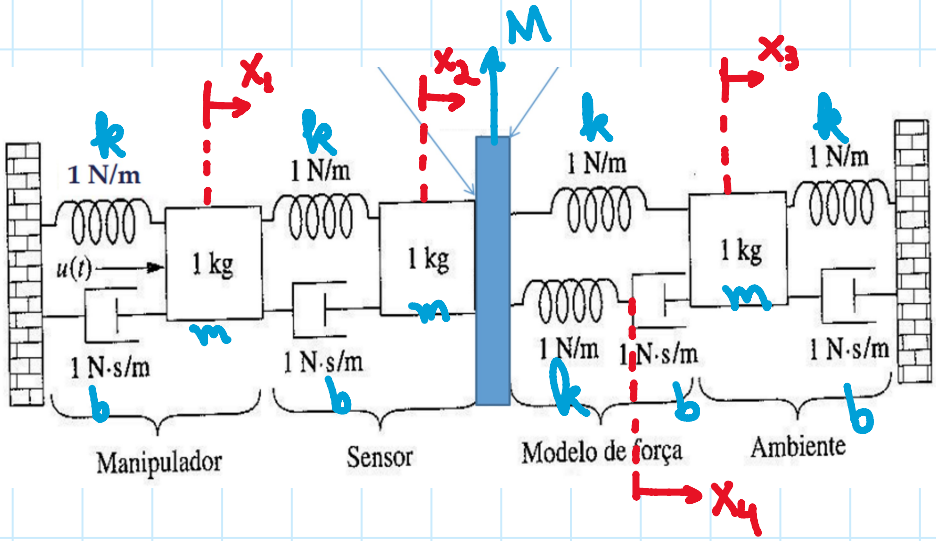
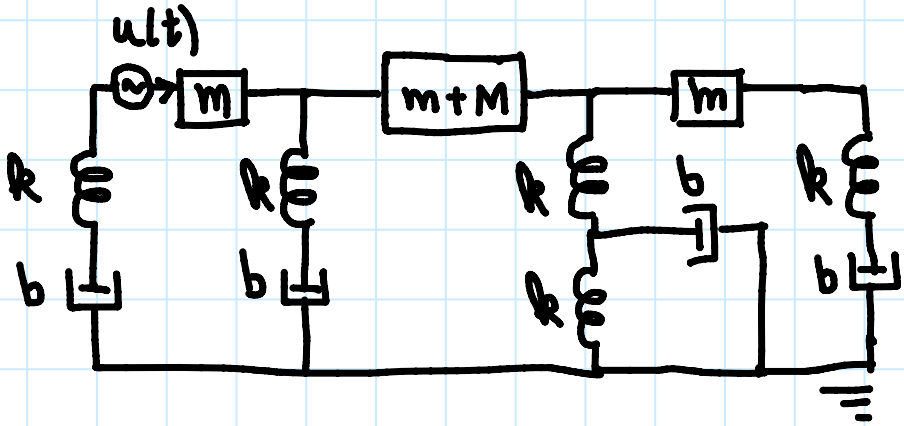
Exercício 3 - Slide analogia tipo 2

terça-feira, 5 de outubro de 2021 20:11

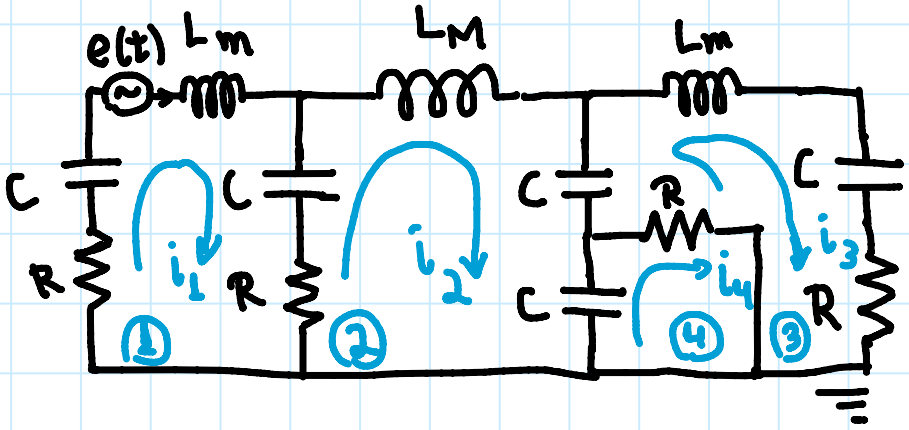
Ex.3)



b) • Circuito mecânico:



c) • Circuito elétrico análogo:



d) • Malha ①:

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$$\left(L_m D + 2R + \frac{2}{CD}\right) i_1 - \left(R + \frac{1}{CD}\right) i_2 = e(t) \quad \text{(I)}$$

• Malha ②:

$$\left(L_M + R + \frac{3}{CD}\right) i_2 - \left(R + \frac{1}{CD}\right) i_1 - \frac{1}{CD} i_3 - \frac{1}{CD} i_4 = 0 \quad \text{(II)}$$

• Malha ③:

$$\left(L_m + 2R + \frac{2}{CD}\right) i_3 - \frac{1}{CD} i_2 - R i_4 = 0 \quad \text{(III)}$$

• Malha ④:

$$\left(R + \frac{1}{CD}\right) i_4 - \frac{1}{CD} i_2 - R i_3 = 0 \quad \text{(IV)}$$

e) • Da analogia do tipo 1:

→ Eq (I): $m\ddot{x}_1 + 2b\dot{x}_1 + 2kx_1 = u(t) + b\dot{x}_2 + kx_2$

→ Eq (II): $(M-m)\ddot{x}_2 + b\dot{x}_2 + 3kx_2 = b\dot{x}_1 + k(x_1 + x_3 + x_4)$

→ Eq (III): $m\ddot{x}_3 + 2b\dot{x}_3 + 2kx_3 = b\dot{x}_4 + kx_2$

→ Eq (IV): $\boxed{b\dot{x}_4 + kx_4 = b\dot{x}_3 + kx_2}$