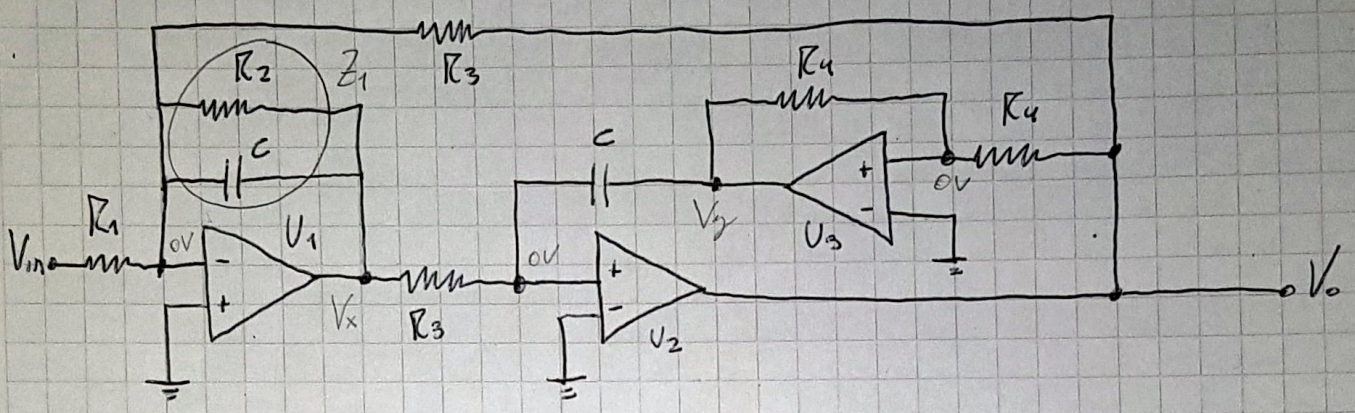
Trabajo Semanal 2



$$T(s) = \frac{V_o}{V_{in}} \overset{?}{\longrightarrow} \frac{V_x}{R_3} = \frac{-V_y}{1/sC}, \quad V_y = -\frac{R_4}{R_4} \cdot V_o$$

$$I_{R_1} = I_{Z_1} + I_{R_3} \Rightarrow \frac{V_{in}}{R_1} = \frac{-V_x}{Z_1} - \frac{V_o}{R_3}, \quad Z_1 = \frac{\frac{R_2}{sC}}{R_2 + 1/sC}$$

$$Z_1 = \frac{R_2}{sCR_2 + 1}$$

$$V_y = -V_o \longrightarrow V_x = V_o R_3 C s$$

$$\frac{V_{in}}{R_1} = -V_o \left[\frac{1}{R_3} + \frac{(sCR_2+1)(sCR_3)}{R_2}\right] = -V_o \left[\frac{1}{R_3} + \frac{s^2C^2R_2R_3 + sCR_3}{R_2}\right]$$

$$\frac{R_2 + sCR_3^2 + s^2C^2R_2R_3^2}{R_2R_3} V_o = -\frac{V_{in}}{R_1}$$

$$\frac{V_o}{V_{in}} = \frac{-R_2R_3}{s^2C^2R_1R_2R_3^2 + sCR_1R_3^2 + R_1R_2} \Rightarrow T(s) = \frac{\frac{-1}{C^2R_1R_3}}{s^2 + s\frac{1}{CR_2} + \frac{1}{C^2R_3^2}}$$

$$T(s) = -\frac{R_3}{R_1} \cdot \frac{\frac{1}{C^2R_3^2}}{s^2 + s\frac{1}{CR_2} + \frac{1}{C^2R_3^2}} = -\frac{R_3}{R_1} \frac{\omega_o^2}{s^2 + s\frac{\omega_o}{Q} + \omega_o^2}$$

Resulta: $\omega_o^2 = \frac{1}{C^2R_3^2} \longrightarrow \omega_o = \frac{1}{C \cdot R_3}$

$$\frac{\omega_o}{Q} = \frac{1}{CR_2} \longrightarrow Q = \frac{R_2}{R_3}$$