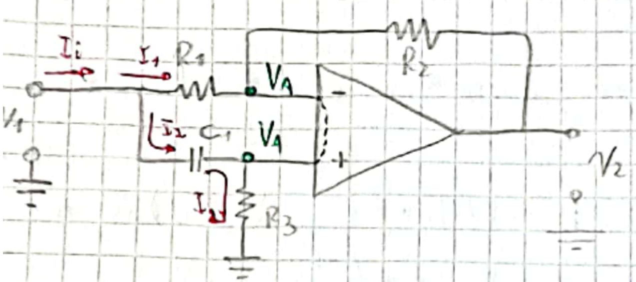
Tarea semanal ①



$$I_1 = \frac{V_A - V_2}{R_2} = \frac{V_1 - V_A}{R_1} \quad (*)$$

$$I_i = I_1 + I_2$$

$$V_A = I_2 \cdot R_3 = \frac{V_1}{\frac{1}{sC_1} + R_3} \cdot R_3 \Rightarrow V_A = V_1 \cdot \frac{sC_1R_3}{1 + sC_1R_3}$$

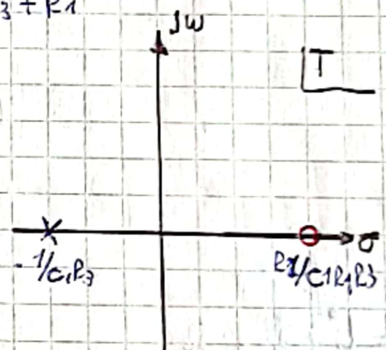
$(*)$ $$V_A \cdot \left(\frac{1}{R_1} + \frac{1}{R_2}\right) - \frac{V_1}{R_1} = \frac{V_2}{R_2}$$

$$V_1 \frac{sC_1R_3}{1+sC_1R_3}\left(\frac{R_1+R_2}{R_1}\right) - \frac{R_2V_1}{R_1} = V_2$$

$$T(s) = \frac{V_2}{V_1} = \frac{sC_1R_3}{1+sC_1R_3}\left(\frac{R_1+R_2}{R_1}\right) - \frac{R_2}{R_1} = \frac{sC_1R_3(R_1+R_2) - R_2 - sC_1R_3R_2}{sC_1R_1R_3 + R_1}$$

$$T(s) = \frac{sC_1R_1R_3 - R_2}{sC_1R_1R_3 + R_1} = \frac{s - \frac{R_2}{C_1R_1R_3}}{s + \frac{1}{C_1R_3}}$$

$$\boxed{T(s) = \frac{s - R_2/C_1R_1R_3}{s + \frac{1}{C_1R_3}}}$$



Filtro pasa todo

$$T(s)\big|_{s=j\omega} = T(\omega) = \frac{j\omega - R_2/C_1R_1R_3}{j\omega + 1/C_1R_3}$$

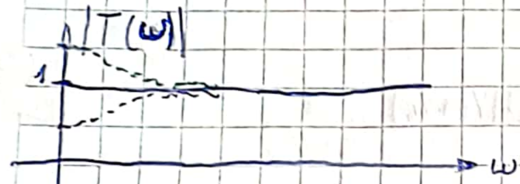
$$|T(\omega)| = \frac{\sqrt{\omega^2 + (R_2/C_1R_1R_3)^2}}{\sqrt{\omega^2 + (1/C_1R_3)^2}} \qquad \angle T(\omega) = \tan^{-1}\left(-\frac{\omega C_1R_1R_3}{R_2}\right) - \tan^{-1}(\omega C_1R_3)$$

Tomando como norma de frecuencia al polo: $\Omega_\omega = \omega_0 = \frac{1}{C_1R_3}$

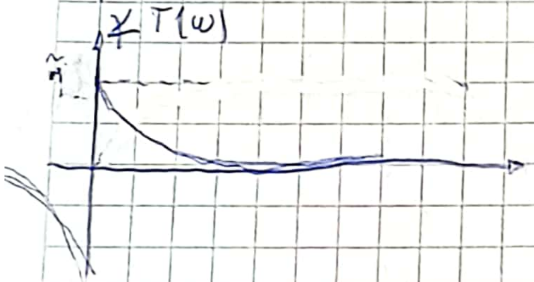
HOJA Nº
FECHA

$$\$ = \frac{s}{\omega_0} \Rightarrow T(\$) = \frac{\$\omega_0 + \frac{R_2\omega_0}{R_1}}{\$\omega_0 + \omega_0} \Rightarrow T(\$) = \frac{\$ + \frac{R_2}{R_1}}{\$ + 1}$$

La norma de frecuencia seria la constante temporal de la rama $C_1 R_2$



$T(0) = \frac{R_2}{R_1}$ la forma en valores bajos de frecuencia depende del cociente de resistencias



Invierte fase a bajas frecuencias