

Electrónica II

Análise em frequência

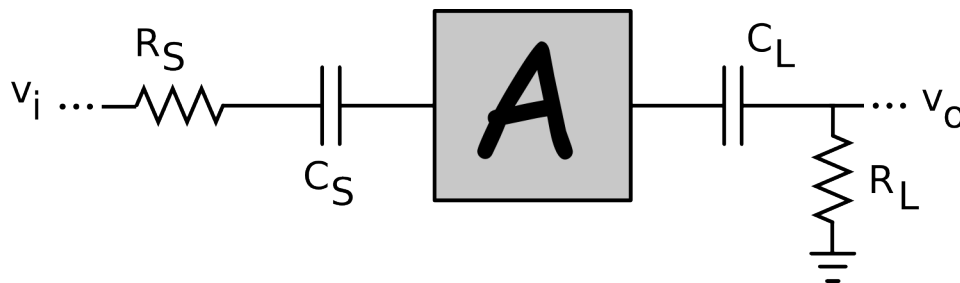
P. Stallinga

1)

A certain commercial amplifier has the following parameters

- Voltage gain: $A = -100$ V/V.
- Input resistance: $r_{in} = 5$ k Ω .
- Output resistance: $r_{out} = 1$ k Ω .
- Capacitance between the input and output: $C_f = 10$ pF.
- Capacitance between the input and the box (ground) and the output and the box (ground): $C_i = C_o = 10$ pF.

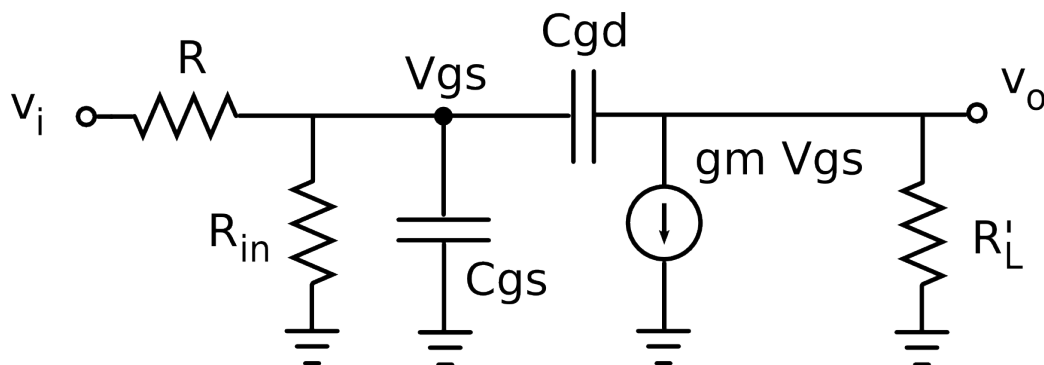
Based on this amplifier the following circuit was designed



$$R_S = 1 \text{ k}\Omega, R_L = 3 \text{ k}\Omega, C_S = C_L = 10 \text{ }\mu\text{F}.$$

- Determine the mid-frequency gain of the complete circuit.
- Schematically draw Bode plots of the behavior of the circuit in terms of frequency.
- Determine the band-width of the circuit.

2)



A figura acima mostra o circuito equivalente de um FET amplificador fonte-comum (*common source*). O sinal de entrada vem de um gerador de sinais com resistência de saída R . R_{in} vem do circuito do bias. R'_L é o equivalente paralelo de resistência de carga R_L , a resistência de dreno R_D e a resistência de saída do FET r_o . Condensadores C_{gs} e C_{gd} são condensadores internos do FET.

$R = 100 \text{ k}\Omega$, $R_{\text{in}} = 420 \text{ k}\Omega$, $C_{\text{gs}} = C_{\text{gd}} = 1 \text{ pF}$, $g_{\text{m}} = 4 \text{ mA/V}$, $R_{\text{L}}' = 3.33 \text{ k}\Omega$.

- a) Determine o ganho do *mid-band* (médias frequências), $A_v = v_o/v_i$.
- b) Determine a largura de banda do circuito.