Ingénierie Electronique pour le Traitement de l'Information

TD9

Modéliser et corriger des systèmes

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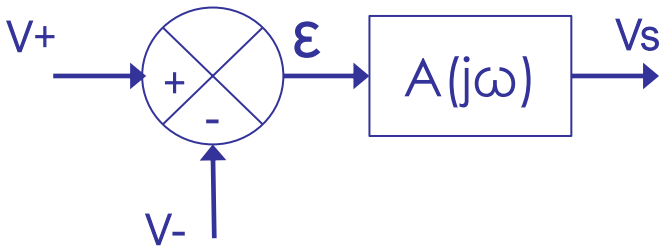
Paris-Saclay

Saint-Étienne

Bordeaux

- **Exercice 1 / Modélisation ALI**

$$A(p) = \frac{V_S(p)}{\varepsilon(p)} = \frac{A_0}{1 + \frac{p}{\omega_c}}$$



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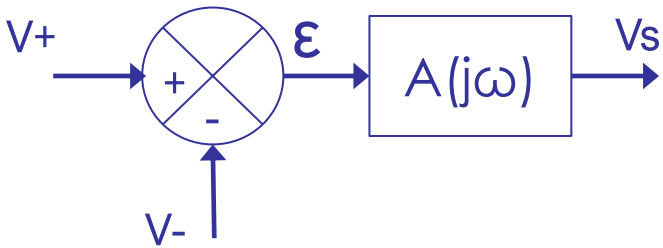

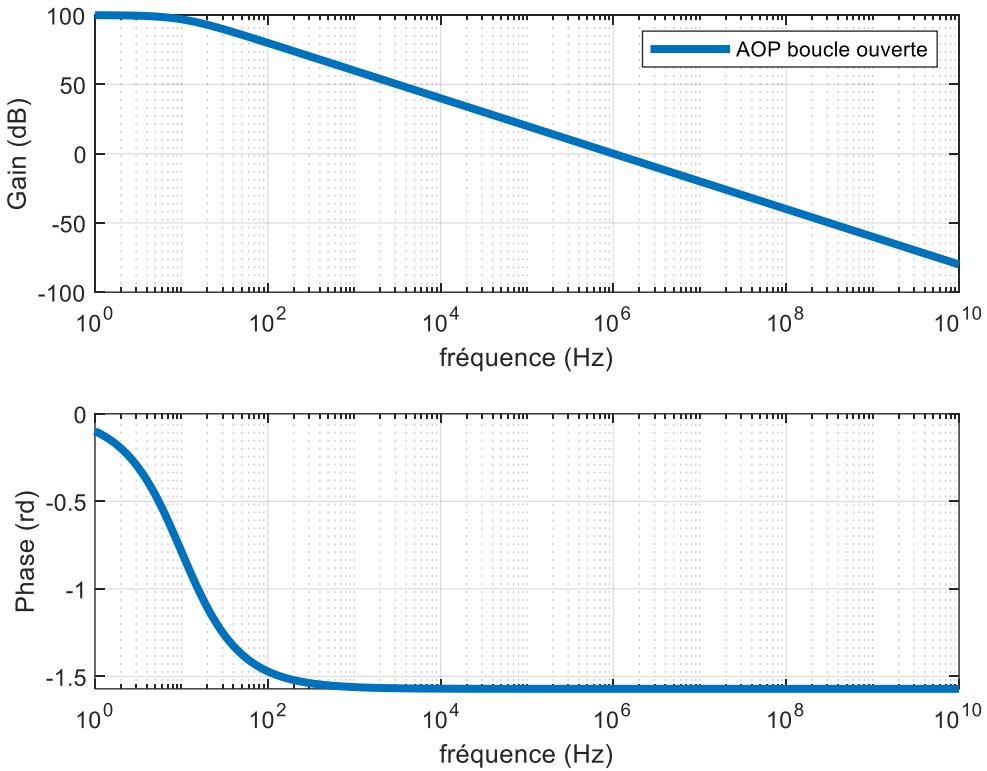

- **Exercice 1 / Modélisation ALI - Rebouclage**

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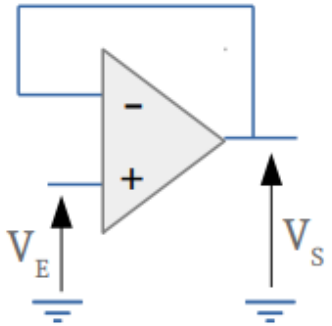

