ECE 109L - EQUIVALENT CIRCUITS - LAB 18
THEVENIN'S THEOREM - PART I

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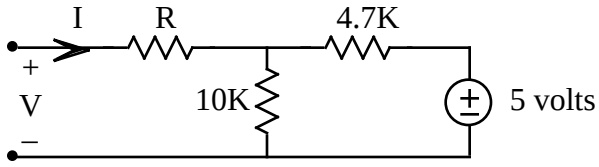
OBJECTIVE

In the last lab we found equivalent resistances of circuits containing just resistors. The objective of this lab is to take the first step towards finding equivalent circuits of resistor circuits containing not only resistors but also sources. The objective of this lab in particular is to find V as a function of I for such circuits.

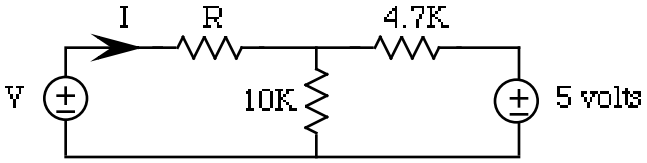
LAB

1. Given the following resistor circuit



PARTNER 1: R = 2K PARTNER 2: R = 4.7K

a. **Prelab** - Measure your resistor values. Compare with nominal values
b. **Prelab** - Connect a voltage source to the circuit as follows



and then make use of node equations to find V as a function of I. Note that this is exactly what we did in previous labs to find V as a function of I for all resistor circuits.
c. **Prelab** - Use Mathcad to obtain a graph of your function in part (b). Make your graph large enough to fill a page
d. **Prelab** - Describe your graph in part (c)
e. Connect a voltage source V to the above circuit and then measure I for a bunch of values of V. Be sure to include the point I = 0
f. Put your data points on your Mathcad graph
g. How good do your data points match the line
h. Describe your line - how does it differ from those of purely resistor circuits
i. Find the slope of your line and then make use of it to find write an equation for V as a function of I
j. Make use of your equation to predict I when V = -2.5 volts.
k. Measure I when V = -2.5 volts
l. Compare with your calculated value
m. Explain why only two data points are needed to find the equation for V as a function of I

2. Repeat parts (a)-(h) in Problem (1) for a circuit that you make up - including the **PreLab**