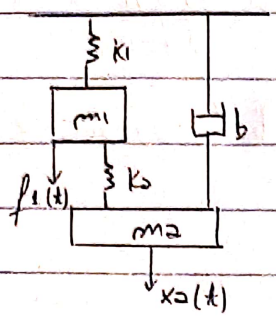
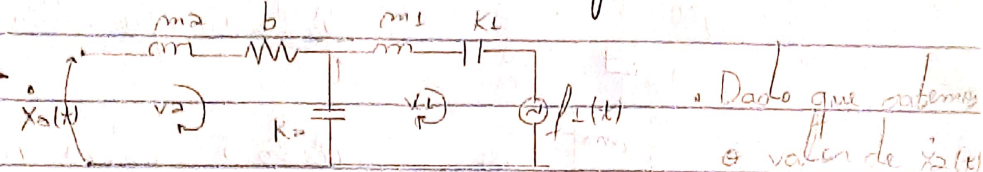
$f \to V$ | $m \to L$
$v \to I$ | $b \to R$
$K \to \frac{1}{C}$

Gabriel Barbosa Pagamini - 10272539 - Modelagem 08/09/2020

Slides

ex 2



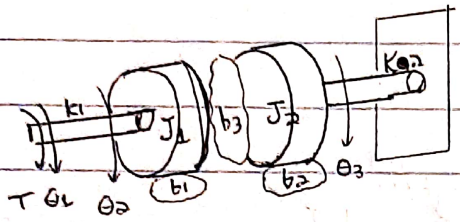


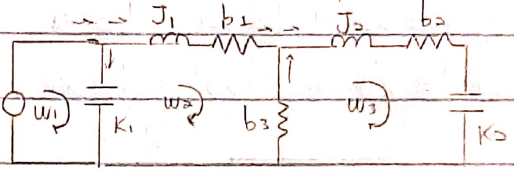
. Dado que sabemos o valor de $\dot{x}_2(t)$

$$\therefore f_1(t) = \frac{K_2}{D}(V_1 - V_2) + \left(m_1 D + \frac{K_1}{D}\right) V_1$$

$$\rightarrow \boxed{m_1 \ddot{x}_1 + (K_1 + K_2) x_1 - K_2 x_2 = f_1(t)}$$

ex 3



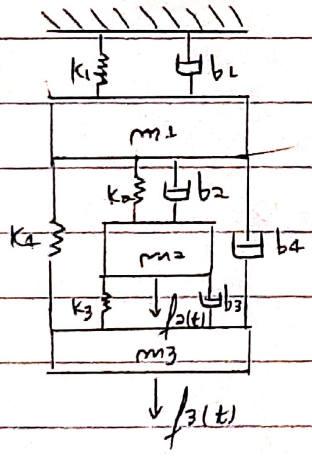


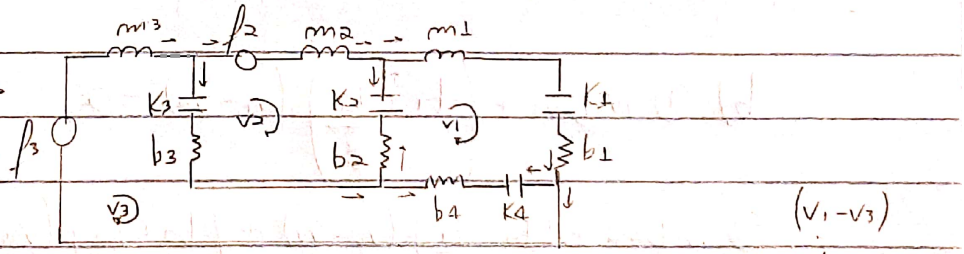
. Malha 1: $T = \frac{K_1}{D}(w_1 - w_2)$ / . Malha 2: $(J_1 D + b_1) w_2 + b_3 (w_2 - w_3) + \frac{K_1}{D}(w_2 - w_1) = 0$

. Malha 3: $\left(J_2 D + b_2 + \frac{K_2}{D}\right) w_3 + b_3 (w_3 - w_2) = 0$

$$\begin{cases} T(t) = K_1(\theta_1 - \theta_2) \\ J_1 \ddot{\theta}_2 + (b_1 + b_3)\dot{\theta}_2 + K_1 \theta_2 = K_1 \theta_1 + b_3 \dot{\theta}_3 \\ J_2 \ddot{\theta}_3 + (b_2 + b_3)\dot{\theta}_3 + K_2 \theta_3 = B_3 \dot{\theta}_2 \end{cases}$$

Lista 3





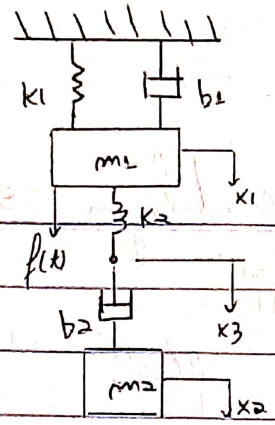
. Malha 1: $\left(m_1 D + b_1 + \frac{K_1}{D}\right) V_1 + \left(b_2 + \frac{K_2}{D}\right)(V_1 - V_2) + \left(b_4 + \frac{K_4}{D}\right)_{=0}$

