

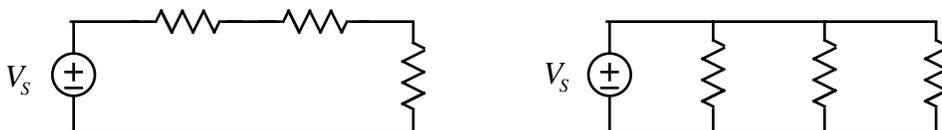
ECE 109L - TRANSFER FUNCTIONS - LAB 22 VOLTAGE AND CURRENT GAIN

FALL 2006

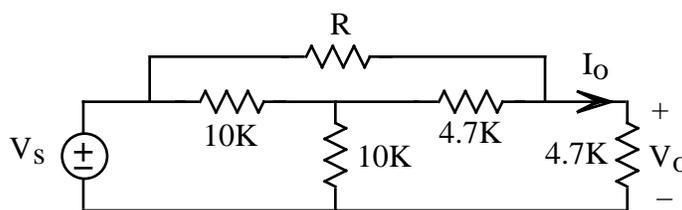
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OBJECTIVE

In the last four labs we found equivalent circuits of resistor circuits containing sources. We now return back to circuits containing just resistors. From Lab 12 we know that all the voltages and currents in series and parallel circuits like the following



are proportional to the source and so have gains G . The objective of this lab is to demonstrate that this result is true for all resistor circuits like the following circuit



PARTNER 1: $R = 4.7K$ PARTNER 2: $R = 10K$

LAB

1. Our objective in this problem is to verify and make use of the fact $V_o = G_1 V_s$ and $I_o = G_2 V_s$ for the general resistor circuit above
 - a. Measure your resistor values. Compare with the nominal values
 - b. Measure V_o and I_o for a number of different positive and negative values of V_s including $V_s = 0$
 - c. Make use of your data to make separate graphs of V_o as a function of V_s and I_o as a function of V_s
 - d. Draw the best lines you can through your data points and measure the slopes
 - e. Make use of your measured slopes to write an equations for V_o as a function of V_s and I_o as a function of V_s
 - f. **PreLab** - Make use of node equations to find the node voltages and then make use of the node voltages to find the gains $G_1 = V_o/V_s$ and $G_2 = I_o/V_s$
 - g. Compare your measured and calculated values of G_1 and G_2
 - h. Make use of your measured values of G_1 and G_2 to predict V_o and I_o when $V_s = 3.5$ volts
 - i. Measure V_o and I_o when $V_s = 3.5$ volts
 - j. Compare your measured and calculated values of V_o and I_o

2. Repeat Problem (1) for a circuit that you make up