

## Electrical Circuits LAB 2 – Ohm’s Law and Kirchhoff’s Laws

### Objectives

Understand and apply LTspice to analysis of electrical circuit which otherwise would required application of Ohm’s law and Kirchhoff’s laws..

### Preparation

Complete the following steps before starting to work on the experiments in this lab:

- 1) Complete Lab 1 and associated report
- 2) Read textbook, watch lecture videos, and complete homework in Chapter 2 “Basic Circuit Laws”
- 3) Review the video on dependent sources at <https://youtu.be/Xuldvwfjm4k> .

Summary of dependent sources:

e: Voltage Dependent Voltage Source – Set value to “Multiplier”

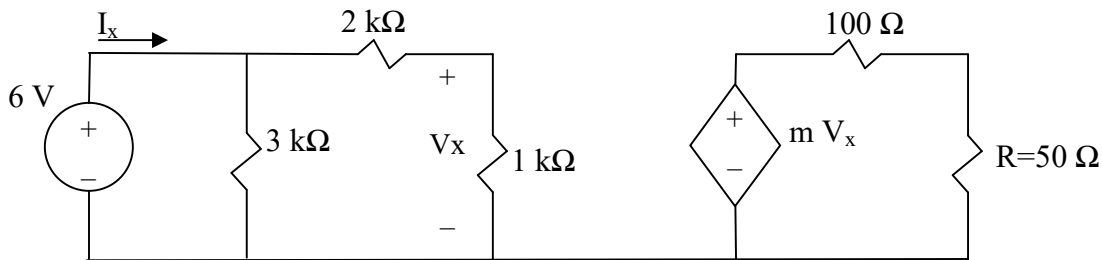
f: Current Dependent Current Source – Set value to “ControllingVsourceID Multiplier”

g: Voltage Dependent Current Source – Set value to “Multiplier”

h: Current Dependent Voltage Source – Set value to “ControllingVsourceID Multiplier”

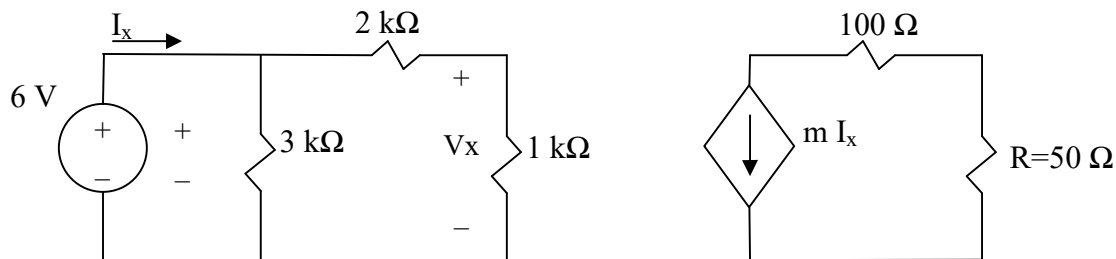
### Experiment 1

Build the following circuit using LTspice and determine the value of multiplier (m) that set voltage across R to  $2\text{ V} \pm 5\%$ .



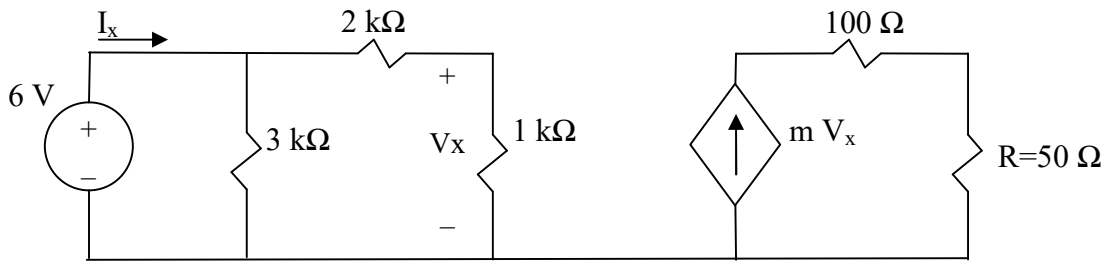
### Experiment 2

Build the following circuit using LTspice and determine the value of multiplier (m) that set voltage across R to  $2\text{ V} \pm 5\%$ .



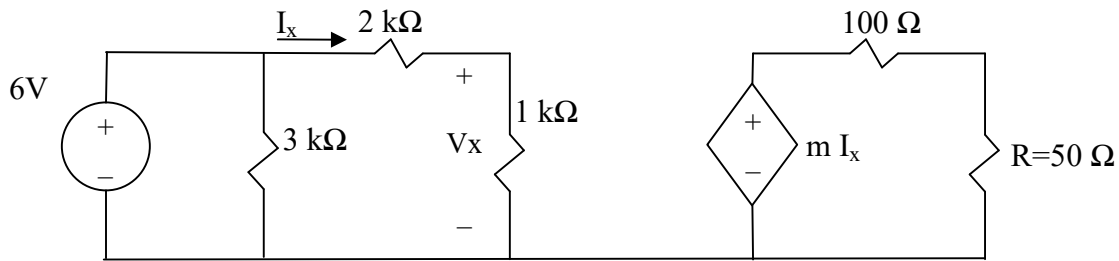
### Experiment 3

Build the following circuit using LTspice and determine the value of multiplier (m) that set voltage across R to  $2\text{ V} \pm 5\%$ .



**Experiment 4**

Build the following circuit using LTspice and determine the value of multiplier (m) that set voltage across R to  $2\text{ V} \pm 5\%$ .



Hint: Add a 0V voltage source in  $I_x$  branch and use it as the controlling source for the dependent source.

## **Report Requirements**

This lab and associated report must be completed individually. All reports must be computer printed (Formulas and Diagrams may be hand drawn) and at minimum:

### **For each experiment include:**

- Clear problem statement in your words.
- Answer to any specific experiment questions (if any)
- Identify the theory or process and associated calculations
- Documents resulting circuit schematics from LTspice, simulation output and additional tables, timing diagram or chart required by the experiment.

### **For the whole report include:**

- A Cover page with your name, class, lab and completion date.
- A Lessons Learned section which summarizes your learning from this lab in 5 sentences or more.
- A New Experiment section that has description of a new experiment and the experiment's results. Experiment should be related to material covered in class but not simply variation of the existing lab experiments.