Universidad
Carlos III de Madrid
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Session 20
Frequency Response of Transistor Amplifiers : Exercises

Electronic Components and Circuits

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Frequency response analysis of transistor amplifiers

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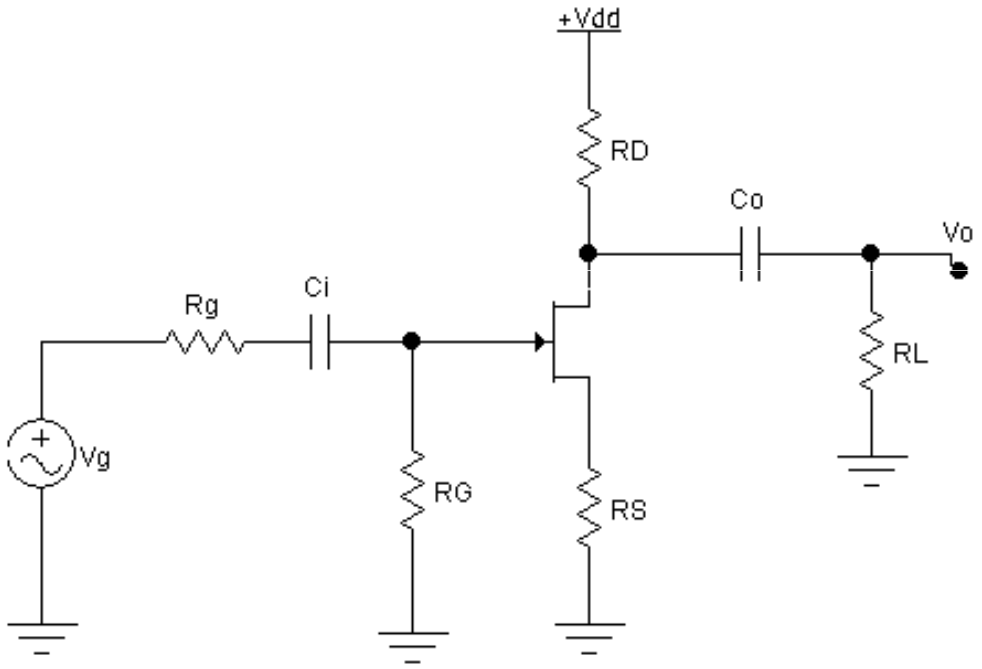
- Numerical resolution of an example, including the obtaining of the midband gain, the high cut-off frequency and the low cut-off frequency.
- Use of the former example to illustrate the methodology to obtain the bode plot.

Proposed Exercise



+Vdd = 15 V

R_S = 560Ω	R_D = 5,6 KΩ	C_i = 10 μF
R_G = 1 MΩ	R_L=10 KΩ	C_0=10 μF
R_g = 50 Ω		

Transistor:

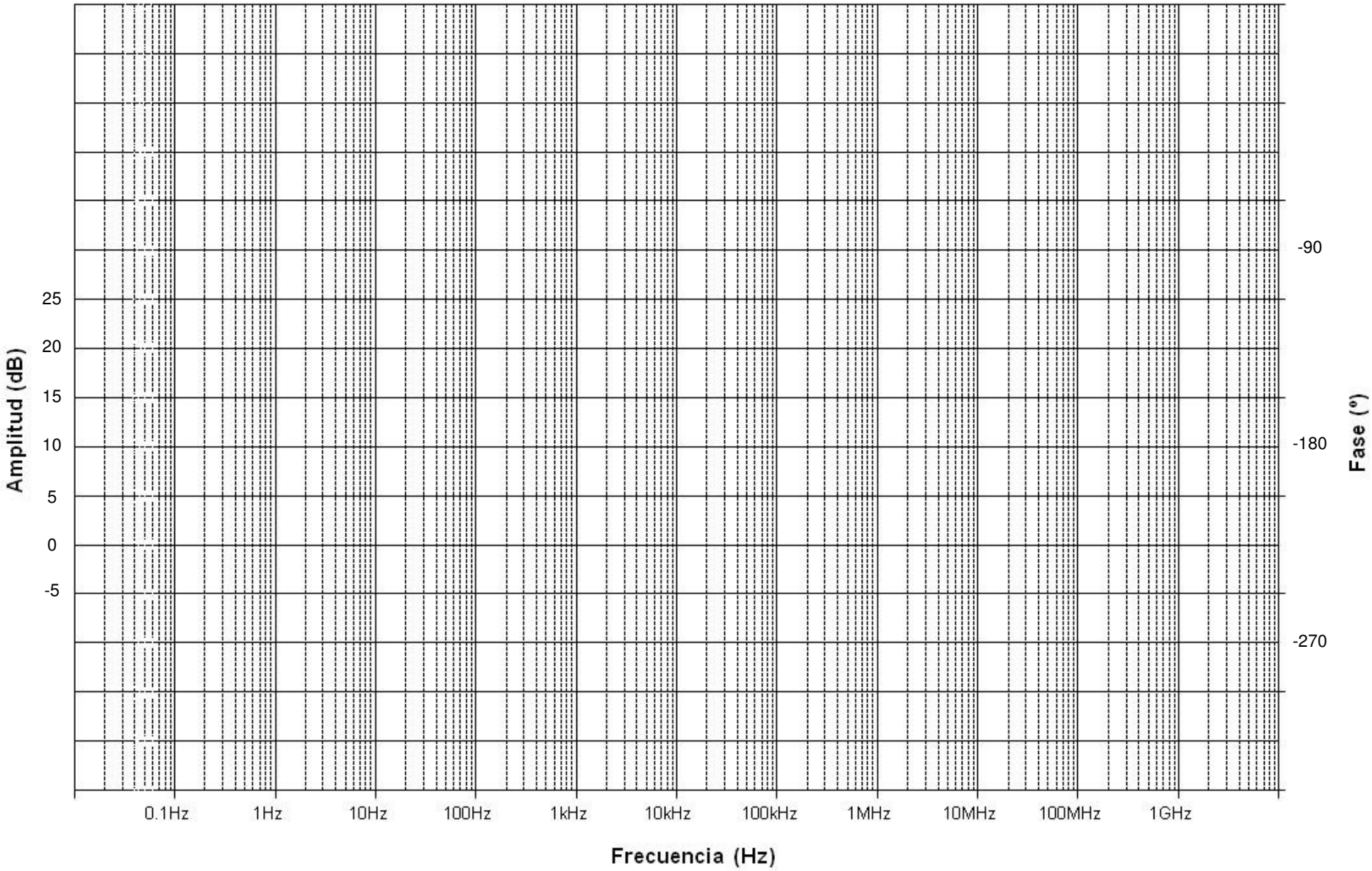
I_{DSS}= 10 mA	V_P = -2 V	C_{gd}=0.36 pF
		C_{gs}=1 pF