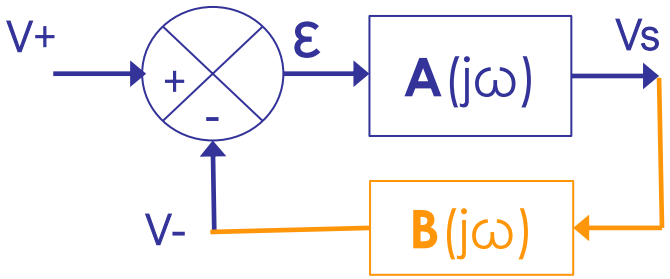

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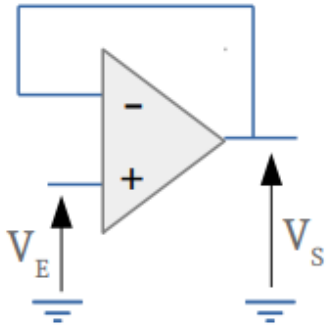

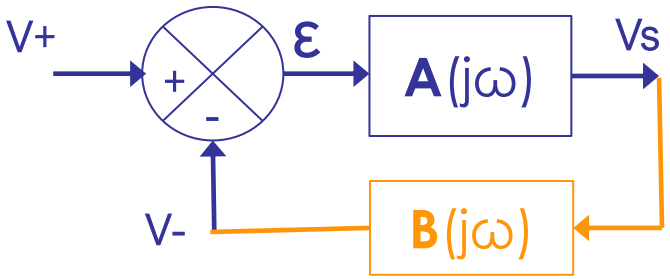

Vs = A(jω) . (Ve – B(jω) Vs)

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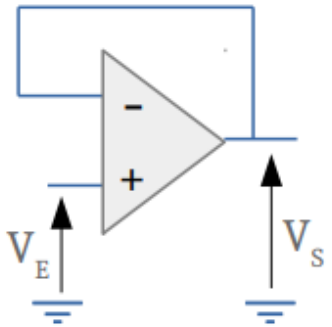
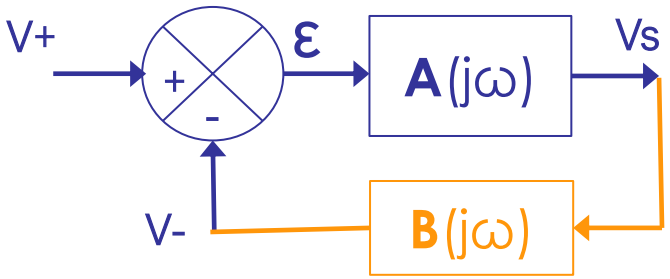
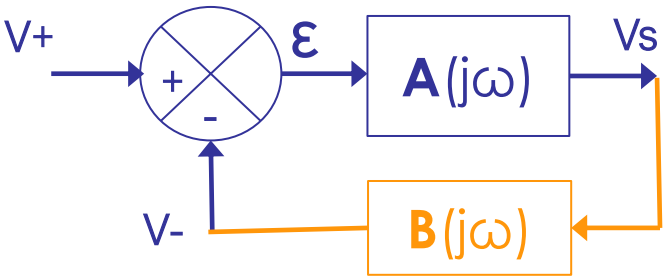


