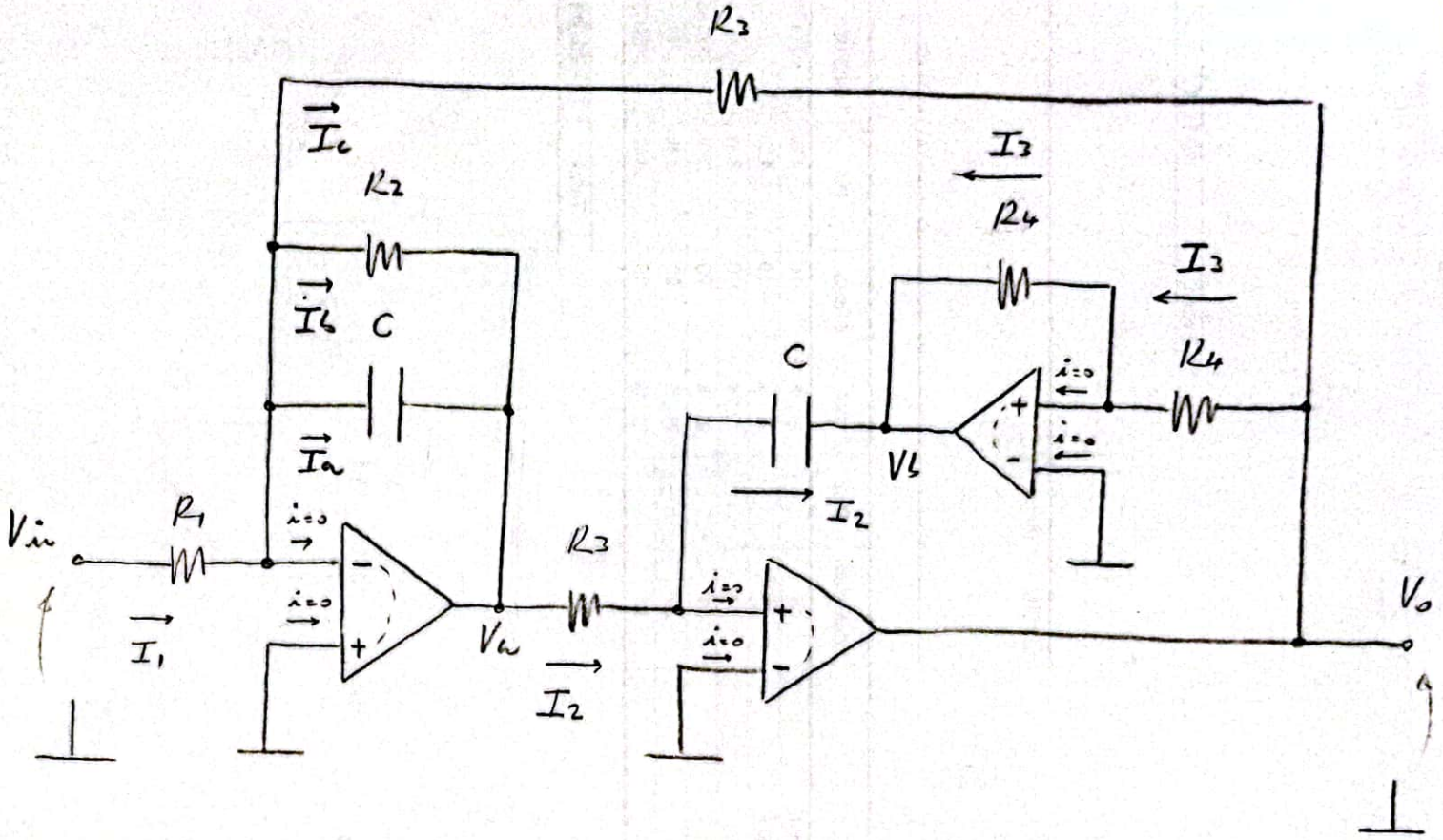

$$I_1 = \frac{V_{in}}{R_1} \quad ; \quad I_a = -V_a\, sC \quad ; \quad I_b = -\frac{V_a}{R_2} \quad ; \quad I_c = -\frac{V_o}{R_3}$$

