

Homework 4**1) Common-Drain Amplifier**

Solve problem 3.7 & 3.8 in the Johns/Martin text.

2) Common-Gate Amplifier

Find the dc gain and the 3 dB corner of the common-gate amplifier defined in problem 3.10 in the Johns/Martin text for the 2 cases:

- a) $R_{in1}=180 \text{ k}\Omega$
- b) $R_{in2}=1.8 \text{ k}\Omega$

3) 2-Stage CMOS OpAmp

Consider the sample HSpice file of the **2-stage CMOS opamp** listed on the ele539 web page.

- a) Sketch the schematic of the test set-up used in this HSpice netlist. To do so, assume the opamp to be an ideal 3-terminal device with V_{in-} , V_{in+} and V_{out} as the only externally available nodes.
- b) Used HSpice to evaluate the following performance parameters of this opamp:
 - Open-loop gain A_0
 - Unity-Gain Bandwidth (for $C_L=5 \text{ pF}$)
 - Power dissipation
 - Maximum linear output swing (defined as the swing, where the total harmonic distortion exceeds 1%)
 - Common-Mode rejection ratio (in dB) at dc and 100 kHz
 - Input and output resistance at dc
 - Systematic offset
 - Positive and negative slew rate (in unity-gain mode)