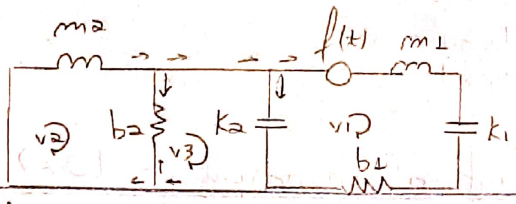
. Malha 2: $f_2(t) = m_2 D V_2 + \left(\frac{K_2}{D} + b_2\right)(V_2 - V_1) + \left(\frac{K_3}{D} + b_3\right)(V_2 - V_3)$

. Malha 3: $f_3(t) = m_3 D V_3 + \left(\frac{K_3}{D} + b_3\right)(V_3 - V_2) + \left(\frac{K_4}{D} + b_4\right)(V_3 - V_1)$

$$\begin{cases} m_1 \ddot{x}_1 + (b_1 + b_2 + b_4)\dot{x}_1 + (K_1 + K_2 + K_4) x_1 = b_2 \dot{x}_2 + K_2 x_2 + b_4 \dot{x}_3 + K_4 x_3 \\ m_2 \ddot{x}_2 + (b_2 + b_3)\dot{x}_2 + (K_2 + K_3) x_2 = b_2 \dot{x}_1 + K_2 x_1 + b_3 \dot{x}_3 + K_3 x_3 + f_2(t) \\ m_3 \ddot{x}_3 + (b_3 + b_4)\dot{x}_3 + (K_3 + K_4) x_3 = b_4 \dot{x}_1 + K_4 x_1 + b_3 \dot{x}_2 + K_3 x_2 + f_3(t) \end{cases}$$

⑥





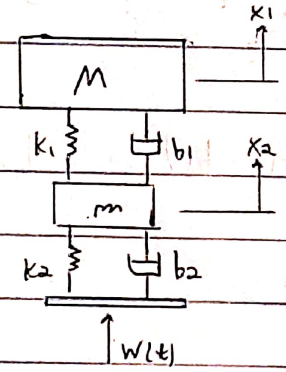
. Malha 1 : $f(t) = \left(m_1 D + b_1 + \frac{K_1}{D}\right) v_1 + \frac{K_2}{D}(v_1 - v_3)$

. Malha 3 : $\frac{K_2}{D}(v_3 - v_1) + b_2(v_3 - v_2) = 0$

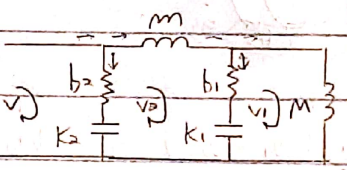
. Malha 2 : $m_2 D v_2 + b_2 (v_2 - v_1) = 0$

$$\begin{cases} m_1 \ddot{x}_1 + b_1 \dot{x}_1 + (k_1 + k_2) x_1 = k_2 x_3 + f(t) \\ m_2 \ddot{x}_2 + b_2 \dot{x}_2 = b_2 \dot{x}_1 \\ b_2 \dot{x}_3 + k_2 x_3 = k_2 x_1 + b_2 \dot{x}_2 \end{cases}$$

⑧



a)



, Com $v = \dot{W}(t)$

. ① : $M D v_1 + \left(b_1 + \frac{k_1}{D}\right)(v_1 - v_2) = 0$

② $m D v_2 + \left(b_1 + \frac{k_1}{D}\right)(v_2 - v_1) + \left(\frac{K_2}{D} + b_2\right)(v_2 - v) = 0$

$$\begin{cases} M \ddot{x}_1 + b_1 \dot{x}_1 + k_1 x_1 = b_1 \dot{x}_2 + k_1 x_2 \\ m \ddot{x}_2 + (b_1 + b_2) \dot{x}_2 + (k_1 + k_2) x_2 = b_1 \dot{x}_1 + k_1 x_1 + b_2 \dot{W}(t) + k_2 W(t) \end{cases}$$

b) ① $M D v_1 + \left(b_1 + \frac{k_1}{D}\right)(v_1 - v_2) = 0$

② $m D v_2 + \left(b_1 + \frac{k_1}{D}\right)(v_2 - v_1) + \left(b_2 + \frac{k_2}{D}\right)(v_2 - v) = 0$, $-W(t)$

③ $\left(b_2 + \frac{k_2}{D}\right)(v - v_2) = W(t)$

$$\begin{cases} M \ddot{x}_1 + b_1 \dot{x}_1 + k_1 x_1 = b_1 \dot{x}_2 + k_1 x_2 \\ m \ddot{x}_2 + b_1 \dot{x}_2 + k_1 x_2 = b_1 \dot{x}_1 + k_1 x_1 + W(t) \end{cases}$$