2 \cos \theta\} \\ (x_2 - x_B)^2 + (y_2 - y_B)^2 - s^2 \end{bmatrix}$$

FOUR BARS 4



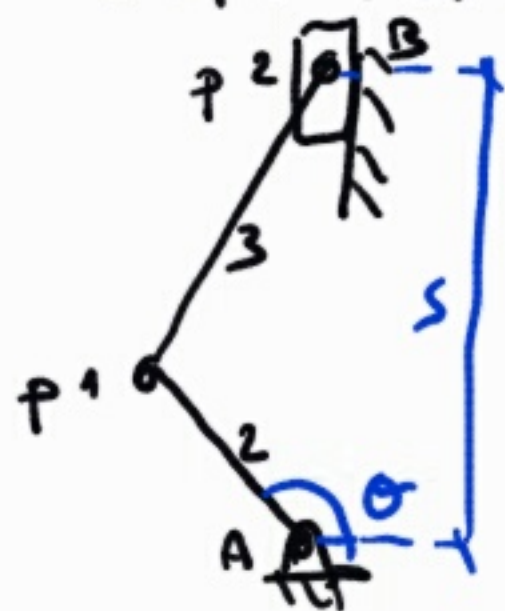
$$q = \begin{bmatrix} x_1 \\ y_1 \\ x_2 \\ y_2 \\ \theta \\ \beta \end{bmatrix} \quad \Phi = \begin{bmatrix} (x_1 - x_A)^2 + (y_1 - y_A)^2 - L_2^2 \\ (x_2 - x_1)^2 + (y_2 - y_1)^2 - L_3^2 \\ (x_2 - x_B)^2 + (y_2 - y_B)^2 - L_4^2 \\ (y_1 - y_A) - L_2 \sin \theta \\ (x_1 - x_2) - L_2 \cos \theta \\ (y_2 - y_B) - L_4 \sin \beta \\ (x_2 - x_B) - L_4 \cos \beta \end{bmatrix}$$

CORIOUS (θ en maniv.)



$$q = \begin{bmatrix} x_1 \\ y_1 \\ x_2 \\ y_2 \\ \theta \\ \beta \end{bmatrix} \quad \Phi = \begin{bmatrix} (x_1 - x_A)^2 + (y_1 - y_A)^2 - L_2^2 \\ (x_2 - x_B)^2 + (y_2 - y_B)^2 - L_3^2 \\ (y_1 - y_B)(x_2 - x_B) - (x_1 - x_B)(y_2 - y_B) \\ (y_1 - y_A) - L_2 \sin \theta \\ (x_1 - x_2) - L_2 \cos \theta \\ (y_2 - y_B) - L_3 \sin \beta \\ (x_2 - x_B) - L_3 \cos \beta \end{bmatrix}$$

bm1 (Example 16.18 Hibbeler)



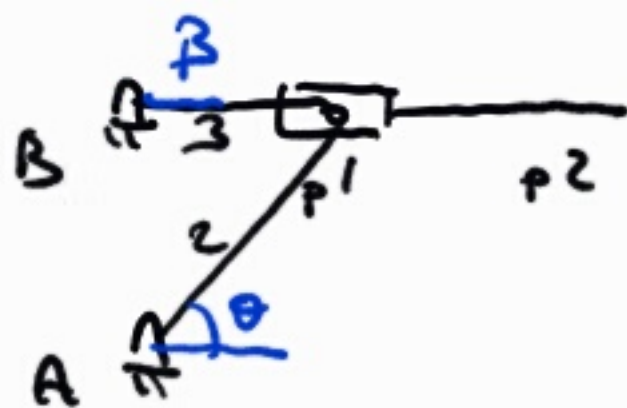
$$q_0 = \begin{bmatrix} x_1 = -0.1768 \\ y_1 = 0.1768 \\ x_2 = 0 \\ y_2 = -0.9057 \\ \theta = 2.3562 \\ s = 0.1057 \end{bmatrix}$$

$$\begin{aligned} L_2 &= 0.25 \\ L_3 &= 0.75 \\ x_B &= x_C = 0 \\ y_B &= 0.8 \\ y_C &= 1.0 \\ \dot{\theta} &= 10 \text{ rad/s} \\ \ddot{\theta} &= -20 \text{ rad/s}^2 \end{aligned}$$

SOL: $a_B = 13.57 \downarrow$ $\omega_3 = 2.43 \text{ rad/s}$

Notas: Resultados OK. Simulación: V1 no va acompañada con el mov. de 2 cuando cambia de sentido.

