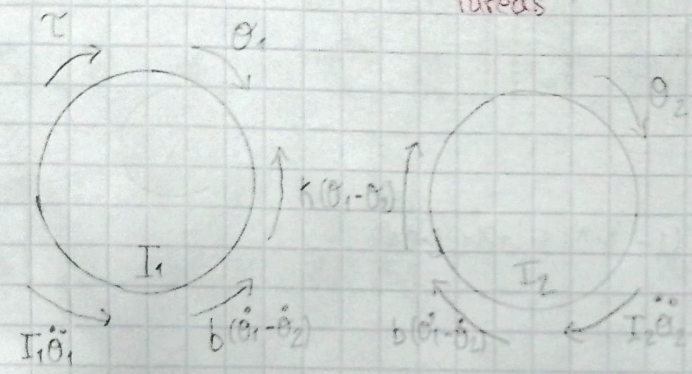
Tareas



$\therefore \tau - k(\theta_1-\theta_2) + b(\dot\theta_1-\dot\theta_2) = I_1\ddot\theta_1 \rightarrow \ddot\theta_1 = \tau/I_1 - k/I_1\theta_1 + k/I_1\theta_2 - b/I_1\dot\theta_1 + b/I_1\dot\theta_2$

$b(\dot\theta_1-\dot\theta_2) + k(\theta_1-\theta_2) = I_2\ddot\theta_2 \rightarrow \ddot\theta_2 = b/I_2\dot\theta_1 - b/I_2\dot\theta_2 + k/I_2\theta_1 - k/I_2\theta_2$

- Variables de estado:

$q_1 = \theta_1 \; ; \; q_2 = \dot q_1 = \dot\theta_1 \; ; \; \dot q_2 = \ddot\theta_1$

$q_3 = \theta_2 \; ; \; q_4 = \dot q_3 = \dot\theta_2 \; ; \; \dot q_4 = \ddot\theta_2$

$\dot q_2 = \tau/I_1 - k/I_1 q_1 + k/I_1 q_3 - b/I_1 q_2 + b/I_1 q_4$

$\dot q_4 = b/I_2 q_2 - b/I_2 q_4 + k/I_2 q_1 - k/I_2 q_3$

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

$$\begin{bmatrix} \theta_1 \\ \theta_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} q_1 \\ q_2 \\ q_3 \\ q_4 \end{bmatrix}$$