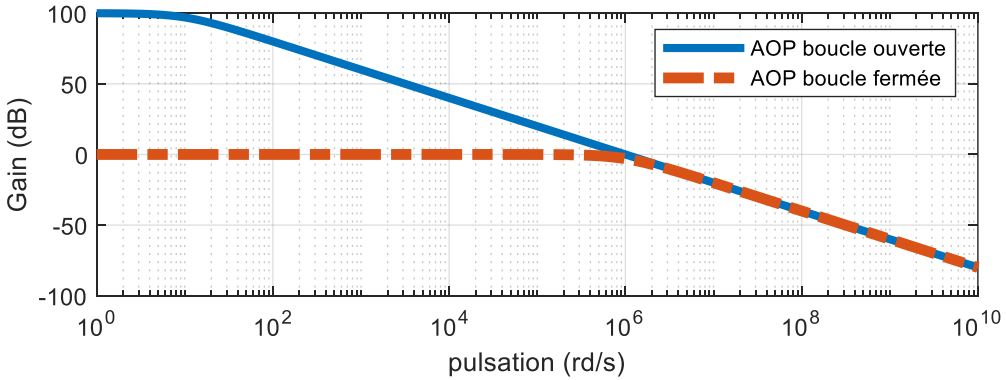


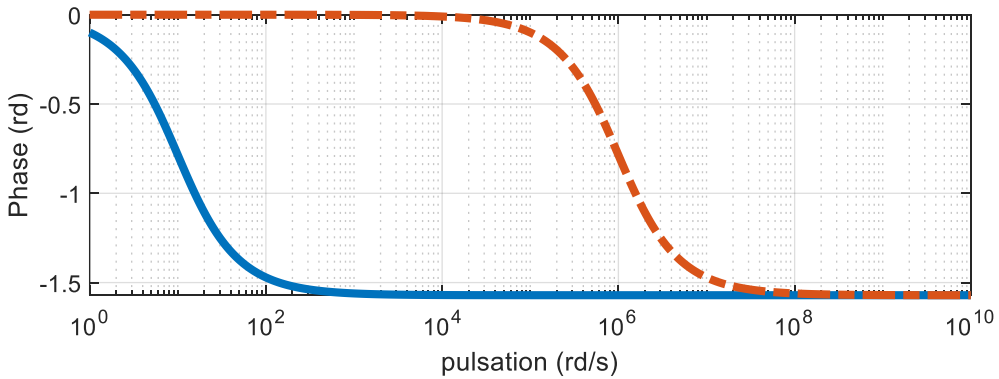
$$\frac{Vs}{Ve} = \frac{A(j\omega)}{1 + A(j\omega).B(j\omega)}$$

- **Exercice 1 / Modélisation ALI - Rebouclage**

$$H(p) = \frac{A_0}{1+A_0} \cdot \frac{1}{1+\frac{p}{\omega_c \cdot (1+A_0)}}$$



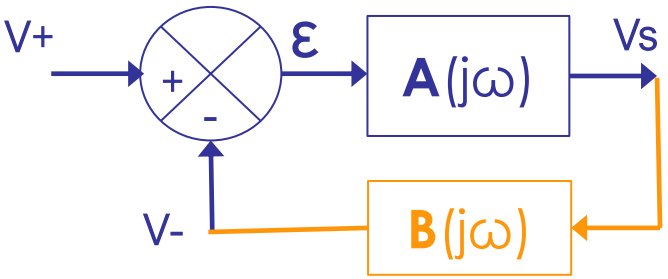


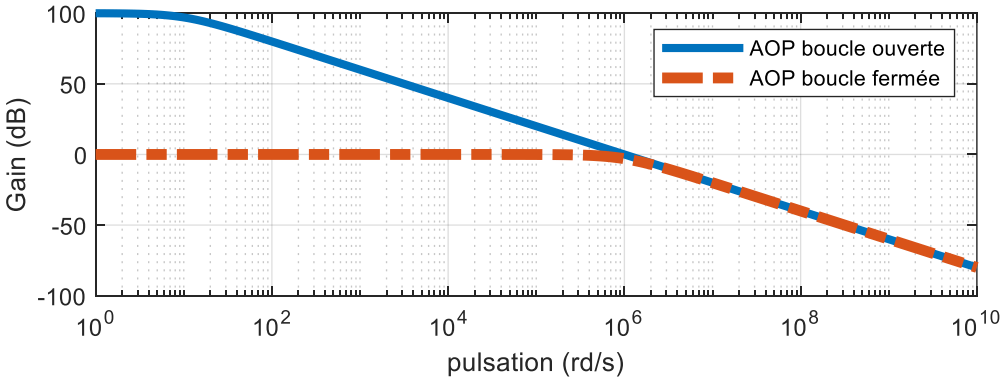


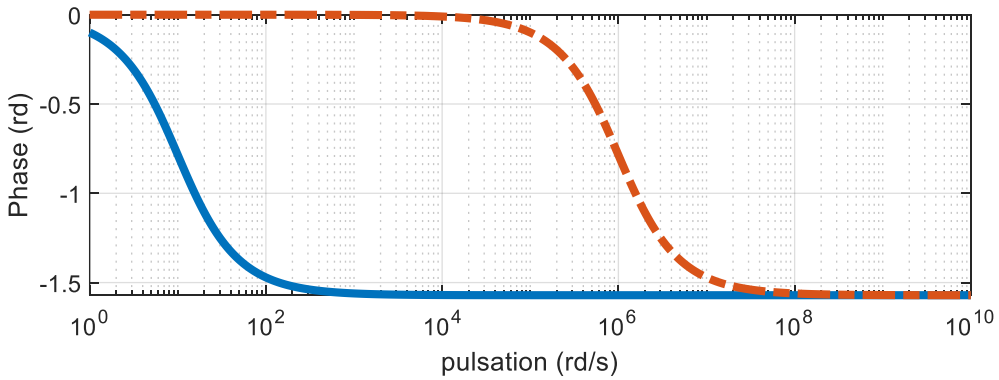
- **Exercice 1 / Modélisation ALI - Rebouclage**

