EE321 – Lab 10

Bipolar Junction Transistors, Part III
A Two-Stage BJT Amplifier

Design a two-stage BJT amplifier. Both stages should be common emitter amplifiers, such as Figure 1 of the previous lab. The amplifier should respond to DC signals — i.e., DO NOT capacitively couple the input and output of the amplifier. You can use 2N3904 (NPN) and/or 2N3906 (PNP) BJTs.

The gain should be 100 (between 90 and 110); with an input of 0 V the output should be 0 V (between -1 and +1 V); a 10 Vpp output should be undistorted.

Design and analyze the amplifier before coming to lab. Be sure to determine the bias voltages (V_E, V_C and V_B for each transistor), the overall gain, and the input (R_{in}) and output (R_{out}) resistances.

Simulate and check the design with PSpice.

Build and test your amplifier.

1. Measure the bias voltages and compare them to the calculated values.
2. Measure the gain at DC, 1 kHz and 10 kHz.
3. Measure R_{in} and R_{out} as you did in Lab 9.

When done write a (word-processed) report on the lab (in addition to the notes kept in your lab notebook). The report should be fairly short — include a schematic of the design, the analysis of the bias voltages (using simple theory), gains and input and output resistances, and the measured bias voltages, gains and input and output resistances. Include and discuss the PSpice analysis.