UNIVERSITY OF UTAH
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
ECE 2280

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1/08

Project #2 Mosfet Amplifiers

DUE: PSpice Simulations *Friday 3/23/2012 by 5pm*

Circuit Demonstration Week of 3/26/2012 *by end of lab session*

- ✓ Do your own work.
- ✓ Clearly present your work.
- ✓ All printouts must be readable.

OBJECTIVES:

- Design at least one MOSFET amplifier(s)
- Establish a dc bias point by selecting appropriate values
- Design for a large gain, low output impedance, and high input impedance
- Investigate the frequency response of a two-stage amplifier

REQUIREMENTS:

- Design a multi-stage amplifier(s) to work as the non-inverting amplifier for the previous microphone/speaker circuit (you built this in **Lab #2**):
- Voltage gain of $|A_v| = 101$ V/V (may be inverting or noninverting).
- Low output impedance
- High input impedance
- Your amplifier(s) must work in the microphone/speaker circuit.

GUIDELINES:

The CD4007.OLB and the fairchild.olb files can be downloaded for the simulation part of this project. They contain symbol and models for the NMOS and the PMOS on the CD4007 chip and the 2N7000 NMOS that you have been using in the lab.

1. Add the <filename>.olb library to your design by choosing:

   - Place -> parts
   - In the Place Parts window, click: Add Library button
   - Browse to the location that you saved this file and select the file

2. Select the parts within this library for your design.

3. Once you have drawn the schematic, link the Mosfet model (the file that contains all the fabrication process data such as k', lambda, vt, etc.) to the schematic by choosing:

   - Edit Simulation window
   - In the Edit Simulation window, click: Configuration Files and then the Libraries(located on the left of the window)
   - Browse again to the location you saved the file and select the <filename>.lib file
   - In the <filename>.lib file, click: Add Library to Design button
   - (If you do not do this, you will get an error message: model _____ is undefined.)

4. To aid in solving for unknown variables, you may want to use Matlab or Excel. You will still have to pick several values arbitrarily. Matlab/Excel just makes it easier to adjust variables without having to solve all the equations again.

5. You will need to test the frequency response of your amplifier to achieve the desired bandwidth for audio (100Hz – 20kHz).