$$H_0 = \frac{A_0}{1+A_0} \approx 1$$

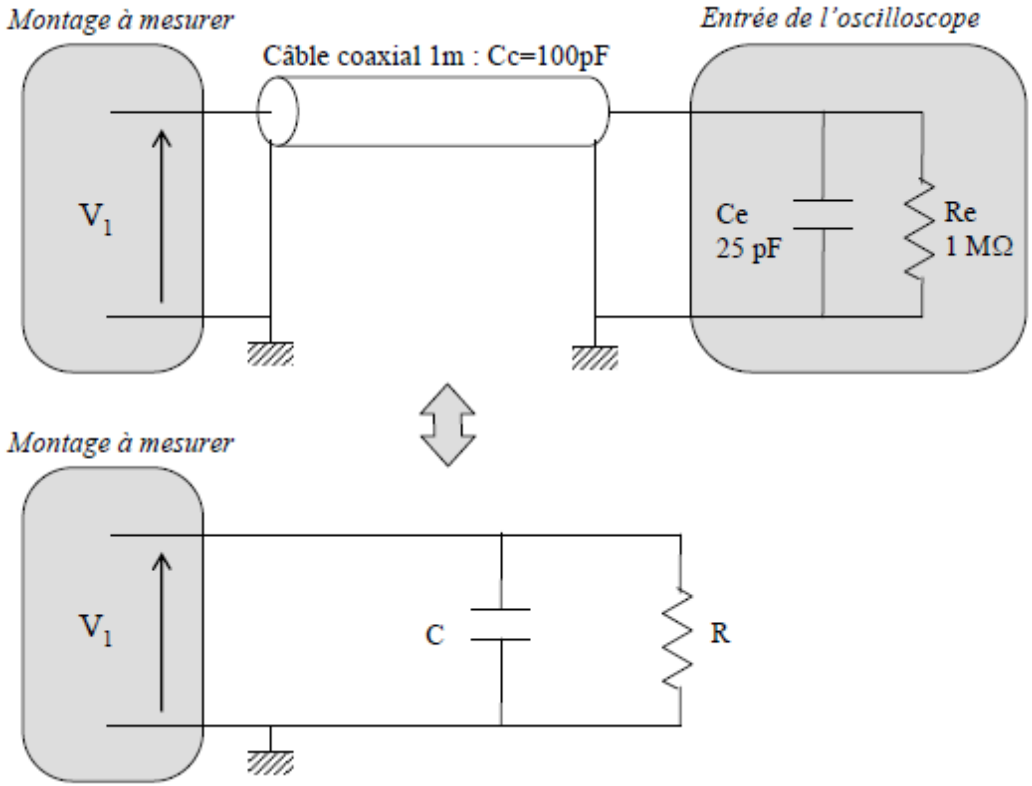
$$f_0 = f_c \cdot (1 + A_0) = GBP \cdot \frac{1+A_0}{A_0}$$