$$I_1 = I_a + I_b + I_c$$

$$I_2 = \frac{V_a}{R_3} = -V_b\, sC \quad ; \quad I_3 = \frac{V_o}{R_4} = -\frac{V_b}{R_4} \quad ; \quad \boxed{V_b = -V_o}$$

$$\boxed{V_a = -(-V_o)\, sR_3C = V_o\, sR_3C}$$

$$I_1 = \frac{V_{in}}{R_1} = I_a + I_b + I_c = -V_a\, sC + \left(-\frac{V_a}{R_2}\right) + \left(-\frac{V_o}{R_3}\right)$$

$$\frac{V_{in}}{R_1} = -V_o s^2 R_3 C^2 - V_o s \frac{R_3}{R_2} C - \frac{V_o}{R_3}$$

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

$$\frac{V_{in}}{R_1} = -V_o \left(\frac{s^2 R_2 R_3^2 C^2 + s R_3^2 C + R_2}{R_2 R_3} \right)$$

$$T(s) = \frac{V_o}{V_{in}} = -\frac{R_2 R_3}{s^2 R_1 R_2 R_3^2 C^2 + s R_1 R_3^2 C + R_1 R_2}$$

$$T(s) = \frac{V_o}{V_{in}} = -\frac{R_2 R_3}{R_1 R_2 R_3^2 C^2} \cdot \frac{1}{s^2 + s \frac{1}{R_2 C} + \frac{1}{R_3^2 C^2}}$$

$$T(s) = \frac{V_o}{V_{in}} = -\left(\frac{1}{R_1 R_3 C^2} \right) \frac{1}{s^2 + s \frac{1}{R_2 C} + \frac{1}{R_3^2 C^2}} \quad ; \quad \boxed{h = \frac{1}{R_1 R_3 C^2}}$$

$$\boxed{T(s) = \frac{V_o}{V_{in}} = -h \frac{1}{s^2 + s \frac{1}{R_2 C} + \frac{1}{R_3^2 C^2}}} \quad ; \quad \omega_o^2 = \frac{1}{R_3^2 C^2} \quad ; \quad \boxed{\omega_o = \frac{1}{R_3 C}}$$

$$\frac{\omega_o}{q} = \frac{1}{R_2 C} \quad ; \quad \frac{1}{R_3 C q} = \frac{1}{R_2 C}$$

$$\boxed{q = \frac{R_2}{R_3}}$$

$\frac{\omega_o}{q}$ ω_o^2

Para $\omega_0 = 1$; $C = \frac{1}{R_3}$; Elijo $R_3 = 10K \rightarrow C = 100\mu F$

Para $q = 3$; $R_2 = 3R_3 \longrightarrow$ $R_2 = 30K$; $R_{2\_norm} = 27K$ / $33K$

$$\left| T(s) \right|_{s=j\omega} = -k \left| \frac{1}{-\omega^2 + j\omega \frac{1}{R_2 C} + \frac{1}{R_3^2 C^2}} \right|$$

$$\left| T(s) \right|_{s=j\omega} = -k \left| \frac{1}{\sqrt{\left(\frac{1}{R_3^2 C^2} - \omega^2 \right)^2 + \left(\omega \frac{1}{R_2 C} \right)^2}} \right|$$

$$\left| T(j\omega) \right|_{\omega=0} = -k R_3^2 C^2 = -\frac{1}{R_1 R_3 C^2} R_3^2 C^2 = -\frac{R_3}{R_1}$$

Para $20 \log \left| T(j\omega) \right|_{\omega=0} = 26 \log \left| -\frac{R_3}{R_1} \right| = 26\ dB$

$= 10$; $R_1 = \frac{R_3}{10} = 1K$