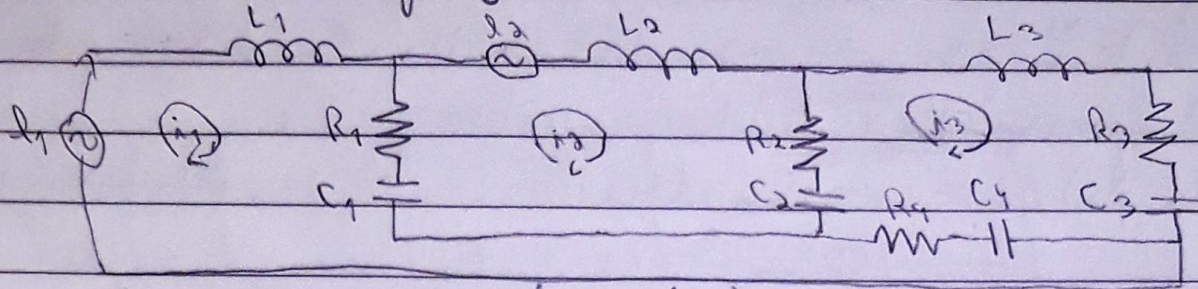


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3.



$$I: i_1(L_1 D + R_1 + R_4 + \frac{1}{C_1 D} + \frac{1}{C_4 D}) - i_2(R_1 + \frac{1}{C_1 D}) - i_3(R_4 + \frac{1}{C_4 D}) = e_1$$

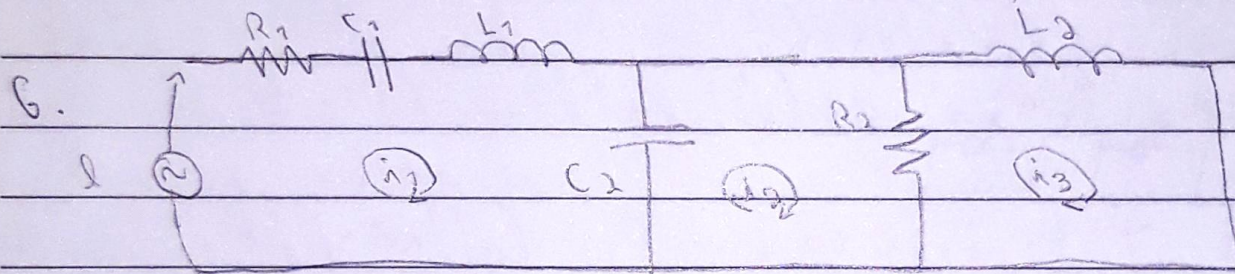
$$\Rightarrow m_1 \ddot{x}_1 + (b_1 + b_4) \dot{x}_1 + (k_1 + k_4) x_1 - b_1 x_2 - k_1 x_2 - b_4 x_3 - k_4 x_3 = f_3$$

$$II: i_2(R_2 + R_1 + \frac{1}{C_2 D} + \frac{1}{C_1 D} + L_2 D) - i_3(R_2 + \frac{1}{C_2 D}) - i_1(R_1 + \frac{1}{C_1 D}) = e_2$$

$$\Rightarrow m_2 \ddot{x}_2 + (b_2 + b_1) \dot{x}_2 + (k_2 + k_1) x_2 - b_2 x_3 - k_2 x_3 - b_1 x_1 - k_1 x_1 = f_2$$

$$III: i_3(R_3 + R_2 + R_4 + \frac{1}{C_3 D} + \frac{1}{C_2 D} + \frac{1}{C_4 D} + L_3 D) - i_2(R_2 + \frac{1}{C_2 D}) - i_1(R_4 + \frac{1}{C_4 D}) = 0$$

$$\Rightarrow m_3 \ddot{x}_3 + (b_3 + b_2 + b_4) \dot{x}_3 + (k_3 + k_2 + k_4) x_3 - b_3 x_2 - k_3 x_2 - b_4 x_1 - k_4 x_1 = 0$$