- **Exercice 2 / Modèle d'un oscilloscope**



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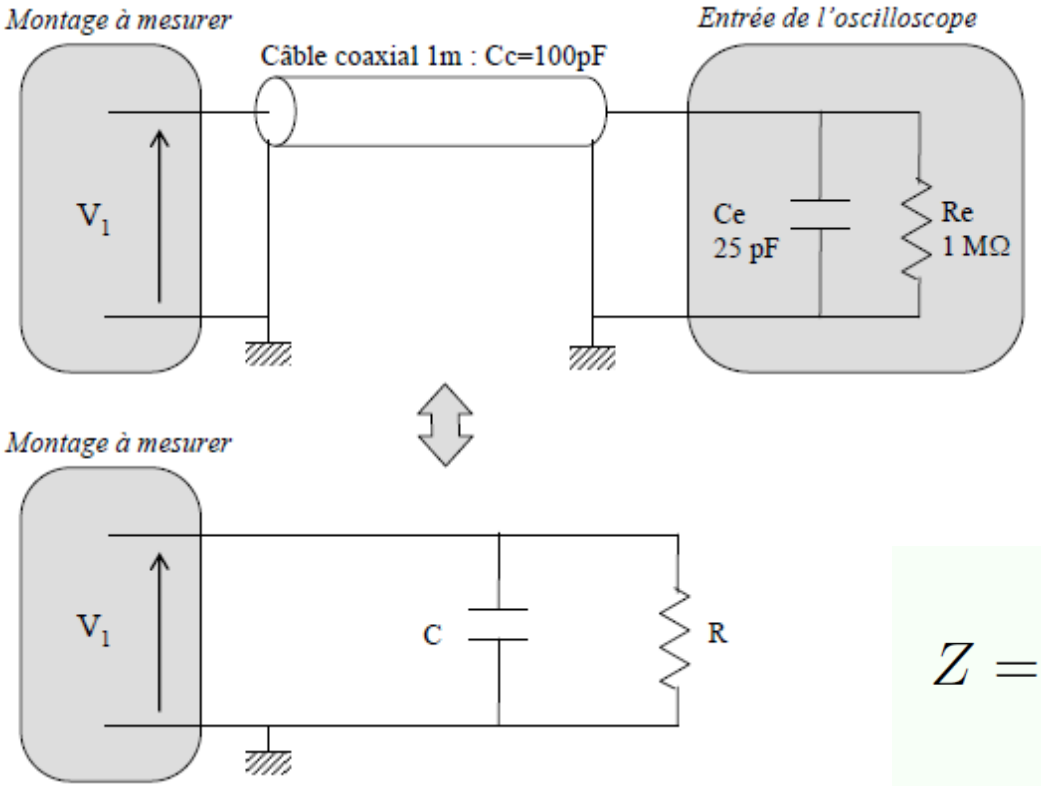
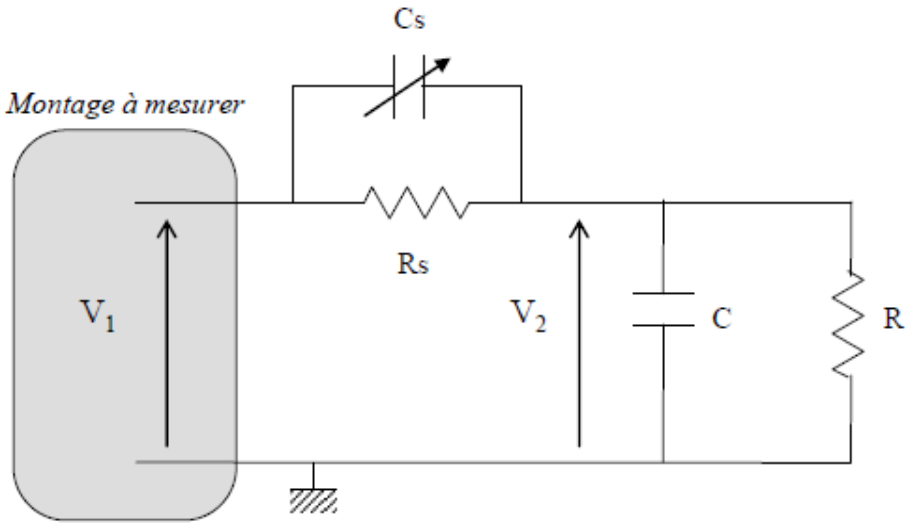


$$Z = \frac{\frac{R}{jC\omega}}{R + \frac{1}{jC\omega}} = \frac{R}{1 + jRC\omega}$$

- **Exercice 2 / Sonde compensée**



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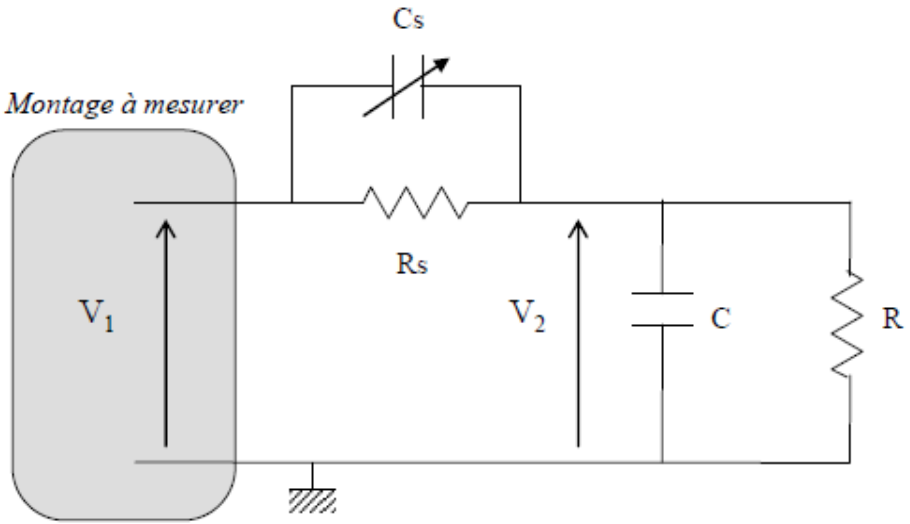

$$T = \frac{R}{R + R_S} \cdot \frac{1 + jR_SC_S\omega}{1 + j\frac{RR_S}{R+R_S}(C + C_S)\omega}$$

