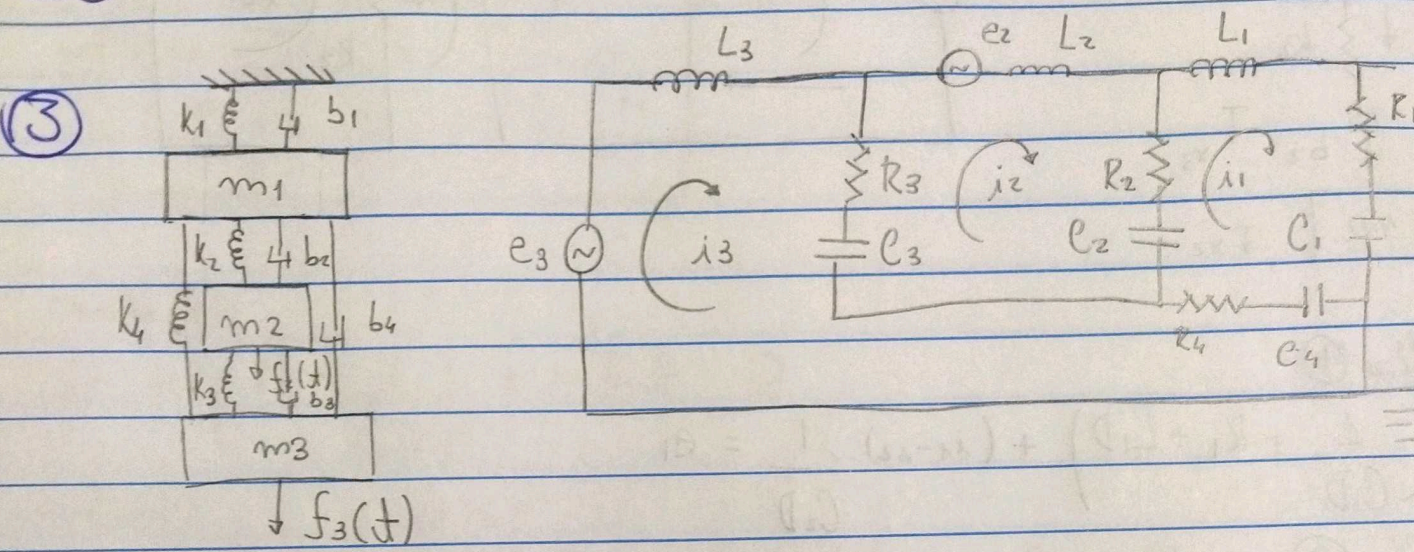


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malha ①

$$\left(R_1 + \frac{1}{C_1 D} + L_1 D \right) i_1 + \left(R_2 + \frac{1}{C_2 D} \right) (i_1 - i_2) + \left(R_4 + \frac{1}{C_4 D} \right) (i_1 - i_3) = 0$$

malha ②

$$L_2 D \cdot i_2 + (i_2 - i_1) \left(R_2 + \frac{1}{C_2 D} \right) + (i_2 - i_3) \left(R_3 + \frac{1}{C_3 D} \right) = e_2$$

