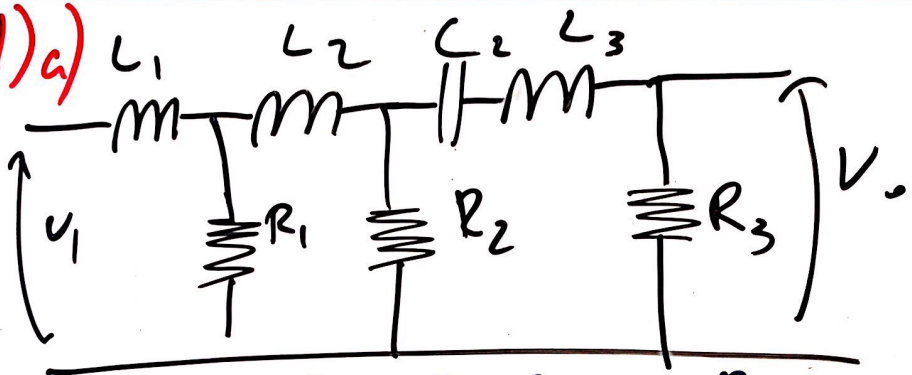
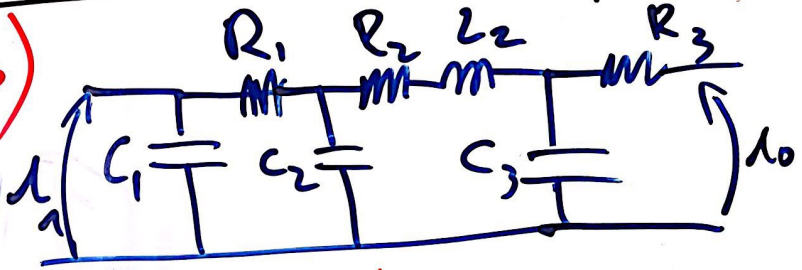
1) a)



b)



c) Lei das malhas:

$$\begin{cases} V_1 = (L_1 D + R_1)\lambda_1 - R_1\lambda_2 \\ (R_1 + L_2 D + R_2)\lambda_2 = R_2\lambda_3 + R_1\lambda_1 \\ V_0 = \left(R_2 + L_3 D + R_2 + \frac{1}{C_2 D}\right)\lambda_3 - R_2\lambda_2 \end{cases} \Bigg\| \begin{cases} Q_1(t) = \dot{h}_1 A_1 + \frac{1}{R_{f1}}(h_1 - h_2 \\ 0 = \dot{h}_2 A_2 + \frac{1}{R_{f1}}(h_2 - h_1) + \frac{1}{R_{f2}}(h_2 - h_3) \\ Q_0(t) = \dot{h}_3 A_3 + \frac{h_3 - h_2}{R_{f2}} + \frac{h_3}{R_{f2}} + \dot{Q}_2(t) \end{cases}$$

Por analogia do tipo 2:

Lei dos nós:

N_1

$$i(t) = \left(C_1 D + \frac{1}{R_1}\right) V_1 - \frac{1}{R_1} V_1$$

N_2

$$0 = \left(C_2 D + \frac{1}{R_1} + \frac{1}{R_2}\right) V_2 - \frac{V_1}{R_1} - \frac{V_a}{R_2}$$

N_3

$$0 = \left(\frac{1}{R_2} + \frac{1}{L_2 D}\right) V_a - \frac{V_3}{L_2 D} - \frac{V_2}{R_1}$$

N_4

$$i_o(t) = \left(C_1 D + \frac{1}{L_2 D} + \frac{1}{R_3}\right) V_3 - \frac{V_a}{L_2 D}$$

$$Q_1(t) = \dot{h}_1 A_1 + \frac{h_1 - h_2}{R_{f_1}}$$

$$0 = \dot{h}_2 A_2 + \frac{h_2 - h_1}{R_{f_1}} + \frac{h_2 - h_a}{R_{f_2}}$$

$$0 = \frac{h_a - h_2}{R_{f_2}} + \dot{Q}_a - \dot{Q}_2$$

$$Q_o(t) = \dot{h}_3 A_3 + \dot{Q}_3 - \dot{Q}_2 + \frac{h_3}{R_{f_3}}$$