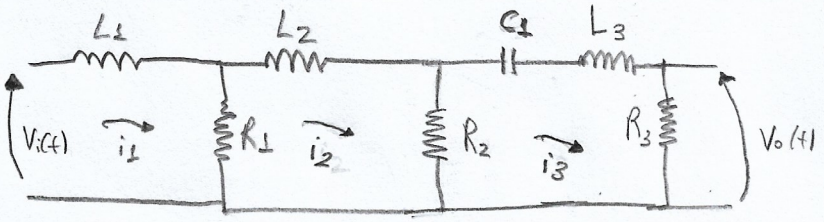
Nome: João Pedro Junqueira S. de Morais

NUSP: 10774437

PME3380 - Modelagem de Sistemas Dinâmicos

Exercício da Aula do dia 22/09/2020

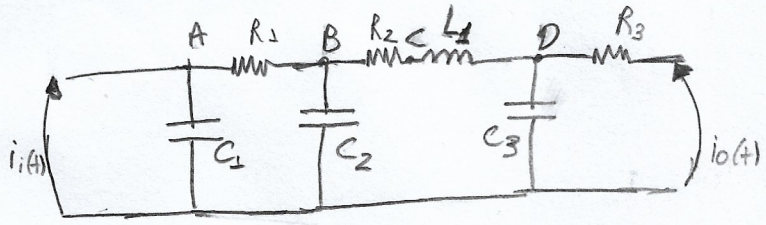
1a)



Analogia tipo 1:

1. $i_1(L_1 D) + R_1 \cdot (i_1 - i_2) = V_i(t)$
2. $i_2(L_2 D) + R_1 \cdot (i_2 - i_1) + R_2 \cdot (i_2 - i_3) = 0$
3. $i_3 \cdot \left(\frac{1}{C_1 D} + L_2 D + R_3\right) + R_2 \cdot (i_3 - i_2) = V_o(t)$

b)



Analogia tipo 2:

A. $V_A \cdot (C_1 D) + \frac{1}{R_1} \cdot (V_A - V_B) = i_i(t)$

B. $V_B \cdot (C_2 D) + \frac{1}{R_1} \cdot (V_B - V_A) + \frac{1}{R_2} \cdot (V_B - V_C) = 0$

C. $(V_C - V_D) \frac{1}{L_1 D} + \frac{1}{R_2} \cdot (V_C - V_B) = 0$

D. $V_D \cdot \left(C_3 D + \frac{1}{R_3}\right) + \frac{1}{L_1 D} \cdot (V_D - V_C) = i_o(t)$

c) Modelo Hidráulico

Tipo 1:

$$\begin{cases} \dot{h_1} A_1 + \frac{1}{R_{f1}} (h_1 - h_2) = Q_i(t) \\ \dot{h_2} A_2 + \frac{1}{R_{f1}} \cdot (h_2 - h_1) + \frac{1}{R_{f2}} (h_2 - h_3) = 0 \\ \dot{h_2} A_3 + \frac{1}{R_{f2}} (h_3 - h_2) + \frac{1}{R_{f3}} h_3 + \dot{Q}_2(t) = Q_o(t) \end{cases}$$

Tipo 2:

$$\begin{cases} A_1 \dot{h_1} + \frac{1}{R_{f1}} (h_1 - h_2) = Q_i(t) \\ A_2 \dot{h_2} + \frac{1}{R_{f1}} \cdot (h_2 - h_1) + \frac{1}{R_{f2}} \cdot (h_2 - h_c) = 0 \\ \frac{1}{R_{f2}} \cdot (h_c - h_2) + \dot{Q}_C(t) - Q_2(t) = 0 \\ A_3 \dot{h_3} + \frac{1}{R_{f3}} h_3 + \dot{Q}_3(t) - \dot{Q}_C(t) = Q_o(t) \end{cases}$$