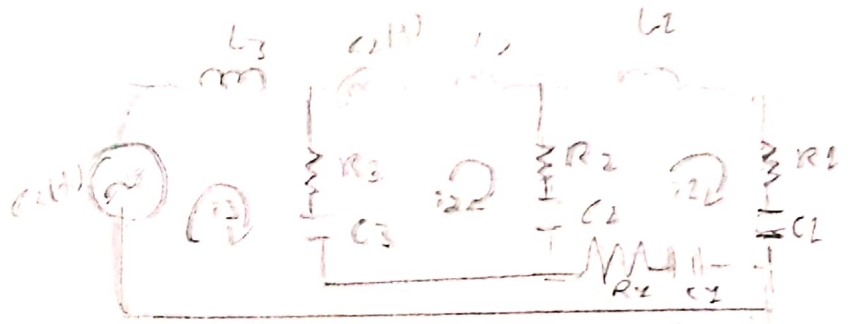
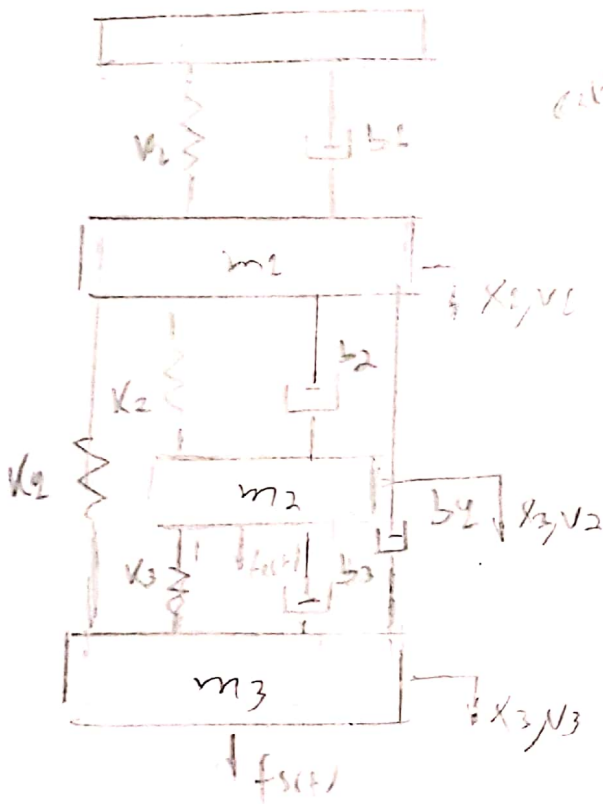


Samuel Alves 10764634

3-



Malha 1

$$i_1 \left( R_1 + R_2 + R_4 + \frac{1}{C_1 D} + \frac{1}{C_2 D} + \frac{1}{C_3 D} \right) - i_2 \left( R_2 + \frac{1}{C_2 D} \right) - i_3 \left( R_4 + \frac{1}{C_3 D} \right) = e_1$$

$$m_1 \ddot{x}_1 + (b_1 + b_2 + b_4) \dot{x}_1 + (k_1 + k_2 + k_4) x_1$$

$$- b_2 \dot{x}_2 - k_2 x_2 - b_4 \dot{x}_3 - k_4 x_3 = 0$$

Malha 2:

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

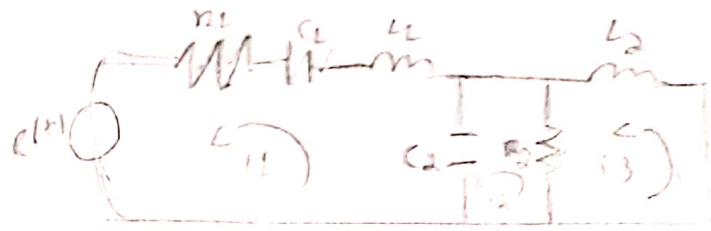
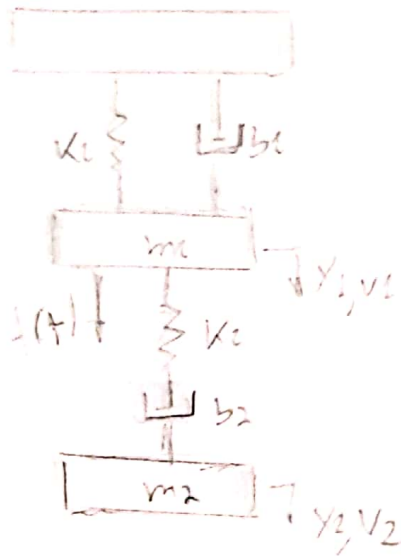
$$m_2 \ddot{x}_2 + (b_2 + b_3) \dot{x}_2 + (k_2 + k_3) x_2 - b_2 \dot{x}_1 - k_2 x_1 - b_3 \dot{x}_3 - k_3 x_3 = f_2$$

Malha 3

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

$$m_3 \ddot{x}_3 + (b_3 + b_4) \dot{x}_3 + (k_3 + k_4) x_3 - b_3 \dot{x}_2 - k_3 x_2 - b_4 \dot{x}_1 - k_4 x_1 = f_3$$