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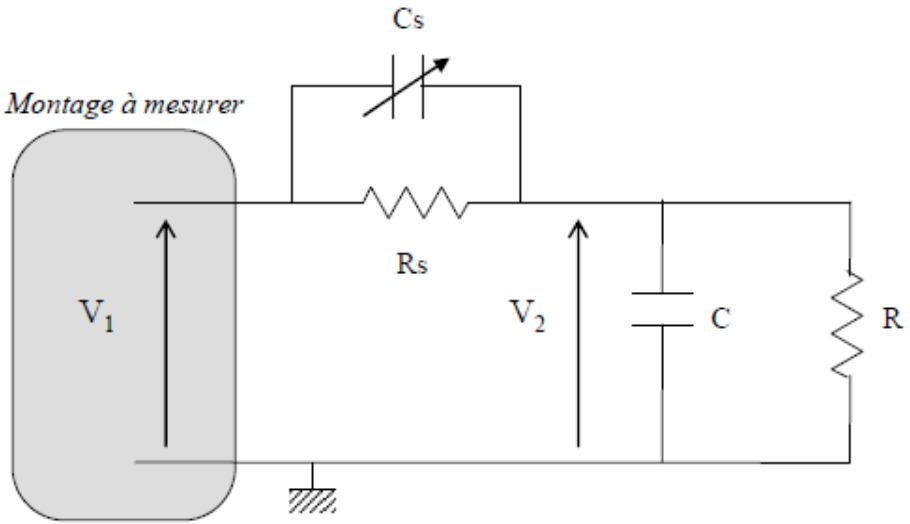

$$f_1 = \frac{1}{2\pi R_S C_S}$$

$$f_2 = \frac{R+R_S}{2\pi R R_S (C+C_S)}$$

$$T = \frac{R}{R+R_S} \cdot \frac{1 + jR_S C_S \omega}{1 + j\frac{RR_S}{R+R_S}(C+C_S)\omega}$$

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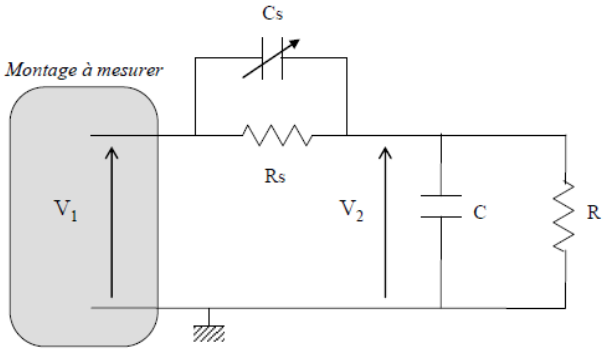
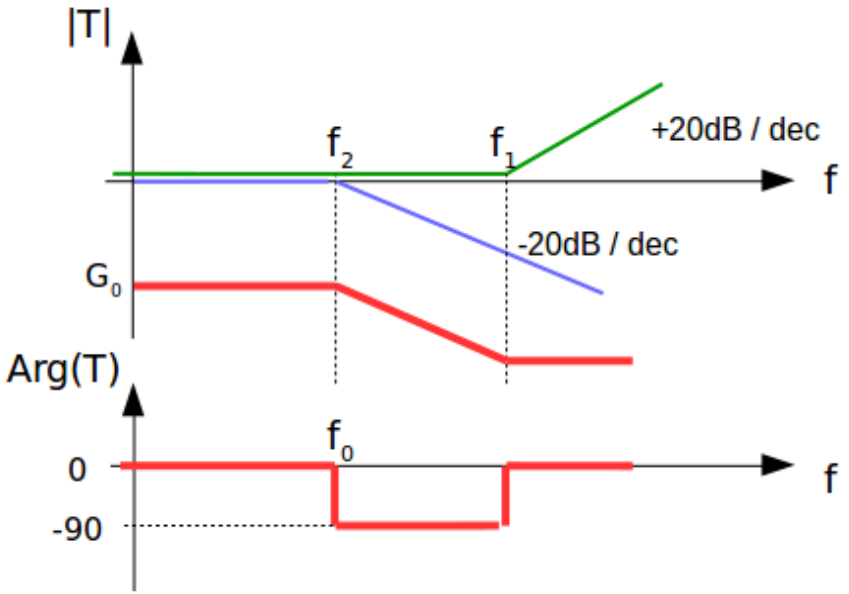
Cs = 5pF
f1 = 3,5 kHz et f2 = 1,3 kHz





