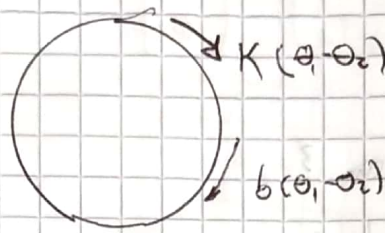
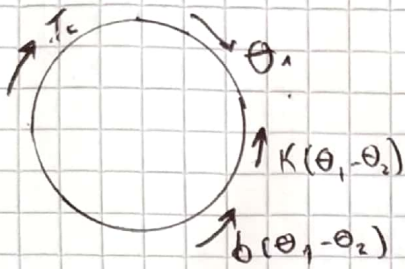


Tarea 3  
corte 2



Ecuación 1

$$T_c - K(\theta_1 - \theta_2) - b(\dot{\theta}_1 - \dot{\theta}_2) = I_1 \ddot{\theta}_1$$

Ecuación 2

$$b(\dot{\theta}_1 - \dot{\theta}_2) + K(\theta_1 - \theta_2) = I_2 \ddot{\theta}_2$$

$$\frac{I_c}{I_1} = \frac{K}{I_1} q_1 + \frac{K q_3}{I_1} - \frac{b q_2}{I_1} + \frac{b q_4}{I_1} = \ddot{q}_1$$

$$\Rightarrow q_1 = \theta_1$$

$$q_3 = \theta_2$$

$$q_2 = \dot{\theta}_1 = \dot{q}_1$$

$$q_4 = \dot{\theta}_2 = \dot{q}_3$$

$$q_5 = \ddot{\theta}_1 = \ddot{q}_1$$

$$q_6 = \ddot{\theta}_2 = \ddot{q}_3$$

$$\frac{I_c}{I_1} = \frac{K}{I_1} q_1 + \frac{K q_3}{I_1} - \frac{b q_2}{I_1} + \frac{b q_4}{I_1} = \ddot{q}_1$$

$$\frac{b \dot{q}_1}{I_2} - \frac{b \dot{q}_3}{I_2} + \frac{K q_1}{I_2} - \frac{K q_3}{I_2} = \ddot{q}_3$$

$$\frac{b q_2}{I_2} - \frac{b q_4}{I_2} + \frac{K q_1}{I_2} - \frac{K q_3}{I_2} = \ddot{q}_4$$

$$\begin{bmatrix} \dot{q}_1 \\ \dot{q}_2 \\ \dot{q}_3 \\ \dot{q}_4 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ -K/I_1 & -b/I_1 & K/I_1 & b/I_1 \\ 0 & 0 & 0 & 1 \\ 0 & \frac{(K+b)}{I_2} & \frac{-K}{I_2} & \frac{-b}{I_2} \end{bmatrix} \begin{bmatrix} q_1 \\ q_2 \\ q_3 \\ q_4 \end{bmatrix} + \begin{bmatrix} 0 \\ 1/I_1 \\ 0 \\ 0 \end{bmatrix} \tau_L \begin{bmatrix} \theta_1 \\ \theta_2 \end{bmatrix} = [1 \ 0 \ 1 \ 0] \begin{bmatrix} q_1 \\ q_2 \\ q_3 \\ q_4 \end{bmatrix}$$