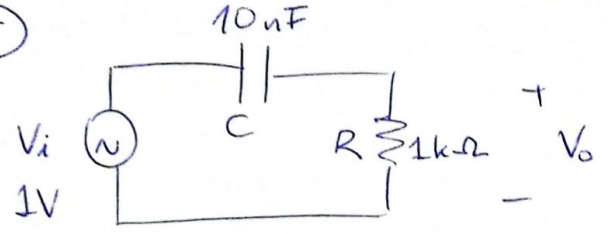
(5)



$$V_o = \frac{R}{R + \frac{1}{Cs}} V_i$$

$$H(s) = \frac{R}{R + \frac{1}{Cs}} = \frac{RCs}{RCs + 1} = \frac{s}{s + \frac{1}{RC}}$$

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

$$\boxed{H(s) = \frac{1}{1 + \frac{10^5}{s}}}$$

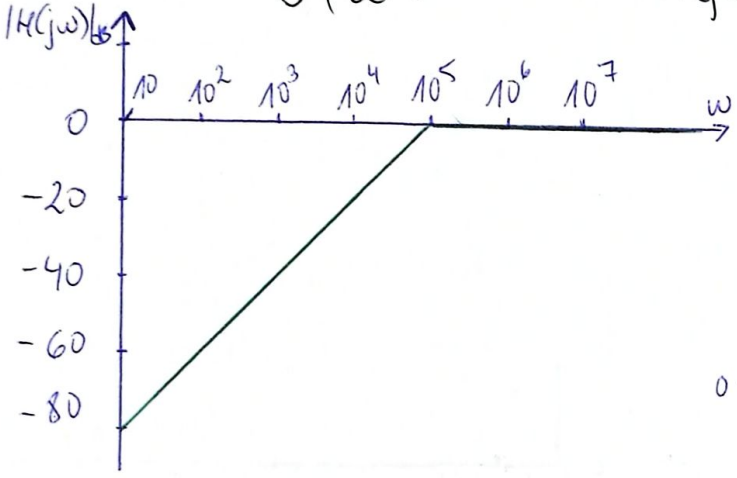
↓ Filtre passa-alt

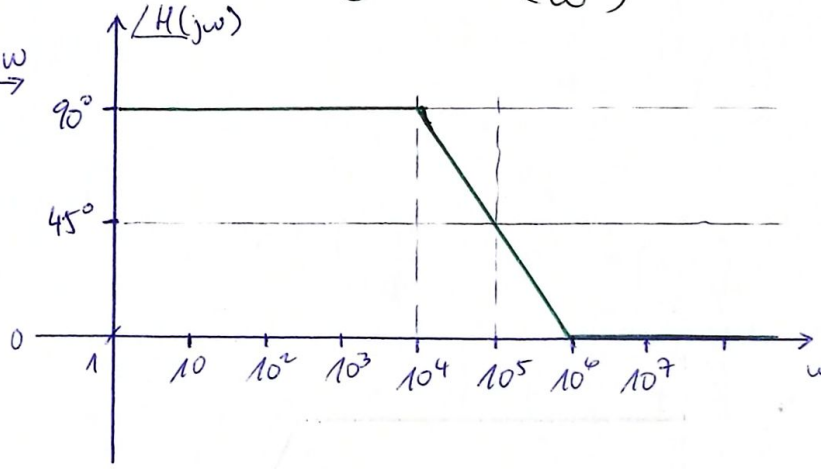
$$H(j\omega) = \frac{1}{1 + \frac{10^5}{j\omega}} \rightarrow |H(j\omega)| = \frac{1}{\sqrt{1 + \left(\frac{10^5}{\omega}\right)^2}}$$

↓

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

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





Freqüència de tall: $\omega_c = 10^5$ rad/s → $f_c = \frac{10^5}{2\pi} = 15{,}9$ kHz

$$|H(j\omega_1)| = \frac{1}{\sqrt{1 + \left(\frac{10^5}{2\pi 10^3}\right)^2}} = 0{,}0627$$

$$|H(j\omega_2)| = \frac{1}{\sqrt{1 + \left(\frac{10^5}{2\pi 10^4}\right)^2}} = 0{,}532$$

$$|H(j\omega_3)| = \frac{1}{\sqrt{1 + \left(\frac{10^5}{2\pi 10^5}\right)^2}} = 0{,}9876$$

$\omega_1 = 2\pi 10^3$

$\omega_2 = 2\pi 10^4$

$\omega_3 = 2\pi 10^5$