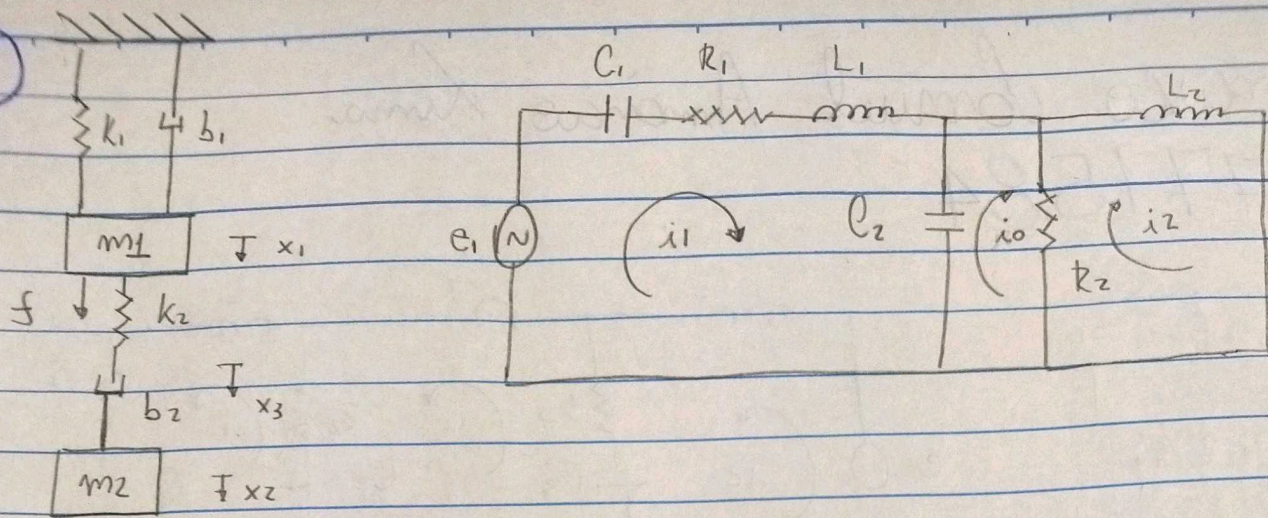
malha ③

$$L_3 D \cdot i_3 + (i_3 - i_2) \left(R_3 + \frac{1}{C_3 D} \right) + (i_3 - i_1) \left(R_4 + \frac{1}{C_4 D} \right) = e_3$$

$$\begin{cases} m_1 \ddot{x}_1 + (k_1 + k_2)x_1 - x_2 k_2 - \dot{x}_1(b_1 + b_2) + \dot{x}_2 b_2 = u(t) \\ m_2 \ddot{x}_2 + x_1 k_2 + x_2(k_3 + k_5 + k_2) - x_3(k_3 + k_5) - \dot{x}_1 b_2 - \dot{x}_2(b_2 + b_3 + b_5) + \dot{x}_3(b_3 + b_5) = 0 \\ m_3 \ddot{x}_3 + x_3(k_3 + k_4 + k_5) - x_2(k_3 + k_5) + \dot{x}_3(b_3 + b_4) - \dot{x}_2(b_3 + b_5) = 0 \end{cases}$$

OK!

6



malha ①

$$i_1 \left(\frac{1}{C_1 D} + R_1 + L_1 D \right) + (i_1 - i_2) \cdot \frac{1}{C_2 D} = e_1$$

malha ②

$$(i_0 - i_1) \left(\frac{1}{C_2 D} \right) + (i_0 - i_2) R_2 = 0$$

malha ③

$$(i_2 - i_0) R_2 + i_2 (L_2 D) = 0$$

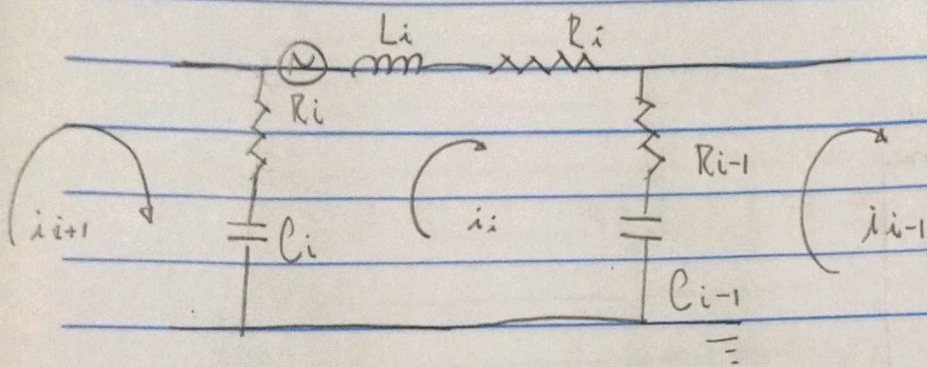
Sist.

$$\begin{cases} m_1 \ddot{x}_1 + k_1 x_1 + k_2 x_1 - k_2 x_2 + \dot{x}_1 b_1 + \dot{x}_1 b_2 - \dot{x}_2 b_2 = f(t) \\ m_2 \ddot{x}_2 - x_1 k_2 + x_2 k_2 - \dot{x}_1 b_2 + \dot{x}_2 b_2 = 0 \end{cases}$$

OK!

