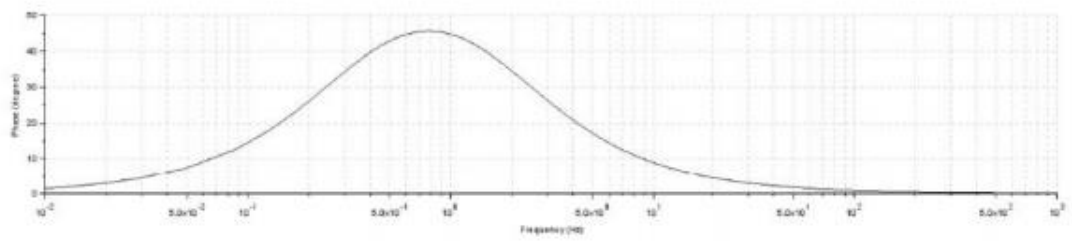
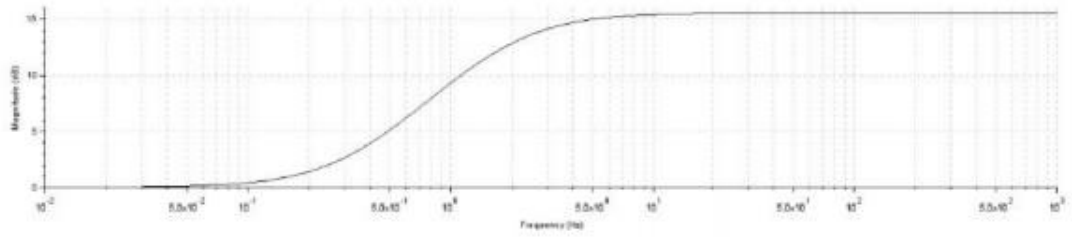
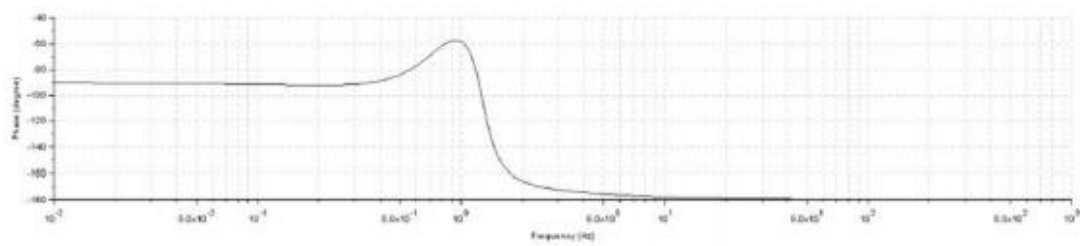
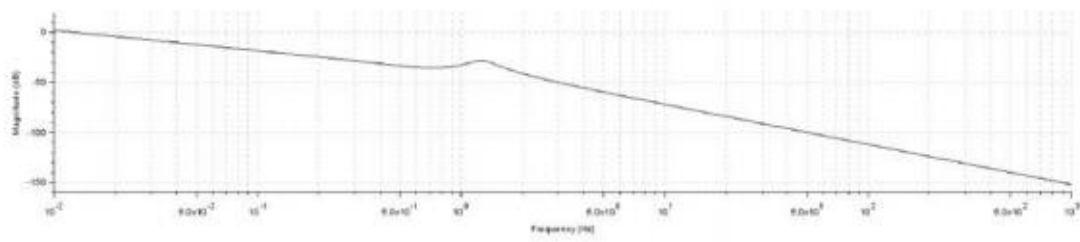


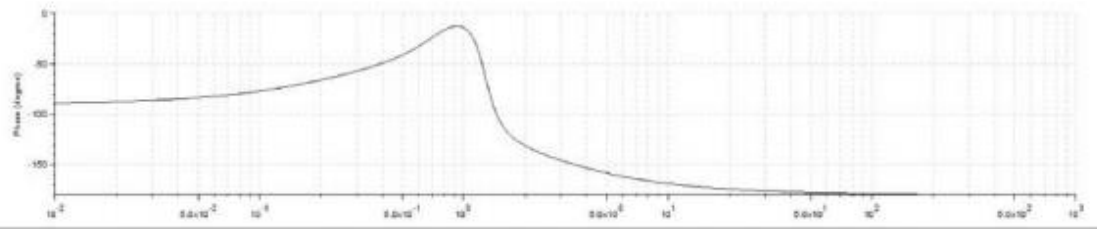
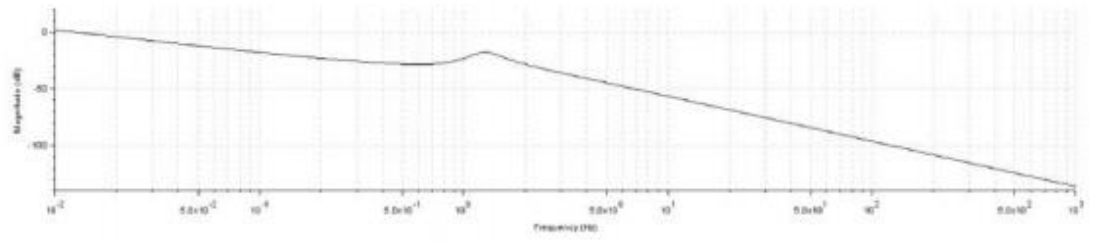
- Exercício 3