co1 (Example 16.20 Hibbeler)

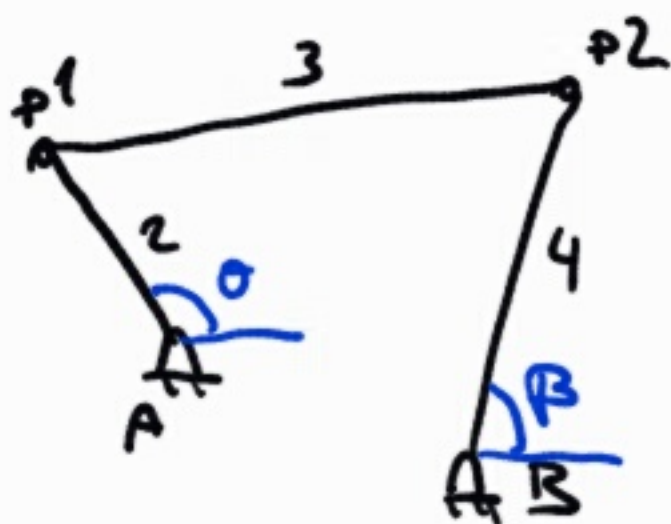


$$q_0 = \begin{bmatrix} x_1 = 0.4 \\ y_1 = 0.4 \\ x_2 = 1 \\ y_2 = 0.4 \\ \theta = 0.7854 \\ \beta = 0 \end{bmatrix}$$

$$\begin{aligned} L_2 &= 0.5657 \\ L_3 &= 1 \\ x_B &= 0 \\ y_B &= 0.4 \\ \dot{\theta} &= -3 \text{ rad/s} \\ \ddot{\theta} &= -4 \text{ rad/s}^2 \end{aligned}$$

SOL: $\ddot{\beta} = 5 \text{ rad/s}^2$ $\dot{\beta} = -3 \text{ rad/s}$

C61 (Ejemplo 4.2 Sandoz)



$$q_0 = \begin{bmatrix} x_1 = -12 \\ y_1 = 21.8 \\ x_2 = 42.9 \\ y_2 = 23.8 \\ \theta = 2.072 \\ \phi = 1.2618 \end{bmatrix}$$

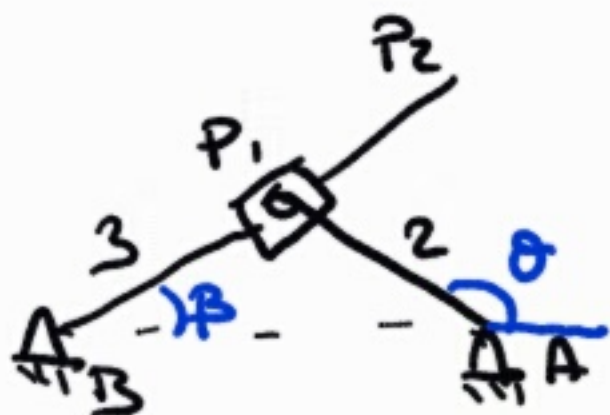
$$\begin{aligned} L_2 &= 24.972 \\ L_3 &= 55 \\ L_4 &= 50 \\ x_B &= 27.645 \\ y_B &= -23.8040 \\ \dot{\theta} &= -62.8 \text{ rad/s} \\ \ddot{\theta} &= -2000 \text{ rad/s}^2 \end{aligned}$$

SOL: $\ddot{\phi} = -1.676 \cdot 10^3 \text{ rad/s}^2$ $|a_2| = 9600 \text{ cm/s}^2$

$v_2 = 152.2 \text{ cm/s}$ $\omega_3 = -18.4 \text{ rad/s}$

Notas: Los resultados varían ligeramente, y están expresados en una escala diferente. Esto puede ser debido a la resolución gráfica.

