

$$(V_b - V_1) sC = \frac{-V_b}{R_3} \quad (1)$$

$$V_a = V_b \quad (3)$$

$$\frac{(V_a - V_1)}{R_1} = \frac{(V_2 - V_a)}{R_2} \quad (2)$$

$$(1) \quad V_b \left( sC + \frac{1}{R_3} \right) = V_1 sC \quad (2) \quad V_a \left( \frac{1}{R_1} + \frac{1}{R_2} \right) = \frac{V_2}{R_2} + \frac{V_1}{R_1}$$

$$V_b = \frac{V_1 sC R_3}{R_3 sC + 1}$$

$$V_a = \frac{R_1 V_2 + R_2 V_1}{R_2 + R_1}$$

$$(3) \quad \frac{V_1 sC R_3}{R_3 sC + 1} = \frac{R_1 V_2 + R_2 V_1}{R_2 + R_1}$$

$$V_1 \left( \frac{sC R_3}{R_3 sC + 1} - \frac{R_2}{R_2 + R_1} \right) = \frac{V_2 R_1}{R_2 + R_1}$$

$$V_1 \left( \frac{sC R_3 R_2 + sC R_3 R_1 - R_2 R_3 sC - R_2}{(R_3 sC + 1)(R_2 + R_1)} \right) = \frac{V_2 R_1}{R_2 + R_1}$$

$$T(s) = \frac{V_2}{V_1} = \frac{sC R_3 R_1 - R_2}{sC R_3 R_1 + R_1} = \frac{s - \frac{R_2}{R_3 R_1 C}}{s + \frac{1}{R_3 C}} = \frac{s - \frac{R_2}{R_1} \omega_0}{s + \omega_0}$$

$$s_1 \quad \omega_0 = \frac{1}{R_3 C}$$

$$|T(j\omega)| = \frac{\sqrt{-\omega^2 + \left(\frac{R_2}{R_1}\right)^2 \omega_0^2}}{\sqrt{-\omega^2 + \omega_0^2}}$$

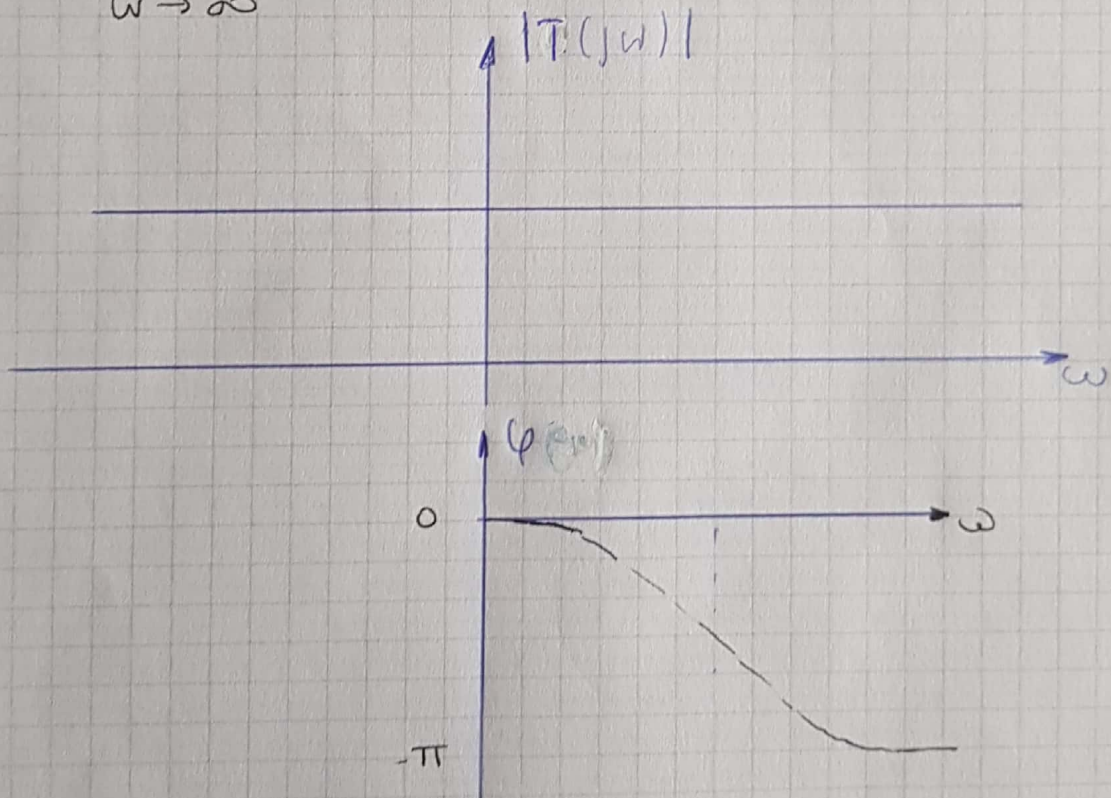
$$|T(j\omega)|_{\omega=0} = \frac{\frac{R_2}{R_1} \omega_0}{\omega_0} = \frac{R_2}{R_1} (*)$$

$$|T(j\omega)|_{\omega=\omega_0} = 1$$

$\downarrow$   
 $\frac{R_2}{R_1} = 1 \rightarrow \text{PASATODO } (*) \rightarrow \text{EN CASO QUE NO SUCEDA}$   
 $\downarrow$

$$|T(j\omega)|_{\omega=\omega_0} \rightarrow \infty$$

$$|T(j\omega)|_{\omega \rightarrow \infty} = 1$$



$$\text{con } R_2/R_1 = 1$$

$$\phi_T = \text{Arctg}\left(\frac{\omega}{-\omega_0}\right) - \text{Arctg}\left(\frac{\omega}{\omega_0}\right) = -2 \text{Arctg}\left(\frac{\omega}{\omega_0}\right)$$

$$\omega = 0 \rightarrow \phi_T = 0$$

$$\omega = \omega_0 \rightarrow \phi_T = -\frac{\pi}{2}$$

$$\omega \rightarrow \infty \rightarrow -\pi$$