$$I: L_1 i_1 + R_1 i_1 + \frac{1}{C_1} (i_1 + \frac{1}{C_2}) (i_1 - i_2) = e$$

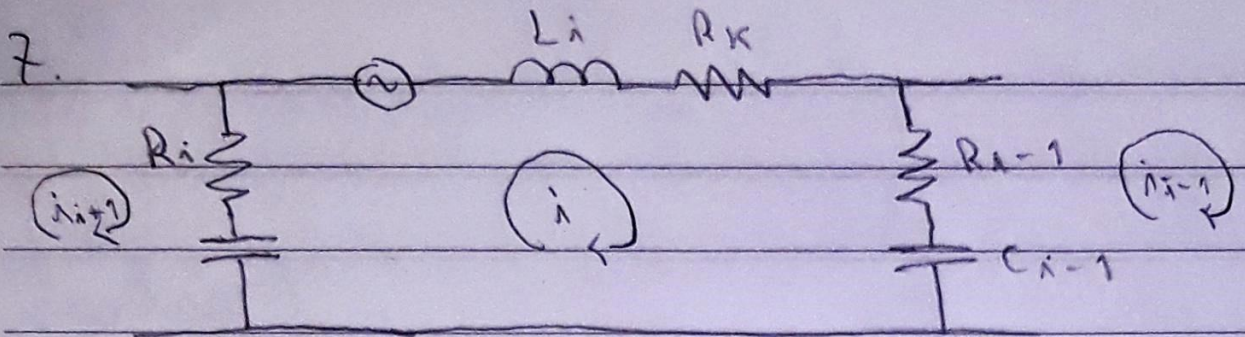
$$\Rightarrow m_1 \ddot{x}_1 + b_1 \dot{x}_1 + (k_1 + k_2) x_1 - k_2 x_2 = f$$

$$II: L_2 i_3 + R_2 (i_3 - i_2) = 0$$

$$\Rightarrow m_2 \ddot{x}_2 + b_2 \dot{x}_2 - b_2 x_1 = 0$$

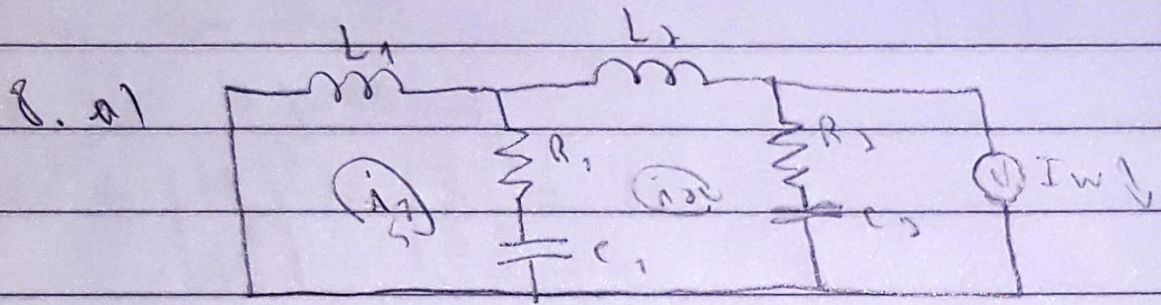
$$III: R_2 (i_2 - i_3) + \frac{1}{C_2} (i_2 - i_1) = 0$$

$$\Rightarrow b_2 \dot{x}_3 - b_2 \dot{x}_2 + k_2 x_3 - k_2 x_1 = 0$$



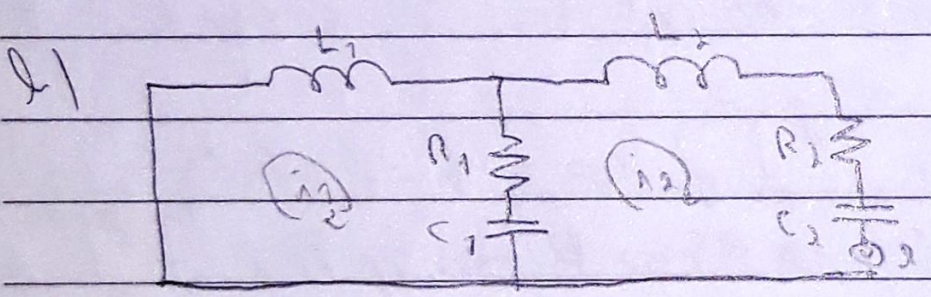
$$i_i (L_i D + R_k + R_i + R_{i-1} + \frac{1}{C_i} + \frac{1}{C_i D}) - i_{i-1} (R_{i-1} + \frac{1}{C_{i-1} D}) - i_{i+1} (R_i + \frac{1}{C_i D}) = 0$$

$$m_i \ddot{x}_i + (R_i + d_i + d_{i-1}) \dot{x}_i + (k_i + k_{i-1}) x_i - d_{i-1} \dot{x}_{i-1} - k_{i-1} x_{i-1} - d_i \dot{x}_{i+1} - k_i x_{i+1} = 0$$



$$\Rightarrow M \ddot{x} + d_1 \dot{x}_1 + k_1 x_1 - d_2 \dot{x}_2 - k_2 x_2 = 0$$

$$\Rightarrow m \ddot{x}_2 + (d_1 + d_2) \dot{x}_2 + (k_1 + k_2) x_2 - d_1 \dot{x}_1 - k_1 x_1 = d_2 \omega(t) + k_2 \omega(t)$$



$$\Rightarrow M \ddot{x}_2 + d_2 \dot{x}_2 + k_2 x_2 - d_1 \dot{x}_1 - k_1 x_1 = 0$$

$$\Rightarrow m \ddot{x}_2 + (d_1 + d_2) \dot{x}_2 + (k_1 + k_2) x_2 - d_1 \dot{x}_1 - k_1 x_1 = \omega(t)$$