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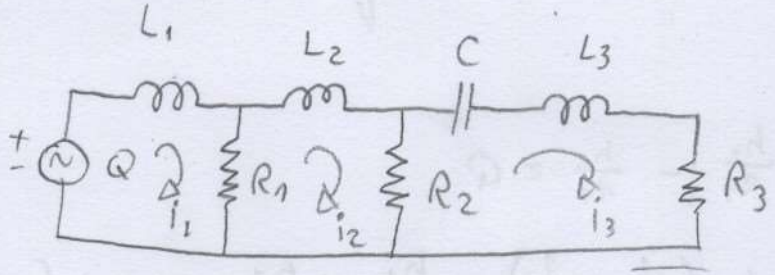
Modelagem de sistemas dinâmicos - Ex aula (22/09)

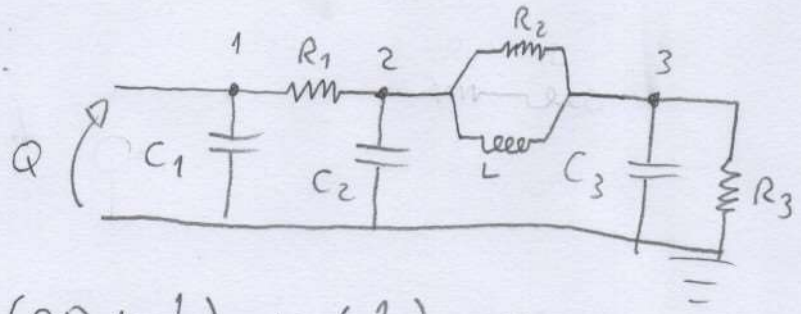
Exercício

Analogia 1:



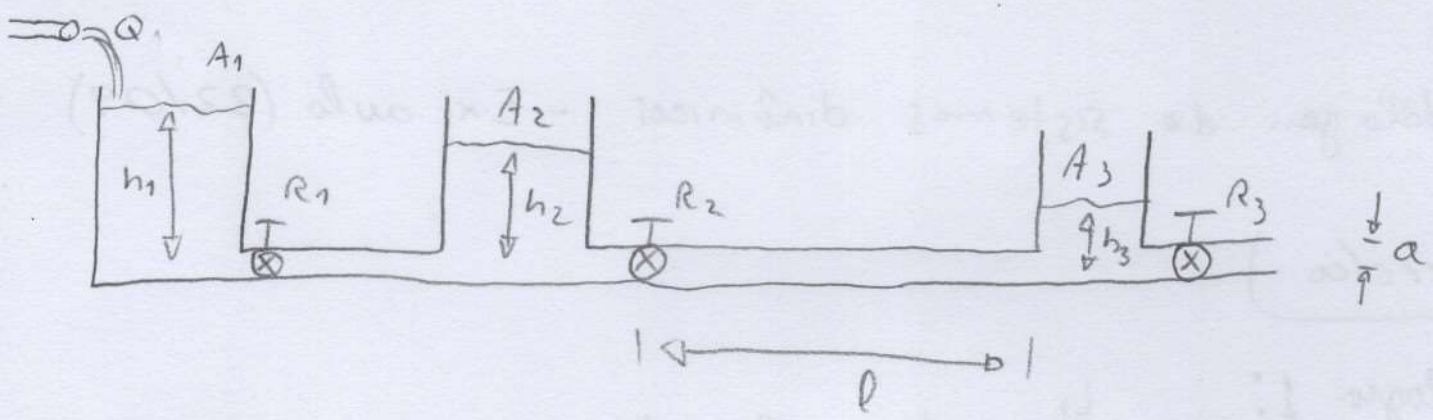
- Circuito 1: $i_1(L_1D + R_1) - i_2 R_1 = Q_i$
- Circuito 2: $i_2(L_2D + R_1 + R_2) - i_1 R_1 - i_3 R_2 = 0$
- Circuito 3: $i_3\left(L_3D + R_2 + R_3 + \frac{1}{CD}\right) - i_2 R_2 = 0$

Analogia 2.



- Nó 1: $V_1\left(C_1D + \frac{1}{R_1}\right) - V_2\left(\frac{1}{R_1}\right) = Q$
- Nó 2: $V_2\left(C_2D + \frac{1}{R_1} + \frac{1}{R_2}\right) - V_1\left(\frac{1}{R_1}\right) - V_3\left(\frac{1}{R_2} + \frac{1}{LD}\right) = 0$
- Nó 3: $V_3\left(C_3D + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{LD}\right) - V_2\left(\frac{1}{R_2} + \frac{1}{LD}\right) = 0$

Reservatórios:



Reservatório 1: $A_1 \dot{h}_1 + \frac{h_1}{R_1} - \frac{h_2}{R_1} = Q$

Reservatório 2: $A_2 \dot{h}_2 + h_2\left(\frac{1}{R_1} + \frac{1}{R_2}\right) - \frac{h_1}{R_1} - \frac{h_3}{R_2} + \frac{g\,a}{l} \int h_2 - h_3 \, dt = 0$

Reservatório 3: $A_3 \dot{h}_3 + h_3\left(\frac{1}{R_2} + \frac{1}{R_3}\right) - \frac{h_2}{R_2} + \frac{g\,a}{l} \int h_3 - h_2 \, dt = 0$