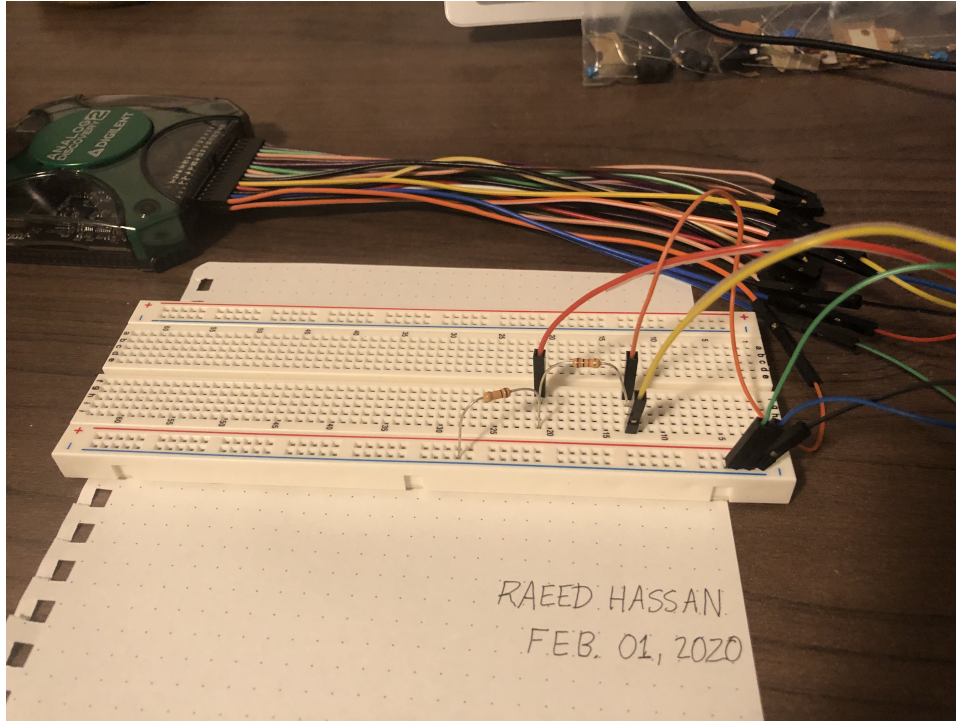# ELECENG 2EI5 Lab 1

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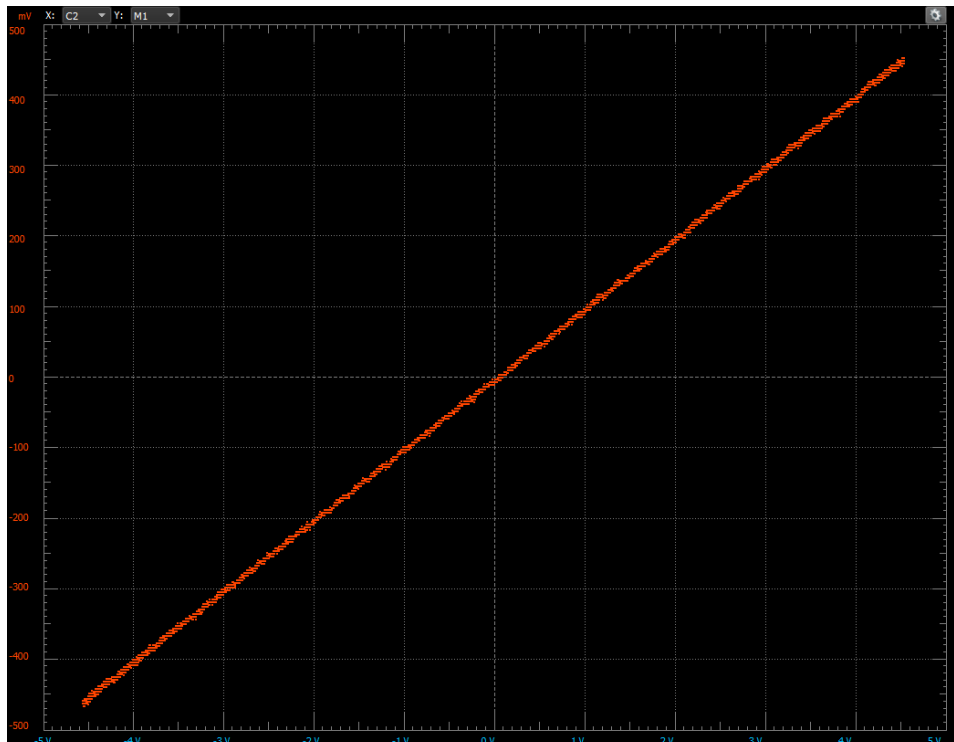
October 26, 2020

