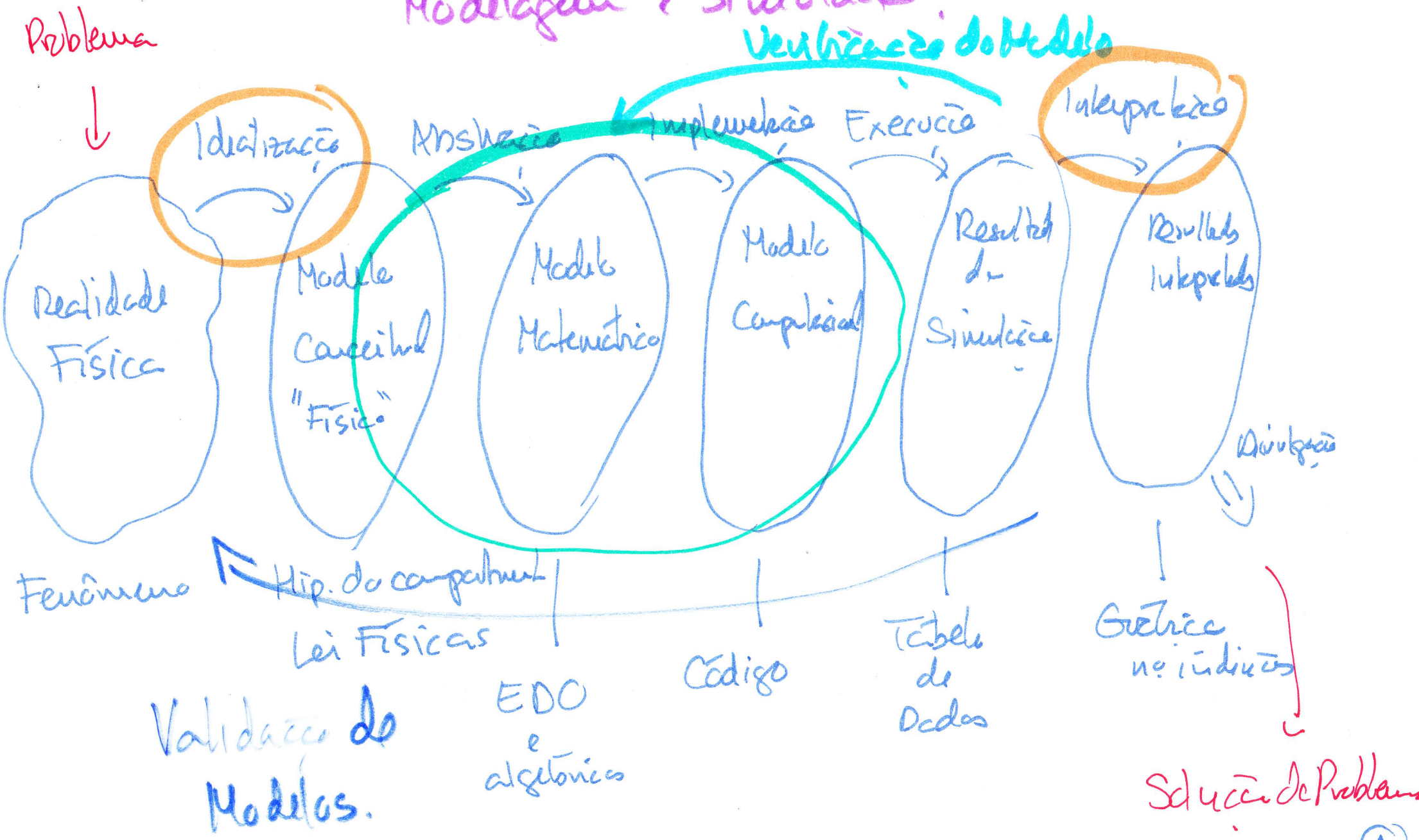
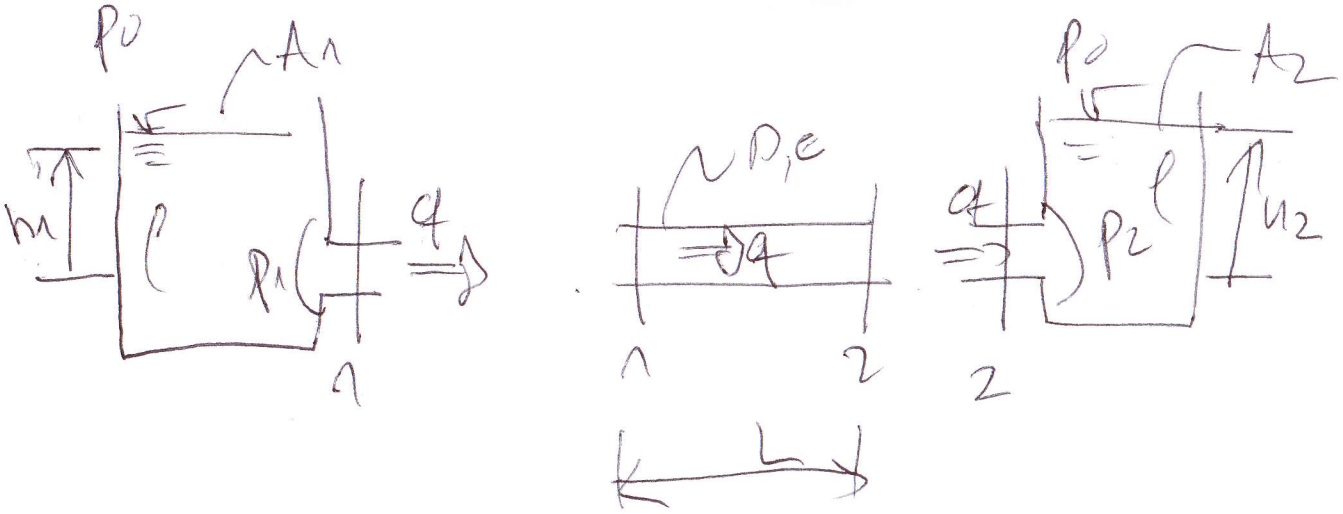
PME 3201 Aula 3 Turma 12 01.10.2020

