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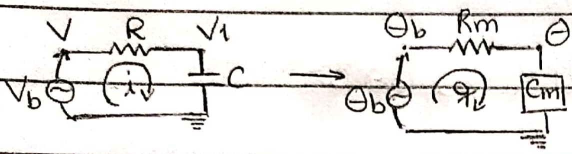
Kevin Chu 10705908

Exercícios da Aula 29/09

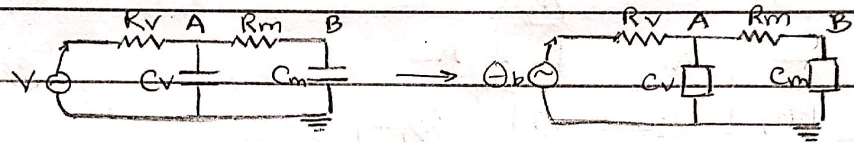
2) 

Analogia: $\theta \to V$

$q \to i$

Resolvendo: $(CD+\frac{1}{R})V_1 - \frac{V}{R} = 0$, com $V_1 \to \theta$; $V \to \theta_b$; $C \to C_m$ e $R \to R_m$

$(C_mD + \frac{1}{R_m})\theta - \frac{\theta_b}{R_m} = 0 \Rightarrow \boxed{C_m\frac{d\theta}{dt} + \frac{\theta}{R} = \frac{\theta_b}{R_m}}$

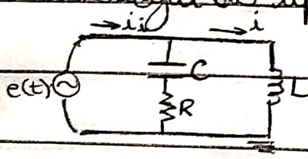
3) Com vidro: 

Nó A: $C_vD\cdot V_A + \frac{1}{R_m}(V_A - V_B) + \frac{1}{R_v}(V_A - V) = 0$

Nó B: $C_mD\cdot V_B + \frac{1}{R_m}(V_B - V_A) = 0$ $\Rightarrow$

Analogia $\Rightarrow$ $\begin{cases} (C_vD + \frac{1}{R_m} + \frac{1}{R_v})\theta_v - \frac{\theta}{R_m} - \frac{\theta_b}{R_v} = 0 \\ (C_mD + \frac{1}{R_m})\theta - \frac{\theta_v}{R_m} = 0 \end{cases}$ $\Rightarrow$ $\boxed{\begin{cases} C_v\frac{d\theta}{dt} + (\frac{1}{R_m} + \frac{1}{R_v})\theta_v = \frac{\theta}{R_m} + \frac{\theta_b}{R_v} \\ C_m\frac{d\theta}{dt} + \frac{\theta}{R_m} = \frac{\theta_v}{R_m} \end{cases}}$

4) Analogia do tipo 1: $q \to V$; $\theta \to i$; $L \to MC_p$; $C \to \dot{m}C_p$; $R \to \frac{1}{R}$



$LD\cdot i + (R+C)(i - i_i) = e(t)$

$LD\theta + (\frac{1}{R} + C)\cdot\theta = q(t) + (\frac{1}{R} + C)\cdot\theta_i$

$\boxed{MC_p\dot{\theta} + (\dot{m}C_p + \frac{1}{R})\theta = q(t) + (\dot{m}C_p + \frac{1}{R})\theta_i}$