TAREAS 2do Corte.

1ra Entrega.

Sistemas Dinamicos Grp 005 - 1

Docente: Henry Barrero Guarnero

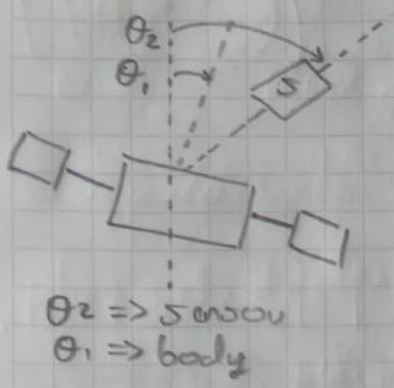
Philip Mateo Millán Patiño

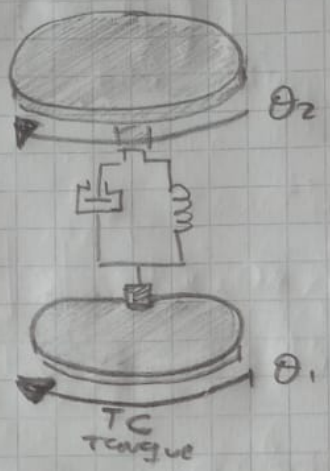
Cod. 20202005096

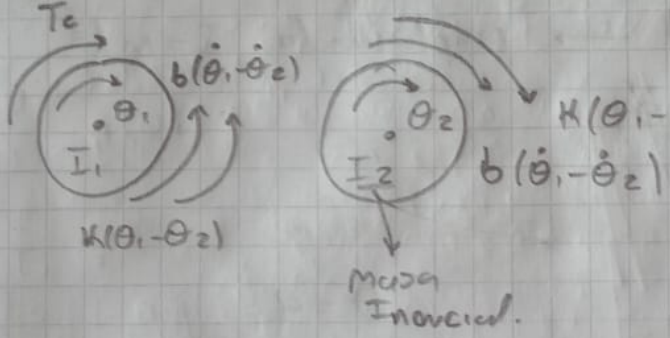
Universidad Distrital Francisco
Jose de Caldas.

Bogotá, 2 de Mayo del
año 2024

TAREA 3







Ecuaciones:

$$T_c - K(\theta_1 - \theta_2) - b(\dot\theta_1 - \dot\theta_2) = I_1\ddot\theta_1$$

$$\ddot\theta_1 = \frac{T_c}{I_1} - \frac{K(\theta_1-\theta_2)}{I_1} - \frac{b(\dot\theta_1-\dot\theta_2)}{I_1} \quad (1)$$

$$\ddot\theta_2 = \frac{b(\dot\theta_1-\dot\theta_2)}{I_2} + \frac{K(\theta_1-\theta_2)}{I_2} \quad (2)$$

Variables:

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

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

reemplazando:

$$\dot q_2 = \frac{T_c}{I_1} - \frac{Kq_1}{I_1} + \frac{Kq_3}{I_1} - \frac{bq_2}{I_1} + \frac{bq_4}{I_1} \quad (1)$$

$$\dot q_4 = \frac{bq_2}{I_2} - \frac{bq_4}{I_2} + \frac{Kq_1}{I_2} - \frac{Kq_3}{I_2} \quad (2)$$

$$\begin{bmatrix}\dot q_1\\ \dot q_2\\ \dot q_3\\ \dot q_4\end{bmatrix} = \begin{bmatrix}0 & 1 & 0 & 0\\ -\frac{K}{I_1} & -\frac{b}{I_1} & \frac{K}{I_1} & \frac{b}{I_1}\\ 0 & 0 & 0 & 1\\ \frac{K}{I_2} & \frac{b}{I_2} & -\frac{K}{I_2} & -\frac{b}{I_2}\end{bmatrix}\begin{bmatrix}q_1\\ q_2\\ q_3\\ q_4\end{bmatrix} + \begin{bmatrix}0\\ 1/I_1\\ 0\\ 0\end{bmatrix} T_c$$

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