ESTUDI PREVI Pràctica 2 (FISE)

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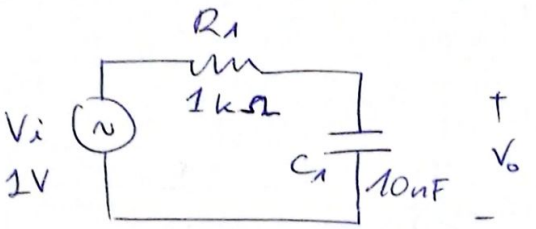


① funció de transferència:

$$V_o = \frac{\frac{1}{C_1 s}}{\frac{1}{C_1 s} + R_1} V_i = \frac{1}{1 + C_1 s \cdot R_1} V_i$$

$$H(s) = \frac{1}{1 + R_1 C_1 s} = \frac{1/R_1 C_1}{s + \frac{1}{R_1 C_1}} = \frac{\frac{1}{10^3 \cdot 10 \cdot 10^{-9}}}{s + \frac{1}{10^3 \cdot 10 \cdot 10^{-9}}} = \frac{10^5}{s + 10^5}$$

$$\boxed{H(s) = \frac{1}{1 + \frac{s}{10^5}}} \rightarrow \text{Filtre passa-baix.}$$

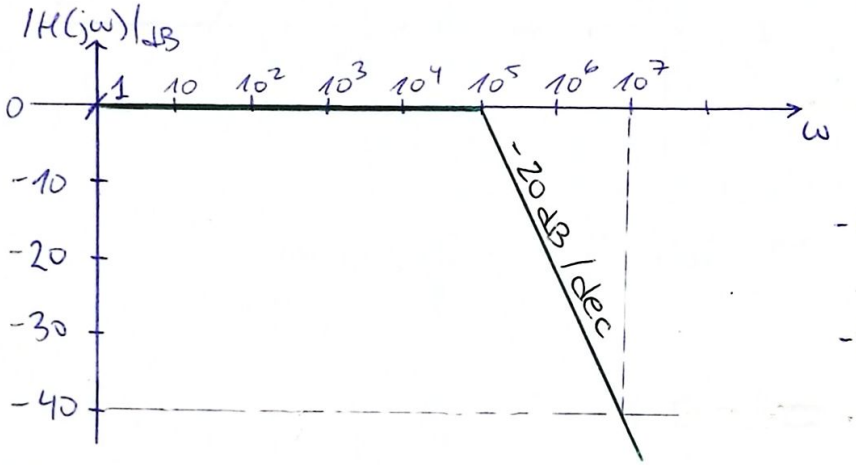
② diagrama de Bode (mòdul i fase)

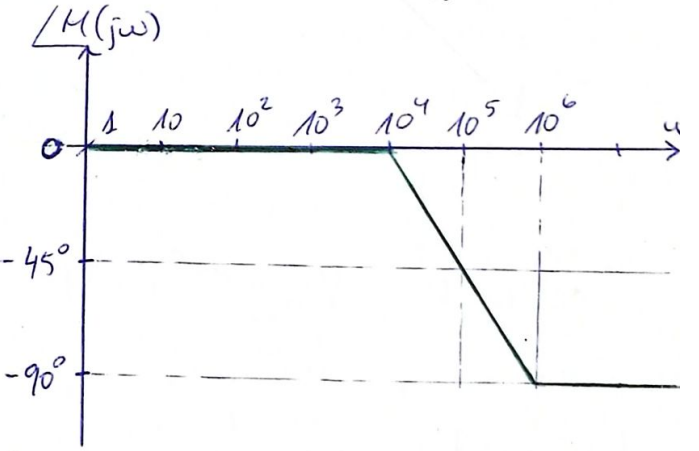
$$H(j\omega) = \frac{1}{1 + \frac{j\omega}{10^5}} \longrightarrow |H(j\omega)| = \frac{1}{\sqrt{1 + \left(\frac{\omega}{10^5}\right)^2}}$$

$$\downarrow$$

$$\angle H(j\omega) = -\operatorname{arctg}\left(\frac{\omega}{10^5}\right)$$

$$|H(j\omega)|_{dB} = -20 \log\left(\sqrt{1 + \left(\frac{\omega}{10^5}\right)^2}\right)$$





③ freqüència de tall del circuit: $\omega_c = 10^5$ rad/s $\rightarrow f_c = \frac{10^5}{2\pi} = 15{,}9$ kHz

④ Valor de $|H(j\omega)|$ per a $f_1 = 1$kHz, $f_2 = 10$ kHz, $f_3 = 100$ kHz.

$$|H(j\omega_1)| = \frac{1}{\sqrt{1 + \left(\frac{2 \cdot 10^3 \pi}{10^5}\right)^2}} = 0{,}998$$

$$|H(j\omega_2)| = \frac{1}{\sqrt{1 + \left(\frac{2\pi \cdot 10^4}{10^5}\right)^2}} = 0{,}8467$$

$$|H(j\omega_3)| = \frac{1}{\sqrt{1 + \left(\frac{2\pi \cdot 10^5}{10^5}\right)^2}} = 0{,}1572$$

$\omega_1 = 2\pi \cdot f_1 = 2\pi 10^3$

$\omega_2 = 2\pi f_2 = 2\pi 10^4$

$\omega_3 = 2\pi f_3 = 2\pi 10^5$