Modelagem e Simulação





$$A_1 \frac{dh_1}{dt} = -q$$

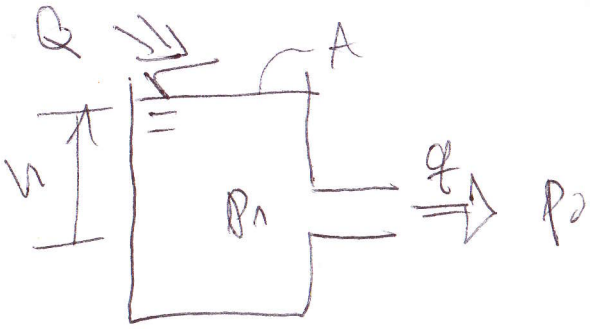
$$A_2 \frac{dh_2}{dt} = q$$

$$p_1 - p_2 = Rq^2$$

$$p_1 > p_2 \qquad R(Re)$$

$$p_1 = p_0 + \rho g h_1$$

$$p_2 = p_0 + \rho g h_2$$



$$A\frac{dh}{dt} = q + Q$$

$$\boxed{A\frac{dh}{dt} = -\sqrt{\frac{\rho g h}{R}} + Q}$$

$$\left.\begin{aligned} p_1 - p_0 &= Rq^2 \\ p_1 &= p_0 + \rho g h \end{aligned}\right\} \quad \rho g h = Rq^2 \Rightarrow q = \sqrt{\frac{\rho g h}{R}}$$

$$\rho g h = Rq^2 \Rightarrow \rho g h \approx R q_0 q \Rightarrow q = \frac{\rho g h}{R q_0}$$

