CE3101 Lab 8: Voltage Regulator

Objectives

- Combine rectifier and OpAmp circuits to build a variable voltage regulator

Prelab **student check off**

- Checkout needed components from the Tech Center ☐

Assignment

Part 1: Simulate: Design a 5V regulator. Use the regulator example from the notes

a) Reuse your rectifier from Lab3 – part 3, but with a 20v P-P (+/-10V 0-Pk) sine wave input (your regulated output should be around 8.6V) ☐

b) Use a UA741 opamp and a 2N3904 NPN transistor for the active components ☐

c) Reference the design to Gnd (VCC- on the opamp = gnd) ☐

Part 2: Build: Build your regulator.

a) You will need to use the benchtop signal generator for the rectifier input– the AD2 cannot support the 20v P-P signal ☐

b) Use the AD2 Supply Voltage output for the 1.2V reference ☐

c) Measure the ripple in the output voltage ☐

Part 3: Build: Modify your regulator.

a) Replace 1 resistor in your design with a potentiometer ☐

b) Determine the maximum and minimum viable output voltage (50mV ripple) ☐

Check Off

- Demo and document part 1 30%
- Demo and document part 2 30%
- Demo and document part 3 40%

Demo (in-person or via Teams chat) and Report (in the box) due by 4:00 pm Wednesday of the week following the lab.