A The Mininmum

2. The resistor used is a 10k resistor. The black wire is ground. The yellow wire is E. The orange wire is V1. The red wire V2.

4. The horizontal axis is V2 (C2 on scope) and the vertical axis is V1-V2 (M1 on scope).

5.

$$V_2 = \frac{E_1 \cdot R_2}{R_1 + R_2}$$

$$E_1 = V_1$$

$$V_2 = \frac{V_1 \cdot R_2}{R_1 + R_2}$$

$$R_2 = \frac{V_2 \cdot R_1}{V_1 - V_2}$$

The slope of the plot with V_2 on the x-axis and $V_1 - V_2$ on the y-axis is $\frac{V_1 - V_2}{V_2}$. To determine R_2, we need calculate the inverse of the slope of the plot and multiply it by R_1. The slope of the plot is approximately 0.099, therefore the value of $R_2 = \frac{1}{0.099} \cdot R_1 = \frac{1}{0.099} \cdot 1000\Omega = 10133\Omega$. The resistor used had a value of 10000Ω with a tolerance of $\pm$ 5%. The resistance value calculated for the resistor used as R_2 is within the tolerance of the nominal resistance value of the resistor.

B   The Bulk

1. The horizontal axis is V2 and the vertical axis is V1-V2.
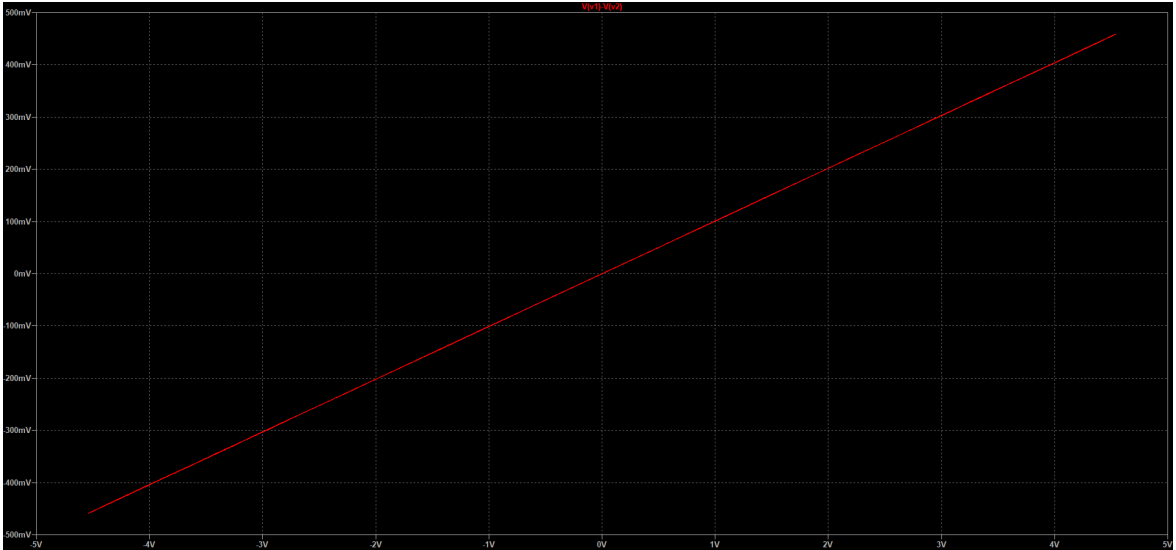
2. The experimental plot and the simulated plot follow same shape and have very similar values. Sources of error include resistances of wires, variation in resistance of resistors due to tolerances, internal resistance of voltmeter (an ideal voltmeter has infinite internal resistance), and the calibration of the Analog Discovery 2.