q_0 = vazão média

$$\boxed{A\frac{dh}{dt} + \frac{\rho g}{R q_0} h = Q}$$

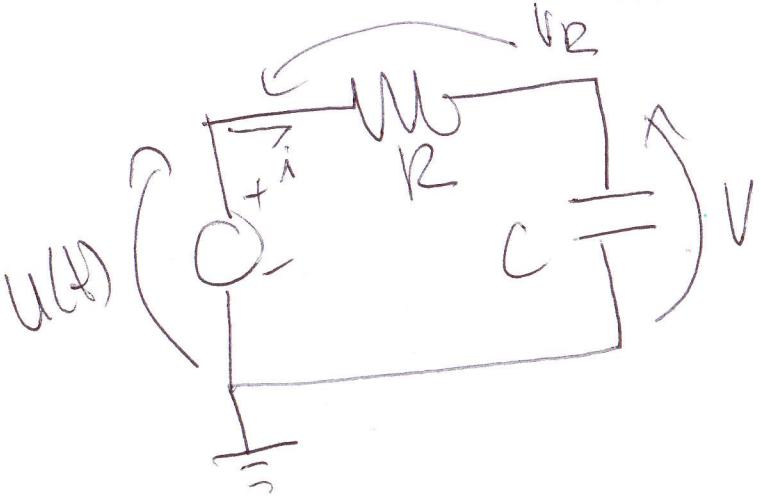
E.D.O. Linearizada

$$h(t) = H_0 e^{-\lambda t} \qquad \lambda = \frac{1}{\tau}$$

$$\tau = \frac{A R q_0}{\rho g} \qquad RG: q_0 = Q$$

$$T: q_0 = q(0)$$

Cast de tempo



$$V_R = R\,i$$

$$i = C\,\frac{dV}{dt}$$

$$u = V_R + V$$

$$u(t) = \begin{cases} 0 & |\ t \leq t_0 \\ u_0 & |\ t > t_0 \end{cases}$$

Exc. Degan

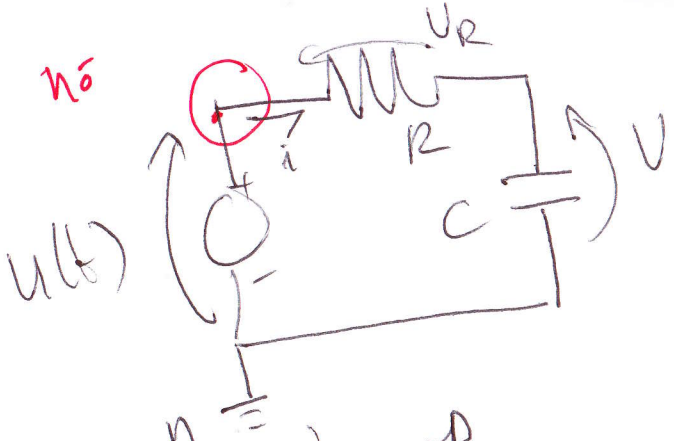
$$R\,i + V = u$$

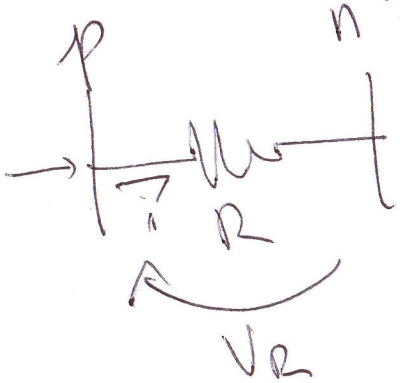
$$\boxed{RC\,\frac{dV}{dt} + V = u}$$

$$\tau = RC \quad //$$

$$V_\omega(t) = V_0\, e^{-t/\tau}$$

$$V_p(t) = K$$



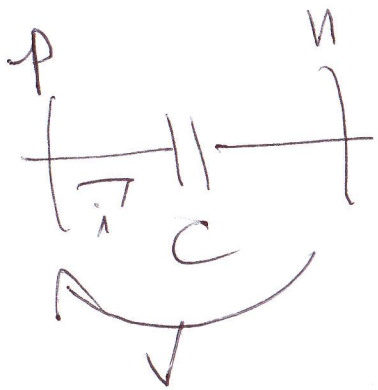


$$Ri = V_R$$

$$i = p_0 i$$

$$V_R = p_0 v - n_0 v$$

$$p_0 i + n_0 i = 0$$

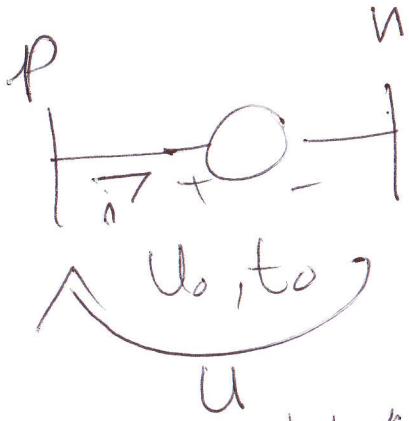


$$i = C\frac{dU}{dt}$$

$$i = p_0 i$$

$$V = p_0 v - n_0 v$$

$$p_0 i + u_0 i = 0$$



$$u(t) = \begin{cases} 0 \mid t \leq t_0 \\ U_0 \mid t > t_0 \end{cases}$$

$$i = p_0 i$$

$$U = p_0 v - n_0 v$$

$$p_0 i + u_0 i = 0$$

$$C_0 v = 0 \;//$$