ELEC 240
Lab 1 - Basic Electrical Measurements

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1 Objective

This lab focuses on the fundamental tools and skills for electrical engineering laboratory work. This includes making current, voltage, and resistance measurements with a digital multimeter, creating graphs in MATLAB, and producing and measuring sinusoids with an oscilloscope and function generator.

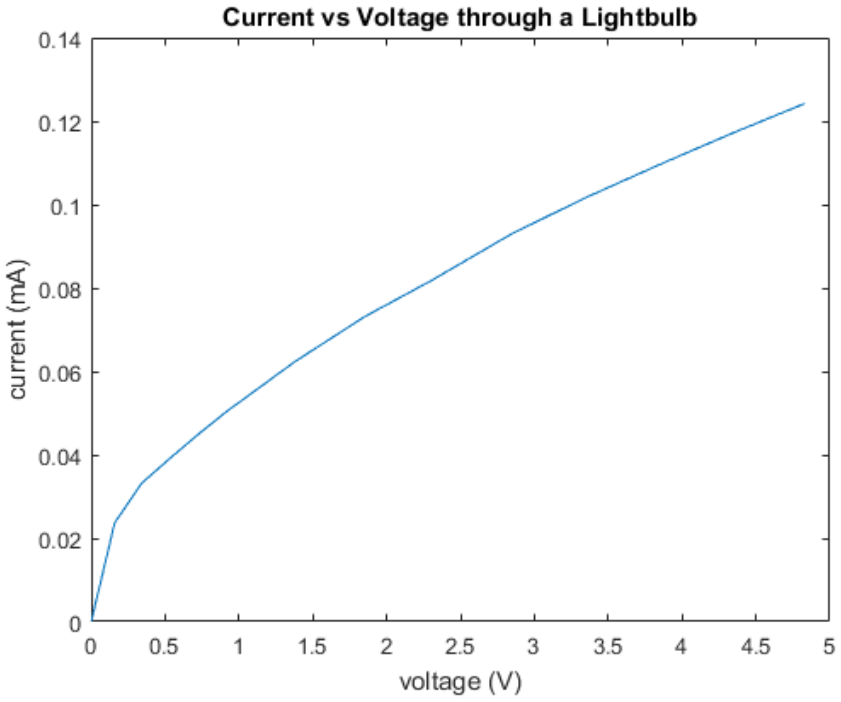
2 Materials

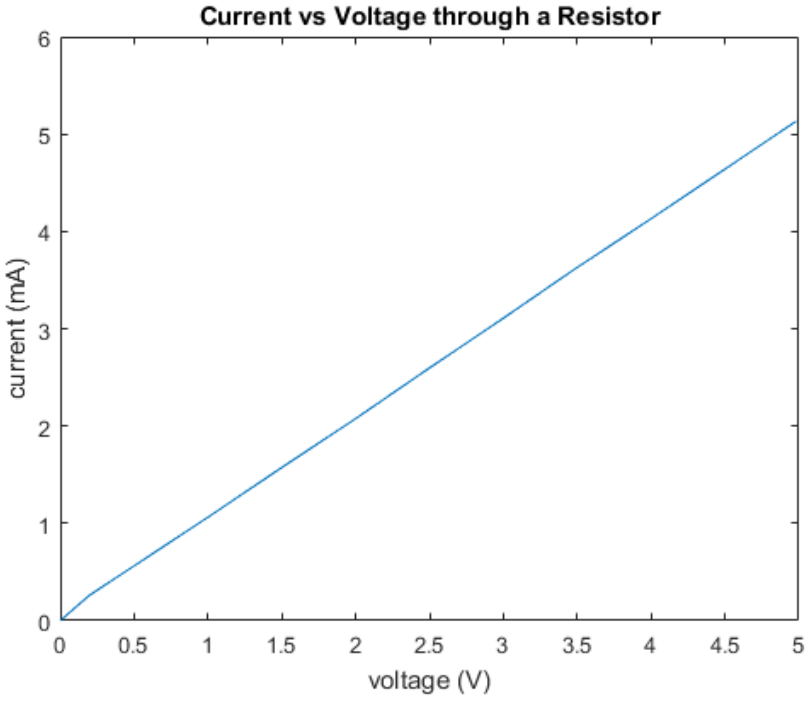
- Digital Multimeter (DMM)
- MATLAB
- Banana Plug Cords
- Battery Pack
- 2 AA batteries
- Lightbulb Socket Board
- 10 equal resistant (of any resistance)
- VirtualBench Software with Function Generator, Oscilloscope, and DC power supply
- BNC to Banana Plug Adapter