3. Replace R2 with other devices and report the iv-characteristics measured. Choose any three of the following:
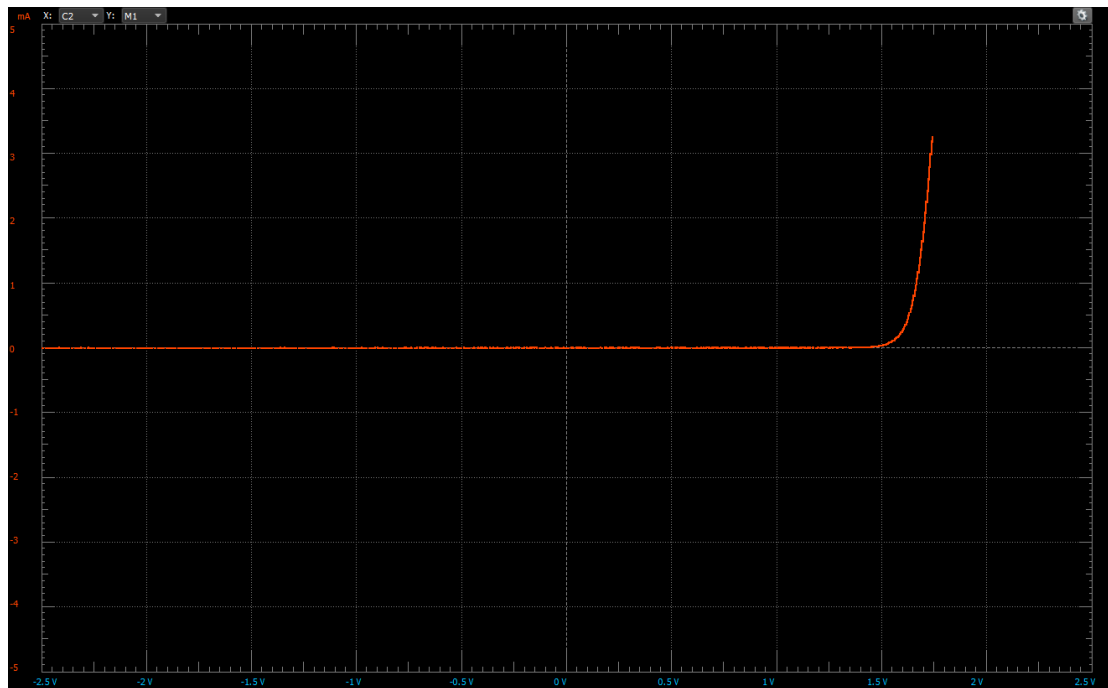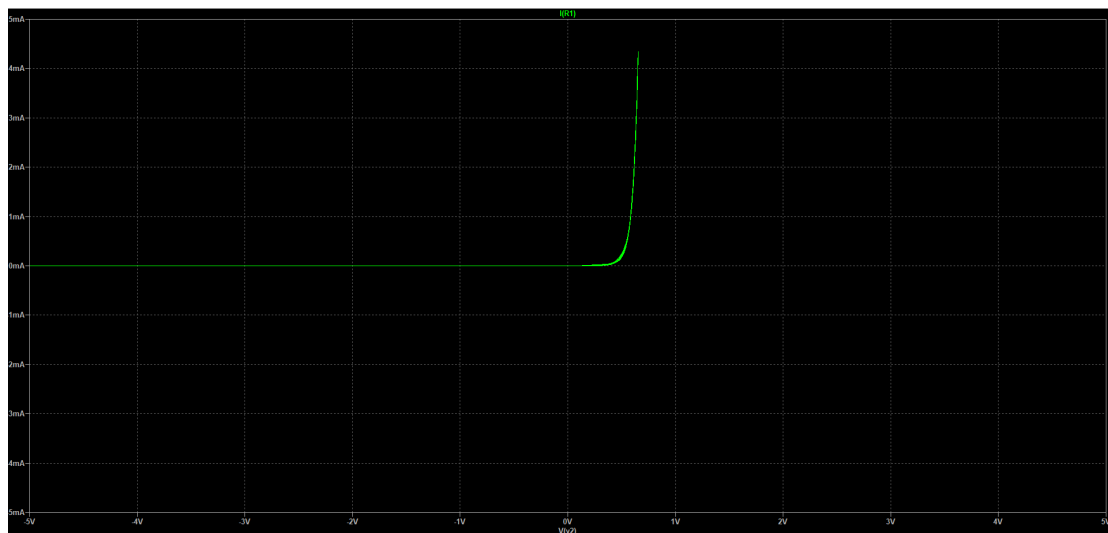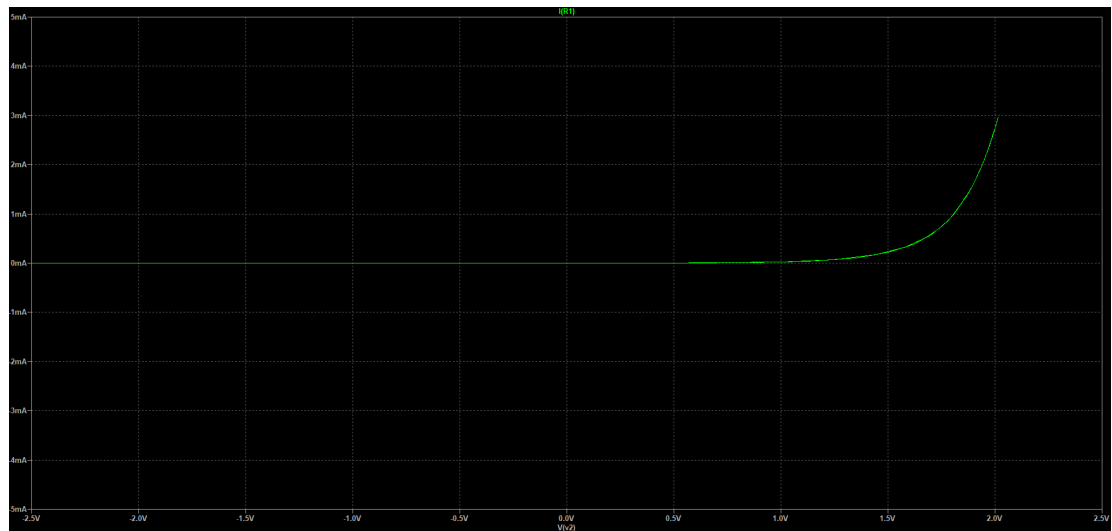
  (c) Capacitor
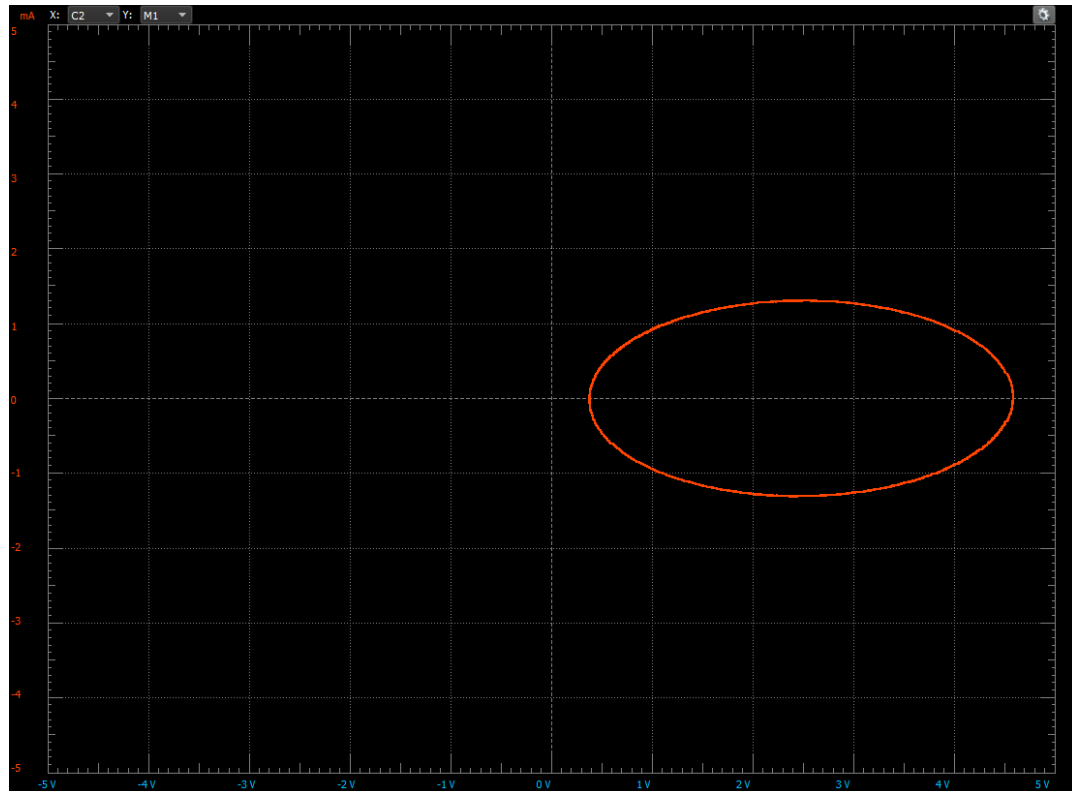