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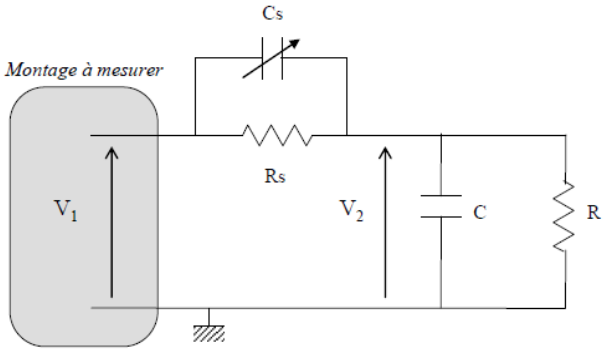

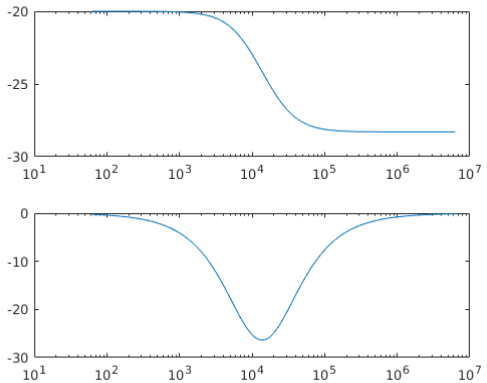

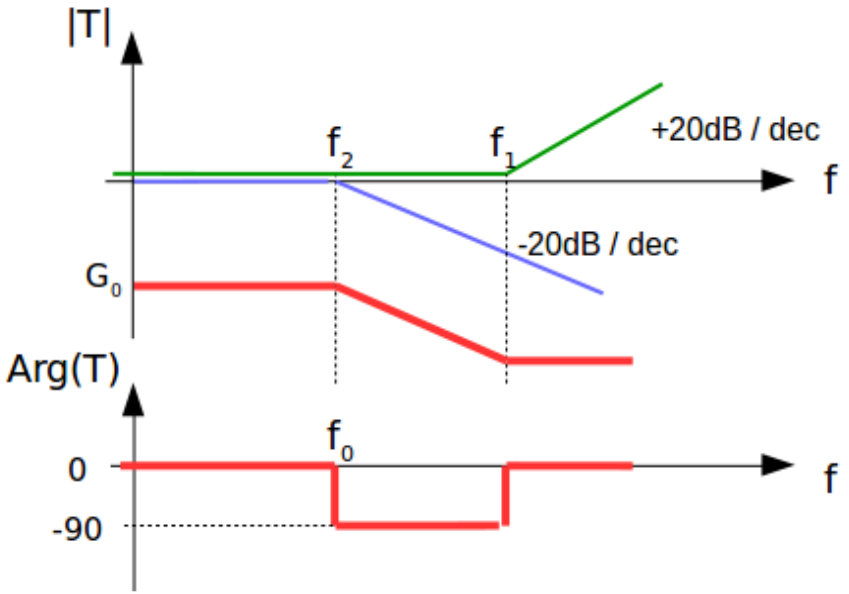

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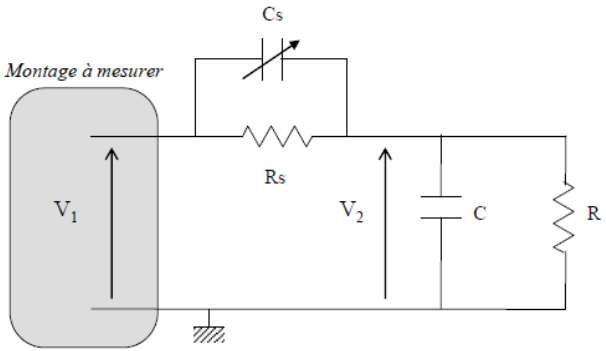
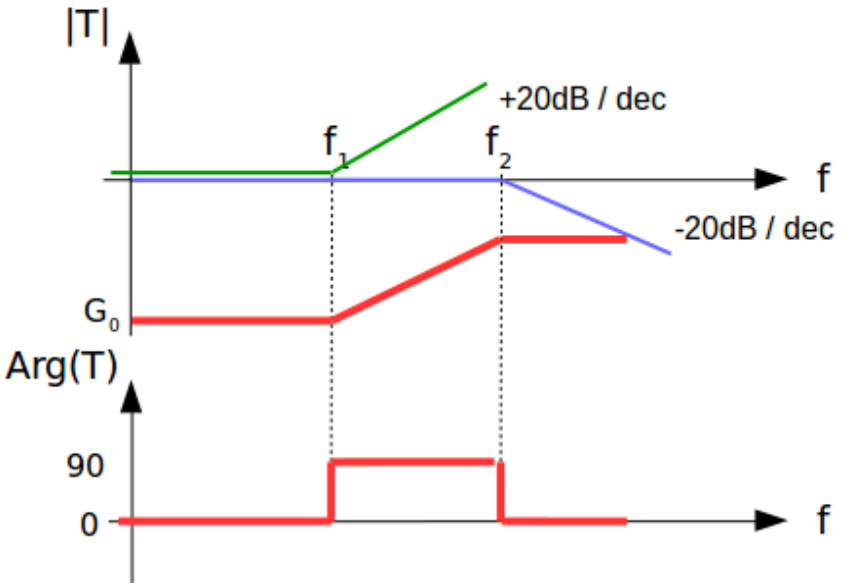
