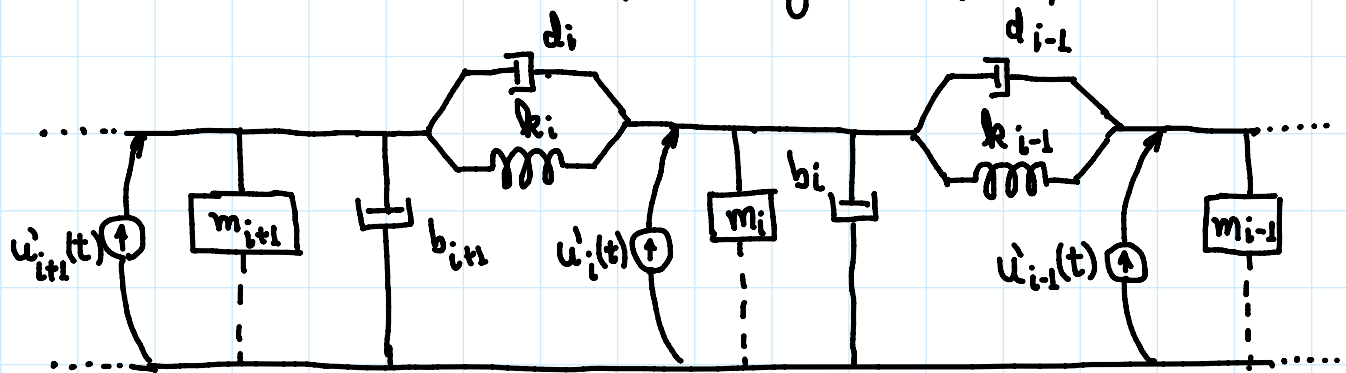
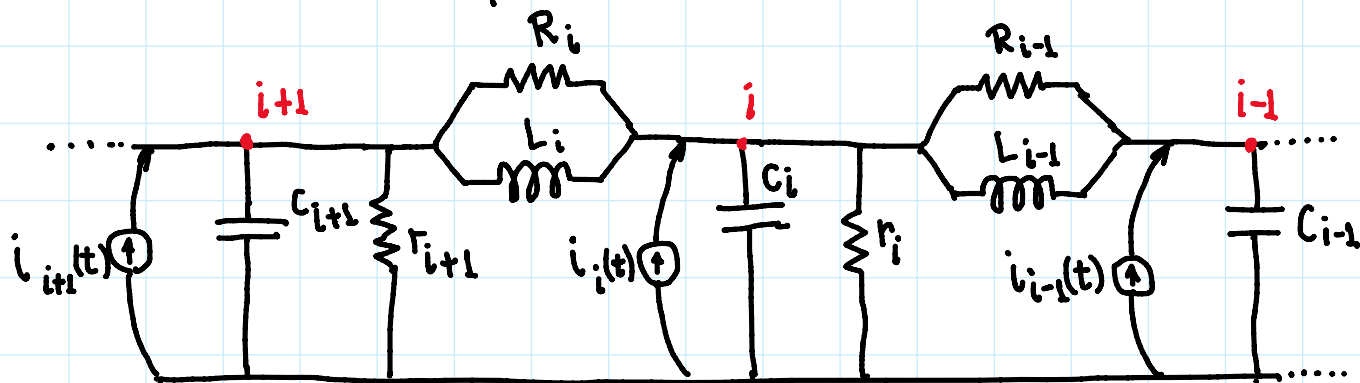


**Ex.7** • O circuito mecânico, obtido pela analogia do tipo 2, fica:



• Obs.:  $\dot{u}_i(t) = u_i(t) - m_i \cdot g \cdot \sin \theta_i$

• O circuito elétrico equivalente:



• Pelo método prático:

$$\Rightarrow \text{Nó } i: V_i \left[ C_i D + \frac{1}{r_i} + \frac{1}{R_i} + \frac{1}{R_{i-1}} + \frac{1}{L_i D} + \frac{1}{L_{i-1} D} \right] - V_{i-1} \left[ \frac{1}{R_{i-1}} + \frac{1}{L_{i-1} D} \right] - V_{i+1} \left[ \frac{1}{R_i} + \frac{1}{L_i D} \right] = i_i(t)$$

• Voltando para o sistema mecânico, utilizando a analogia do tipo 2:

$$\dot{x}_i \left[ m_i D + b_i + d_i + d_{i-1} + \frac{k_i}{D} + \frac{k_{i-1}}{D} \right] - \dot{x}_{i-1} \left[ d_{i-1} + \frac{k_{i-1}}{D} \right] - \dot{x}_{i+1} \left[ d_i + \frac{k_i}{D} \right] = u_i(t) - m_i g \sin \theta_i \Rightarrow$$

$$-x_{i+1} \left[ d_i + \frac{k_i}{p} \right] = u_i(t) - m_i g \sin \theta_i \Rightarrow$$

$$\Rightarrow m_i \ddot{x}_i + (b_i + d_i + d_{i-1}) \dot{x}_i + (k_i + k_{i-1}) x_i - b_{i-1} \dot{x}_{i-1} - b_i \dot{x}_{i+1} - k_{i-1} x_{i-1} - k_i x_{i+1} = u_i(t) - m_i g \sin \theta_i$$