tesis

PL

11/3/2020

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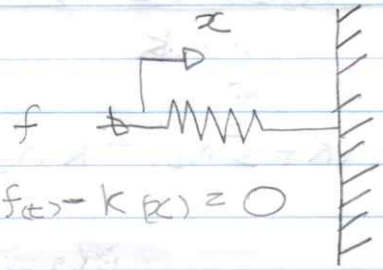
- Diagrama de bloques
- Modelado de sistemas

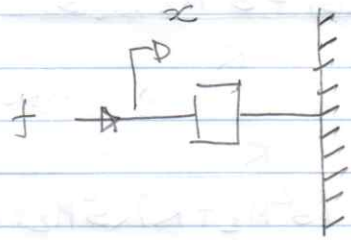
ejemplo



$f(t) = -Kx$

$f(t) - K(x) = 0$

$\sum F_R = m_1 \ddot{x}_1(t)$



$f(t) = -B \frac{dx}{dt}$

$\mathcal{L}$

$\Rightarrow F(s) = -sBX(s)$

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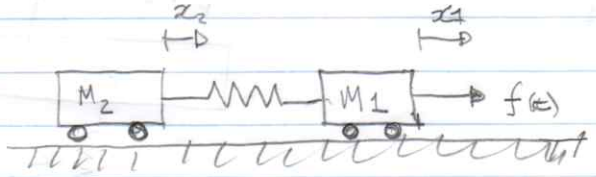
2 b)



$\sum F_R = m \cdot a_{(t)}$

x_1: $\sum F_1 = M_1 a_1$ $\quad f(t) - K[x_1(t) - x_2(t)] = M_1 a_1 = M_1 \frac{d^2}{dt^2} x_1(t)$

x_2: $\sum F_2 = M_2 a_2$ $\quad -K[x_2(t) - x_1(t)] = M_2 \frac{d^2 x_2(t)}{dt^2}$

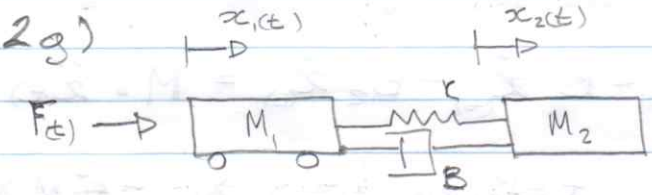
$\downarrow \mathcal{L}$

$$\begin{cases} F(s) - K[X_1(s) - X_2(s)] = s^2 M_1 X(s) \\ -K[X_2(s) - X_1(s)] = s^2 M_2 \cdot X_2(s) \end{cases}$$

$$G(s) = \frac{X_2(s)}{F(s)}$$

$$\frac{X_1(s)}{F(s)} = \frac{K_2}{s^4(M_1 \cdot M_2) + s^3(B \cdot M_2) + s^2(K_1 M_2 + K_2 M_2 + K_2 M_1) + s(B \cdot K_2) + K_1 K_2}$$

2g)



$$G(s) = \frac{X_1(s)}{F(s)}$$

$$\Sigma F_R = M \cdot a_{(t)}$$

$$\begin{cases} \Sigma F_1 = M_1 a_1 \\ \Sigma F_2 = M_2 a_2 \end{cases}$$

$$\begin{cases} f(t) - K[x_1(t) - x_2(t)] - B[\dot{x}_1(t) - \dot{x}_2(t)] = M_1 \cdot \ddot{x}_1(t) \\ -K[x_2(t) - x_1(t)] - B[\dot{x}_2(t) - \dot{x}_1(t)] = M_2 \ddot{x}_2(t) \end{cases}$$

$$\downarrow \mathcal{L}$$

$$\begin{cases} F(s) - K[X_1(s) - X_2(s)] - sB[X_1(s) - X_2(s)] = s^2 M_1 X_1(s) \\ -K[X_2(s) - X_1(s)] - sB[X_2(s) - X_1(s)] = s^2 M_2 X_2(s) \end{cases}$$

$$-KX_2(s) + KX_1 s - sBX_2(s) + sBX_1(s) = s^2 M_2 X_2(s)$$

$$(sB + K) X_1(s) = (s^2 M_2 + sB + K) X_2(s)$$

$$X_2(s) = \frac{sB + K}{s^2 M_2 + sB + K} X_1(s)$$

$$\frac{X_1(s)}{F(s)} = \frac{s^2 M_2 + sB + K}{s^2[s^2 M_1 M_2 + (sB + K)(M_1 + M_2)}$$