C02 (Example 16.14 Pytel)



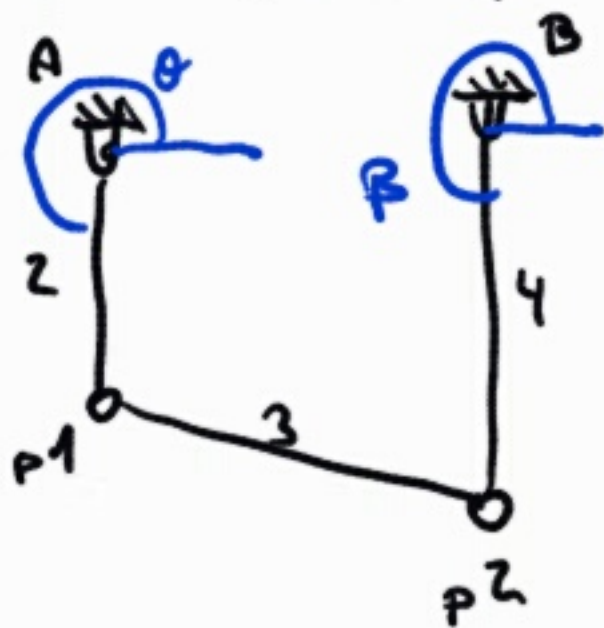
$$q_0 = \begin{bmatrix} x_1 = -173.20 \\ y_1 = 100 \\ x_2 = 90.45 \\ y_2 = 185.94 \\ \theta = 2.6180 \\ \phi = 0.3151 \end{bmatrix}$$

$$\begin{aligned} L_2 &= 200 \\ L_3 &= 600 \\ x_B &= -480 \\ y_B &= 0 \\ \dot{\theta} &= 6 \text{ rad/s} \\ \ddot{\theta} &= 0 \text{ rad/s}^2 \end{aligned}$$

SOL: $\ddot{\phi} = -31.39 \text{ rad/s}^2$ $\dot{\phi} = -2.536 \text{ rad/s}$

Notas: Los resultados varían ligeramente

cb2 (Example 16.2 Pytel)



$$q_0 = \begin{bmatrix} x_1 = 0 \\ y_1 = -80 \\ x_2 = 96.1692 \\ y_2 = -120 \\ \theta = 4.7124 \\ \phi = 4.7124 \end{bmatrix}$$

$$L_2 = 80$$

$$L_3 = 95$$

$$L_4 = 120$$

$$x_B = x_2$$

$$y_B = 0$$

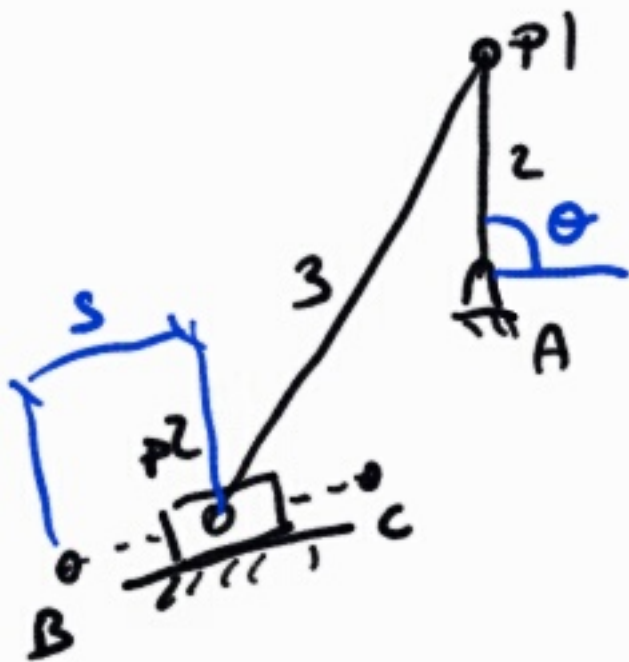
$$\dot{\theta} = 2.4 \text{ rad/s}$$

$$\ddot{\theta} = 1.5 \text{ rad/s}^2$$

SOL: $\ddot{\phi} = 0.406 \text{ rad/s}^2$ $\dot{\phi} = 1.6 \text{ rad/s}$

Notes: Error (redondeo) en $\ddot{\phi}$

bm2 (Prob. 16-116 Hibbeler)



$$q_0 = \begin{bmatrix} x_1 = 0 \\ y_1 = 7 \\ x_2 = -5 \\ y_2 = -5 \\ \theta = 1.5708 \\ s = 3.43 \end{bmatrix}$$

$$L_2 = 7$$

$$L_3 = 13$$

$$x_B = -2.2542$$

$$y_B = -2.94$$

$$x_C = -7.74$$

$$y_C = -7.05$$

$$\dot{\theta} = 3 \text{ rad/s}$$

$$\ddot{\theta} = 2 \text{ rad/s}^2$$

SOL: $a_2 = 54.66$

Notes: Verificado con la solución por mt, gráfico en Drive.