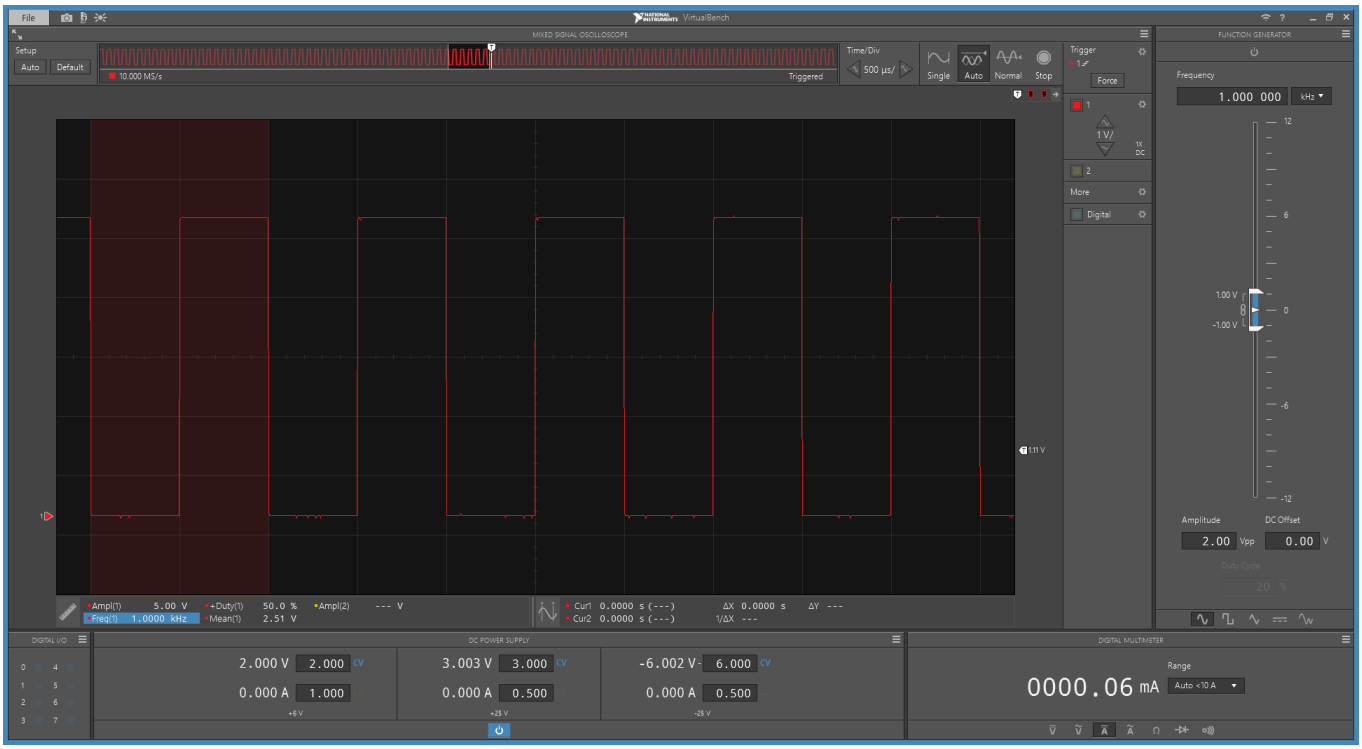
3 Test Description

1. **Measuring Voltage with the DMM** We measured the voltage of the battery alone and then the voltage of the lightbulb when connected in series with the battey.
2. **Measuring Current With DMM** We measured current of the circuit with the lightbulb by putting the DMM in series with the lightbulb.
3. **Measuring Resistance with the DMM** We measured the resistance of various individual resistors (ie 330, 430, and 220 Ohms) and then measured the consistency of 10 460 Ohm resistors.
4. **Measuring the I-V Characteristics of a Light Bulb** We connected the lightbulb to the DC power supply from the VirtualBench so we could vary the input voltage. We then took voltage and current measurements as we increased the voltage and noted the discrepancies between the Power Supply output readings and our own measurements of voltage and current.
5. **Viewing Signals with the Oscilloscope** We created a 1kHz sine wave with the function generator then observed this sine wave with the oscilloscope. We observed the effects of changing the Time/Div and other positioning controls.
6. **Making Quantitative Measurements with the Oscilloscope** We used the oscilloscope to measure the DC power supply, a sine wave, and a square wave. We took measurements of frequency and amplitude of the sine and square wave.

3.1 Pre-Lab Calculations and Schematics







4 Results and Discussion

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Note (To be deleted): The heart of your report is the presentation of your results and a discussion of those results. In your discussion, you should not only analyze your results, but also discuss the implications of those results.

5 References

1. https://www.ece.rice.edu/ dpr2/elec240/lab1/

6 Conclusion

7 Errors

Your text here

Note (To be deleted): Briefly list sources of error and discuss how to eliminate or deal with them