Cs = 50pF
f1 = 350 Hz et f2 = 1 kHz





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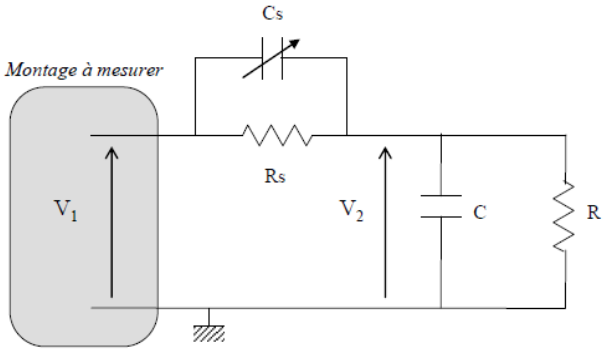

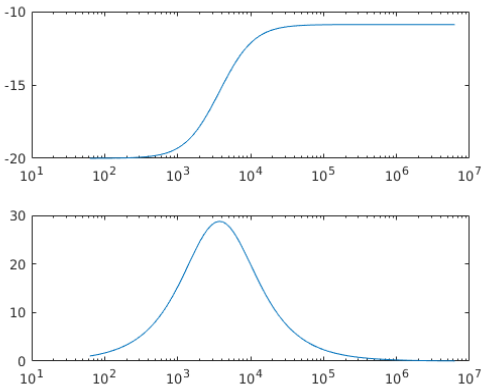

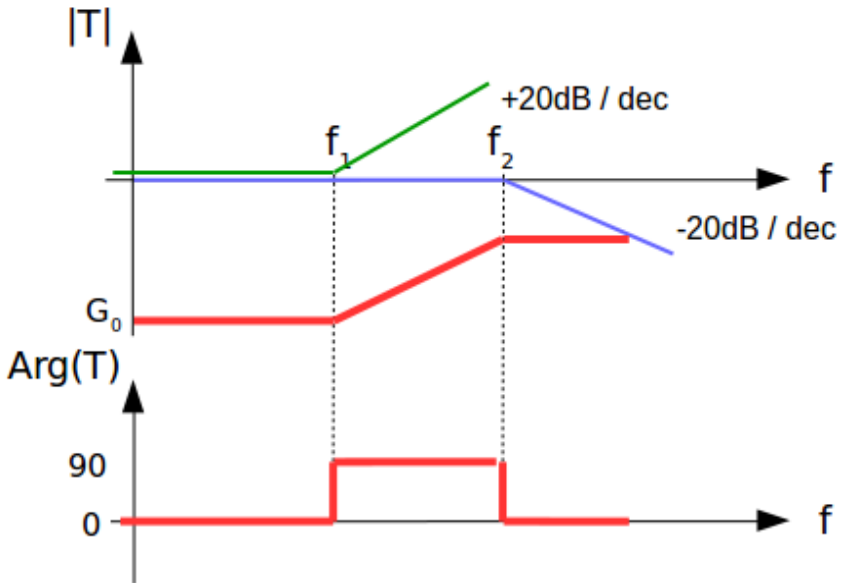

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Bon choix de Cs
f1 = f2