7

8



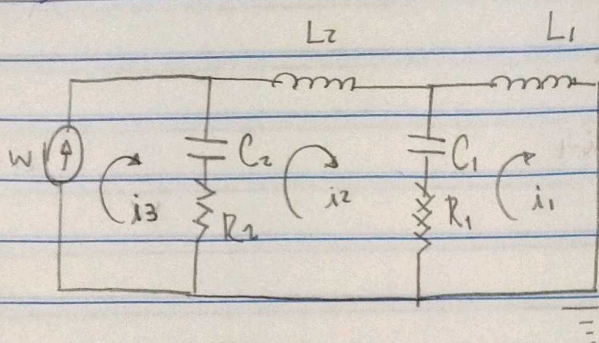
nodal (i)

$$(i_i - i_{i+1}) \left(R_i + \frac{1}{C_i D} \right) + i_i (L_i D + R_i) + (i_i - i_{i-1}) \left(R_{i-1} + \frac{1}{C_{i-1} D} \right) = e(t)$$

$$m_a \ddot{x}_i + \dot{x}_i (b_i + d_i + d_{i-1}) + (k_i + k_{i-1}) x_i - b_{i-1} x_{i-1} - k_{i-1} x_{i-1} - b_i x_{i+1} - k_i x_{i+1} = f(t)$$

8

A) $w = \text{deslocamento}$



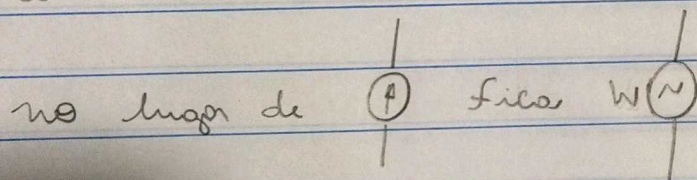
malha ①

$$(i_1 - i_2) \left(R_1 + \frac{1}{C_1 D} \right) + i_1 L_1 D = 0$$

malha ②

$$(i_2 - w) \left(\frac{1}{C_2 D} + R_2 \right) + L_2 D i_2 + (i_2 - i_1) \left(\frac{1}{C_1 D} + R_1 \right) = 0$$

B) $w = \text{força}$



malha ①

$$(i_1 - i_2) \left(R_1 + \frac{1}{C_1 D} \right) + i_1 L_1 D = 0$$

malha ②

$$(i_2 - i_3) \left(R_2 + \frac{1}{C_2 D} \right) + i_2 L_2 D + (i_2 - i_1) \left(R_1 + \frac{1}{C_1 D} \right) = e$$

$$A) m_1 \ddot{x}_1 + b_1 \dot{x}_1 + k_1 x_1 - b_2 \dot{x}_2 - k_2 x_2 = 0$$

$$m_2 \ddot{x}_2 + b_2 \dot{x}_2 + k_2 x_2 - b_1 \dot{x}_1 - k_1 x_1 + b_2 \dot{x}_2 + k_2 x_2 - \dot{w} b_2 - w k_2 = 0$$

OK!

$$B) m_1 \ddot{x}_1 + b_1 \dot{x}_1 + k_1 x_1 - b_2 \dot{x}_2 - k_2 x_2 = 0$$

$$m_2 \ddot{x}_2 + b_2 \dot{x}_2 + k_2 x_2 - b_1 \dot{x}_1 - k_1 x_1 + b_2 \dot{x}_2 + k_2 x_2 = w(t)$$

OK!