  (d) 1N4148
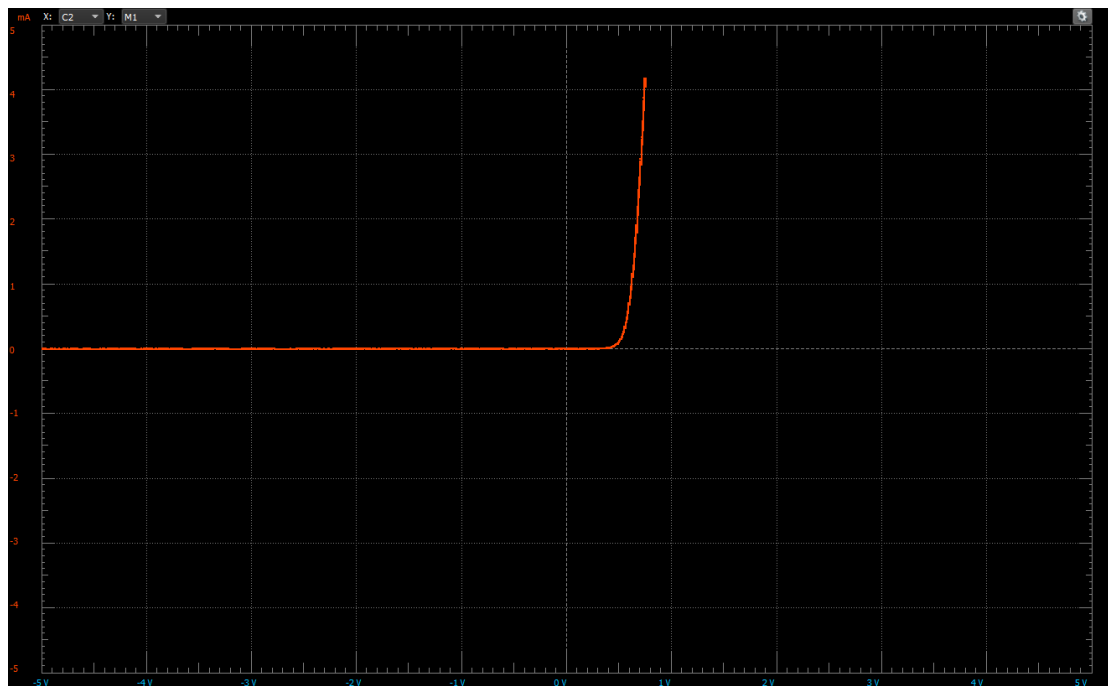
(f) LED

4. Simulate two of the measurements that you did for step 3 above (this cannot include option a).

(d) 1N4148

(f) LED

C The Max

A potential problem in measurement from R1 being too small is that it would act like a short circuit and draw too much current from the source, potentially affecting your measurements. A potential problem in measurement from R1 being too large is that it would act like a open circuit and not draw enough current from the source, potentially affecting your measurements.