6-



Malha 1

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

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

Malha 2

$$i_2 L_2 D + R_2 (i_2 - i_3) = 0$$

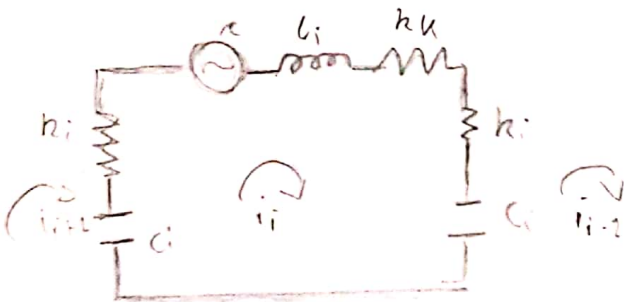
$$m_2 \ddot{x}_2 + b_2 (\dot{x}_2 - \dot{x}_1) = 0$$

Malha 3

$$(i_2 - i_3) R_3 + (i_3 - i_1) \frac{1}{C_3 D}$$

$$b_2 (\dot{x}_3 - \dot{x}_2) + k_2 (x_3 - x_2) = 0$$

7-

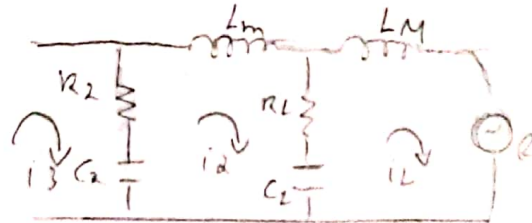
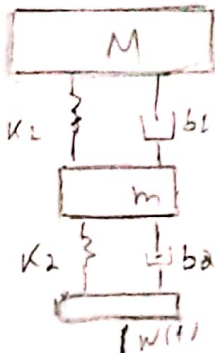


$$i_1 \left( L_1 D + R_1 + R_2 + R_3 + \frac{1}{C_1} + \frac{1}{C_2} \right) - i_2 \left( R_2 + \frac{1}{C_2 D} \right)$$

$$-i_2 L_2 \left( R_3 + \frac{1}{C_3 D} \right) = 0$$

$$m_1 \ddot{x}_1 + (R_1 + D_1 D) \dot{x}_1 + (K_1 + K_2) x_1 + b_1 \dot{x}_1 + K_1 x_1 - b_1 \dot{x}_2 - K_2 x_2 = 0$$

8- a)



Malha 1

$$(i_1 - i_2) \left( \frac{1}{C_1 D} \right) + (i_2 - i_3) R_2 + D_1 D i_2 = e(t)$$

$$M \ddot{x}_2 + k_1 (x_1 - x_2) + b_1 (\dot{x}_1 - \dot{x}_2) = 0$$

Malha 2

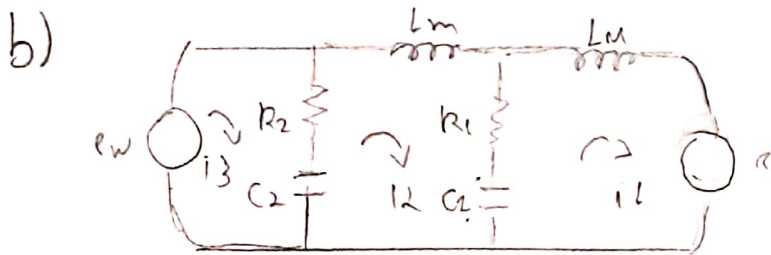
$$(i_2 - i_1) \frac{1}{C_1 D} + (i_2 - i_1) R_2 + L_m D i_2 + (i_2 - i_3) R_2 + (i_2 - i_3) \frac{1}{C_2 D} = -e$$

$$m \ddot{x}_2 + K_1(x_2 - x_1) + b_2(\dot{x}_2 - \dot{y}_1) + b_2(\dot{y}_2 - \dot{\omega}) + K_2(x_2 - \omega) = -U$$

Malha 3

$$(i_3 - i_2) \frac{1}{C_2 D} + (i_3 - i_2) R_2 = 0$$

$$K_2(\omega - x_2) + b_2(\dot{\omega} - \dot{x}_2) = 0$$



Malha 1

$$(i_1 - i_2) \frac{1}{C_1 D} + (i_1 - i_2) R_2 + L_m D i_1 = e$$

$$M \ddot{x}_1 + K_1(x_1 - y_2) + b_1(\dot{x}_1 - \dot{y}_2) = U$$

Malha 2

$$(i_2 - i_1) \frac{1}{C_1 D} + (i_2 - i_1) R_2 + (i_2 - i_3) \frac{1}{C_2 D} + (i_2 - i_3) R_2 + L_m D i_2 = -e$$

$$m \ddot{x}_2 + K_1(x_2 - x_1) + b_1(\dot{x}_2 - \dot{x}_1) + K_2(x_2 - x_3) + b_2(\dot{x}_2 - \dot{x}_3) = -U$$

Malha 3

$$(i_3 - i_2) \frac{1}{C_2 D} + (i_3 - i_2) R_2 = R_w$$

$$K_2(x_3 - x_2) + b_2(\dot{x}_3 - \dot{x}_2) = \omega(t)$$