CE3101 Lab 3: Rectifier Circuits

Objectives

- Explore rectifier circuits
- Design practice

Prelab **student check off**

- Checkout an Analog Discovery 2 kit from the Tech Center ☐
- Checkout needed components from the Tech Center ☐

Assignment

Part 1: Use a 1N4148 diode to create a half wave rectifier with a 1KΩ load
Simulate your design using a 0 - 3V 60Hz sine wave (replacing the transformer)
Setup the AD2 to generate a 0 - 3V 60Hz sine wave (replacing the transformer)
Build your design and measure the input voltage, the rectified voltage, and the ripple
Estimate the diode "on" voltage
Compare the simulation to the actual circuit ☐

Part 2: Add a filter capacitor to the design from Part 1. Target less than, but close to 5% ripple
Note: our class eqns do not cover this design - you will need to make a modification
Simulate with your calculated capacitor
Simulate with the best "common component" capacitor available
Build your design and measure the input voltage and the rectified voltage ☐

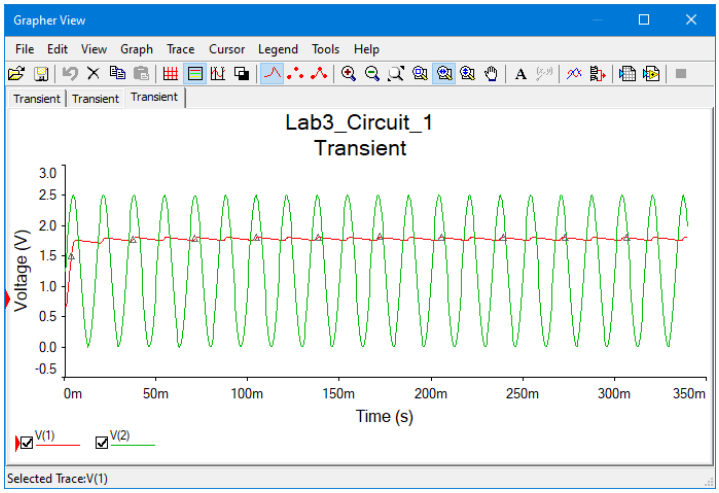
Part 3: Design a bridge rectifier circuit with <5% ripple using two 0 - 5V 60Hz sine waves (+/- 10v pk-pk) (replacing the transformer) and a 2KΩ load. Simulate, build, and test.
We need 2 signal generators because the AD2 signals are referenced to gnd ☐

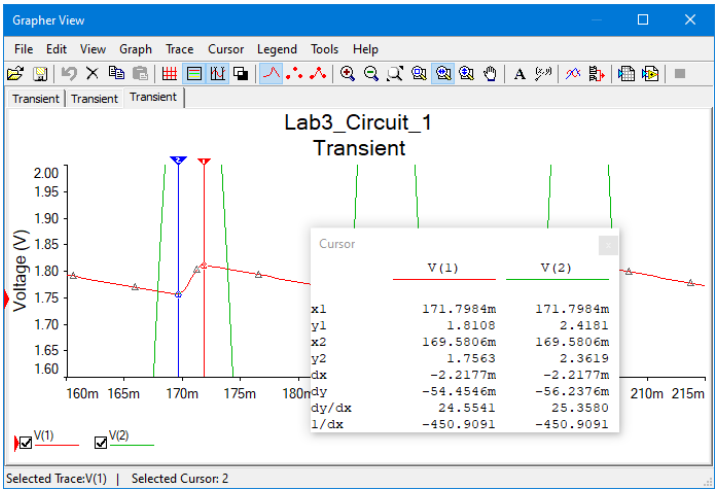
Check Off

- Demo and document part 1 20%
- Demo and document part 2 30%
- Demo and document part 3 50%

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

Example Part 2 Simulation Results
(different voltage, common cap)





Part 3 Schematic