

ECE 109L - EQUIVALENT CIRCUITS - LAB 19

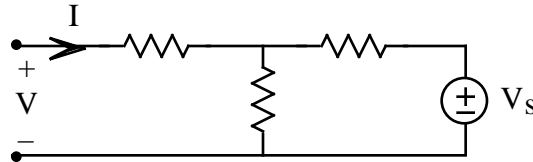
THEVENIN'S THEOREM - PART II

SUMMER 2007

A.P. FELZER

OBJECTIVE

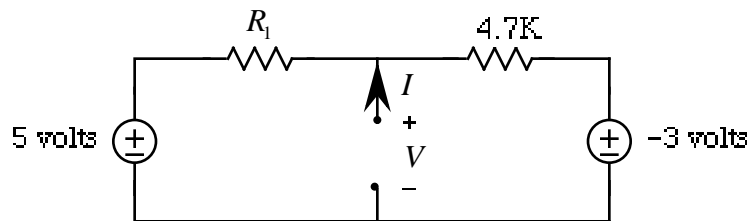
We know from last Lab that if a circuit contains resistors and sources as follows



then $V = aI + b$. The objective of this lab is to demonstrate that a is equal to the equivalent resistance of the circuit when all the independent sources are set to zero and b is equal to the open circuit voltage of the circuit.

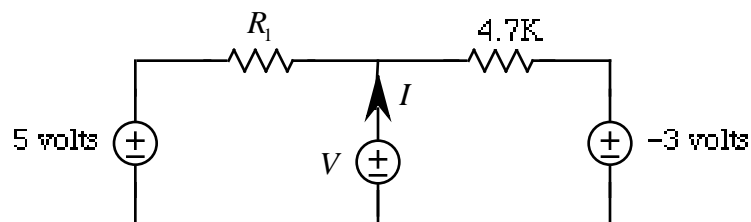
LAB

1. Given the following resistor circuit



PARTNER 1: $R_1 = 2K$ PARTNER 2: $R_1 = 10K$

- a. Measure your resistor values. Compare with nominal values
- b. Take enough data points to plot V as a function of I
- c. Plot your data points and then draw a line through them
- d. Find an equation for your line with V (in **volts**) and I (in **amps**) of the form $V = aI + b$. What are the corresponding values of a and b
- e. **PreLab** - Use node equations to calculate V as a function of I after a voltage source is added to our circuit as follows



- f. Compare your calculated values for a and b with those from your graph
- g. **PreLab** - Draw the circuit for measuring the open circuit voltage
- h. Measure the open circuit voltage
- i. Compare your measured value of the open circuit voltage with your value for b in part (d)
- j. **PreLab** - Draw the circuit for measuring the equivalent resistance of the circuit when all the sources are set to zero
- k. Measure the equivalent resistance of the circuit with all the sources set to zero
- l. Compare your measured value of the equivalent resistance when all the sources are set to zero with your value for a in part (d)