

# DE ANZA COLEGE – PHYSICS 4B LAB – FALL 2024

## Lab 2 – Ohmic Resistors

### TITLE

Demonstration of Ohm's Law

### OBJECTIVE

1. Learn how to use a DMM, and HP-DMM to measure DC Voltage and DC Current.
2. Calculate the resistance of two resistors graphically using the characteristic curve and compare with the expected value.

### THEORY

1. Ohm's Law relates the amount of current that can pass through a resistor as a function of Voltage in the form of:  
$$\Delta V = IR$$
2. If the relationship between  $I$  and  $\Delta V$  is constant then this resistor is considered a linear (ohmic) resistor. Otherwise, it's considered a non-ohmic resistor. In reality, even ohmic resistors become non-ohmic for high enough currents or voltages.

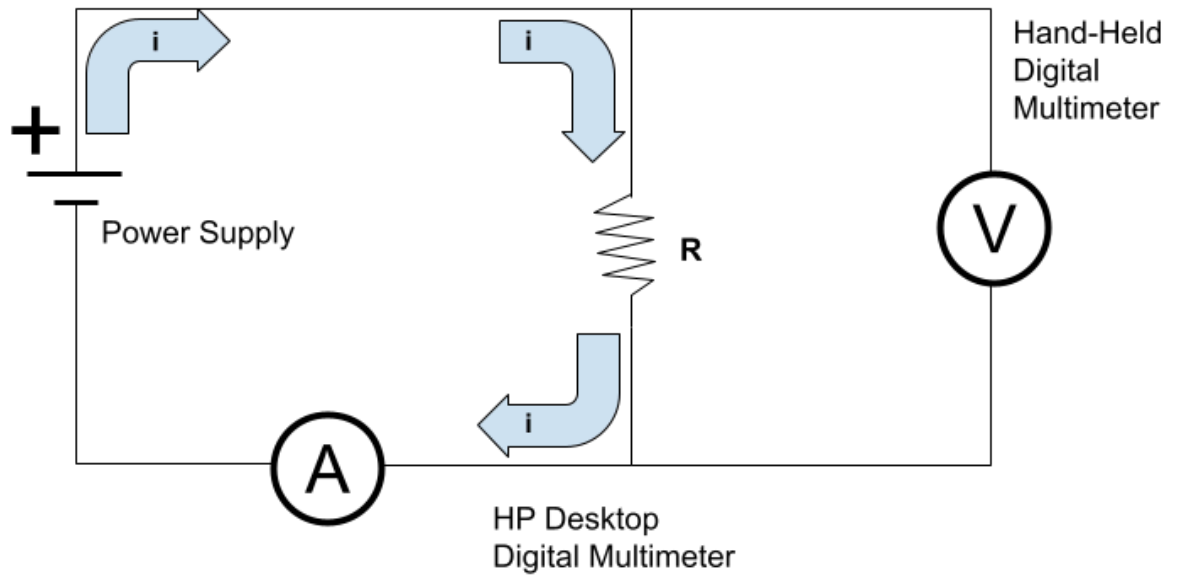
### APPARATUS

1. DMM (used as a voltmeter)
2. HP-DMM (used as an ammeter)
3. 2 different resistors,  $100\Omega$  and  $600\Omega$
4. 5 leads, alligator clips, 2 power cords
5. Power Supply

### PROCEDURE

1. Measure the resistance of each resistor using the DMM

2. Setup the following circuit



3. Using the first resistor at 100 Ohms, adjust the voltage of the power supply and for 10 different values of the  $V_{\text{out}}$  collect data points of  $V$  and  $I$  using the DMM and HP-DMM
4. Repeat the same procedure for the second resistor at 600 Ohms.
5. For both resistors, make a plot in Excel of  $V$  (y-axis) and  $I$  (x-axis)
6. Using a linear curve fit, calculate the slope of the curve
7. Compare the results from the calculation with the expected values.