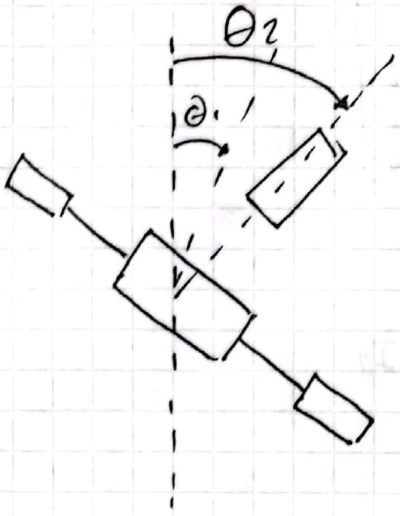
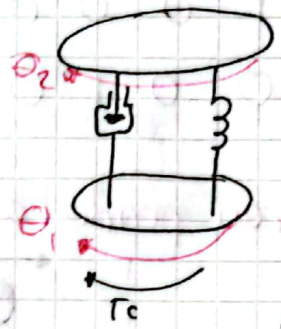
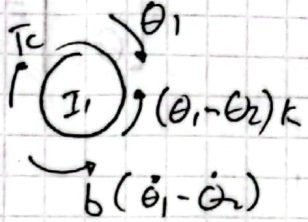
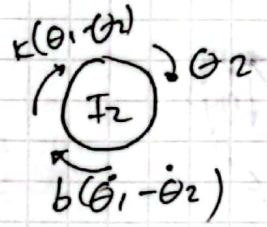
Tarea









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

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

$$\ddot{\theta}_1 = \frac{Tc}{I_1} - \frac{K}{I_1}\theta_1 + \frac{K}{I_1}\theta_2 - \frac{b}{I_1}\dot{\theta}_1 + \frac{b}{I_1}\dot{\theta}_2$$

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

$$q_1 = \theta_1 \qquad q_3 = \theta_2$$
$$q_2 = \dot{q}_1 = \dot{\theta}_1 \qquad q_4 = \dot{q}_3 = \dot{\theta}_2$$
$$\dot{q}_2 = \ddot{q}_1 = \ddot{\theta}_1 \qquad \dot{q}_4 = \ddot{q}_3 = \ddot{\theta}_2$$

$$\begin{bmatrix} \dot{q}_1 \\ \dot{q}_2 \\ \dot{q}_3 \\ \dot{q}_4 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ \frac{-K}{I_1} & \frac{-b}{I_1} & \frac{K}{I_1} & \frac{b}{I_1} \\ 0 & 0 & 0 & 1 \\ \frac{-K}{I_2} & \frac{-b}{I_2} & \frac{K}{I_2} & \frac{b}{I_2} \end{bmatrix} \begin{bmatrix} q_1 \\ q_2 \\ q_3 \\ q_4 \end{bmatrix} + \begin{bmatrix} 0 \\ \frac{1}{I_1} \\ 0 \\ 0 \end{bmatrix} Tc$$

$$\begin{bmatrix} \Theta_1 \\ \Theta_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} q_1 \\ q_2 \\ q_3 \\ q_4 \end{bmatrix}$$