- Exercício 4



- Exercício 5



①

$$G_s(s) = \frac{s^2 + 5s + 25}{s^4 + 7,4s^2 + 76s^2 + 320} = \frac{s^2 + 5s + 25}{s(s-5)(s^2 + 2,4s + 64)}$$

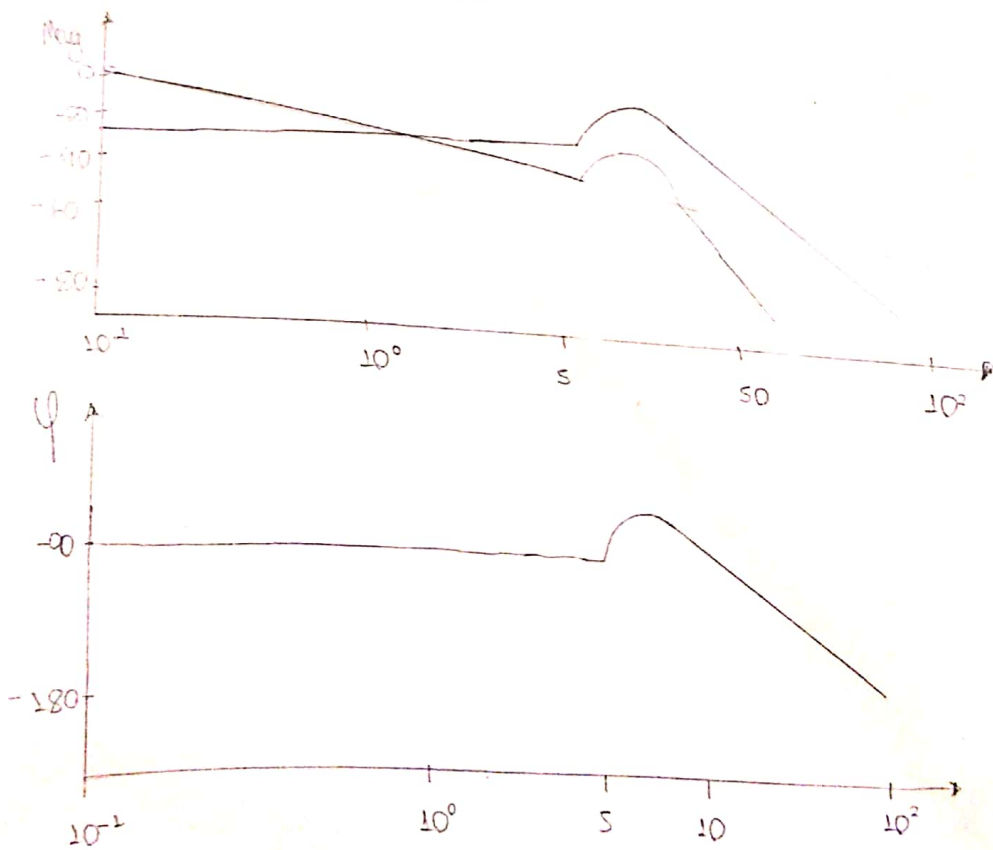
$$G_s(j\omega) = \frac{25 \left(1 - \left(\frac{\omega}{8}\right)^2 + \frac{j\omega}{8} \right)}{s \cdot s \left(\frac{j\omega}{5} \cdot 1 \right) 64 \left(1 - \frac{\omega^2}{8^2} + 0,09 + j\omega \right)}$$

$$K_b = \frac{25}{320}$$

$$\omega_0 = 5 \text{ rad/s} \quad \text{e} \quad s = 0,5$$

$$\omega_r = \omega_n \sqrt{1 - 2\zeta^2} = 3,5 \text{ rad/s}$$

$$\omega_{rF} = \omega_n \sqrt{1 - 2\zeta^2} = 7,8 \text{ rad/s}$$



2

$$G_2 = \frac{6 \cdot 5 \cdot 2}{5 \cdot 10} \Rightarrow G_2(j\omega) = \frac{1 \left(\frac{\omega}{2} \right)^2 + 1}{\left(\frac{\omega}{10} \right)^2 + 1}$$

$\omega_n = 2 \text{ rad/s} \rightarrow$ zéro \rightarrow augmentation de 90° et essaimement de 20 dB par décade
 $\omega_{rp} = 10 \text{ rad/s} \rightarrow$ Poles \rightarrow Diminution de 40 dB par décade

