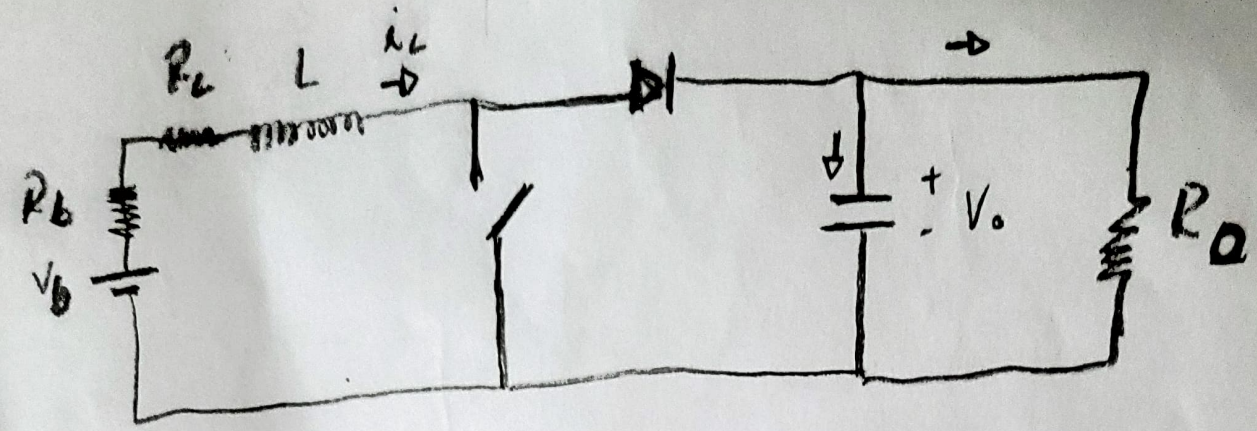

→ corrente no capacitor:

$$-C\frac{d\langle v_o\rangle}{dt} + \langle i_L\rangle\langle d\rangle - \frac{\langle v_o\rangle}{R_o} = 0$$

$$-C D \hat{v}_o + (I_L + \hat{i}_L)(D + \hat{d}) - \frac{\hat{v}_o}{R_o} = 0$$

$$-C D \hat{v}_o + I_L \hat{d} + D \hat{i}_L - \frac{\hat{v}_o}{R_o} = 0$$

→ $I_L = \frac{V_o}{R_o}$

$$\frac{V_o}{R_o}\hat{d} + D\hat{i}_L = \hat{v}_o\left(DC + \frac{1}{R_o}\right)$$

→ malha:

$$V_b - \langle i_L\rangle R_b - L\frac{d\langle i_L\rangle}{dt} - R_L\langle i_L\rangle - \langle v_o\rangle\langle d\rangle = 0$$

$$-\hat{i}_L R_b - L D \hat{i}_L - R_L \hat{i}_L - V_o \hat{d} - D\hat{v}_o = 0$$

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$$\hat{d} = \frac{-\hat{i}_L R_b - L_s \hat{i}_L - R_L \hat{i}_L - D\hat{v}_o}{V_o}$$

$$\frac{-\hat{i}_L R_b - L_s \hat{i}_L - R_L \hat{i}_L - D\hat{v}_o + D\hat{i}_L}{R_o} = \hat{v}_o\left(sC + \frac{1}{R_o}\right)$$

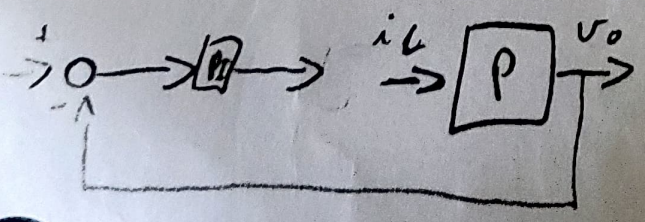
$$-\hat{i}_L R_b - L_s \hat{i}_L - R_L \hat{i}_L - D\hat{v}_o + DR_o\hat{i}_L = \hat{v}_o(sCR_o + 1)$$

$$\hat{i}_L(-L_s - R_b - R_L + DR_o) = \hat{v}_o(sCR_o + 1 + D)$$

$$\hat{i}_L(L_s + R_L + R_b - DR_o) = -\hat{v}_o(1 + sCR_o + D)$$

$$\frac{\hat{i}_L}{\hat{v}_o} = -\frac{R_o C_s + D + 1}{L_s + R_L + R_b - DR_o}$$

$$\frac{\hat{v}_o}{\hat{i}_L} = -\frac{L_s + R_L + R_b - DR_o}{R_o C_s + D + 1}$$



projetado pelo
PID Tuner do matlab
margem de fase = 60°
freq = 10Hz

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