$I_D = I_{DSS} \cdot (1-V_{GS}/V_P)^2$

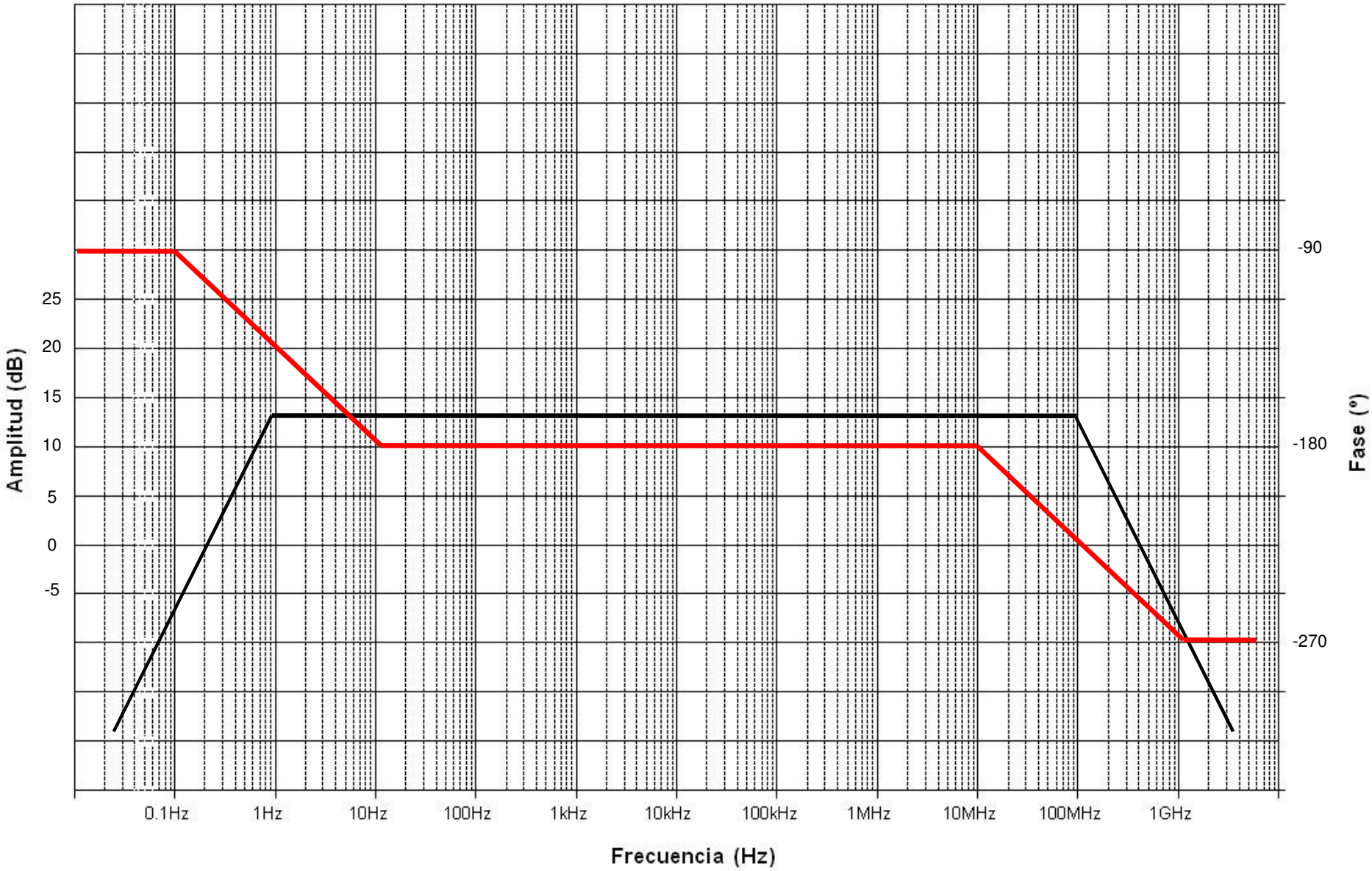
Proposed Exercise

1. Determination of the dc operating point of the BJT and the small-signal model parameters
2. Determination of the midband gain.
3. Determination of the high cut-off frequency using the open-circuit time constants method
4. Determination of the low cut-off frequency using the short-circuit time constants method
5. Drawing of the Bode Plot.

Bode Plot


Amplitud (dB)
25
20
15
10
5
0
-5
-90
-180
-270
Fase (°)
0.1Hz
1Hz
10Hz
100Hz
1kHz
10kHz
100kHz
1MHz
10MHz
100MHz
1GHz
Frecuencia (Hz)

Bode Plot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