Addis Ababa Institute of Technology

Fundamental of Circuit

LAB REPORT 1

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Experiment No 1:
Title: Introduction to Electric Circuits Simulation and Testing
Date 19/4/2016
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Introduction:

The first lab was about Electric Circuits Simulation and Testing software called “Mutism”.

The general of goal of the first lab is to learn the basic user interface of the software. Such as, the toolbars, Circuit Window and etc. The first task was to draw simple circuit using the software and measured the corresponding current and voltage for the circuit.

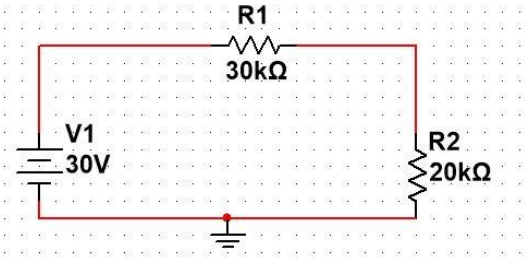


Fig_1

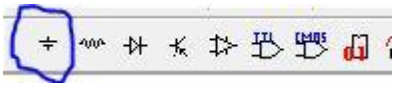
Pre-Lab preparation/Used Equipment:

Before starting the lab, one must be sure that the computer which is ready for the experiment has already installed the Multisim software

Procedure:

After making sure that the computer has a Multisim software. Let start drawing the simple circuit consists one voltage source, two resistor connected with series.

1. From components toolbar which contains Source button, Basic button, Diode button, Transistor button, select the source button and ”Select a component ” window will pop up



2. On the “Select a component” window there is a search text field

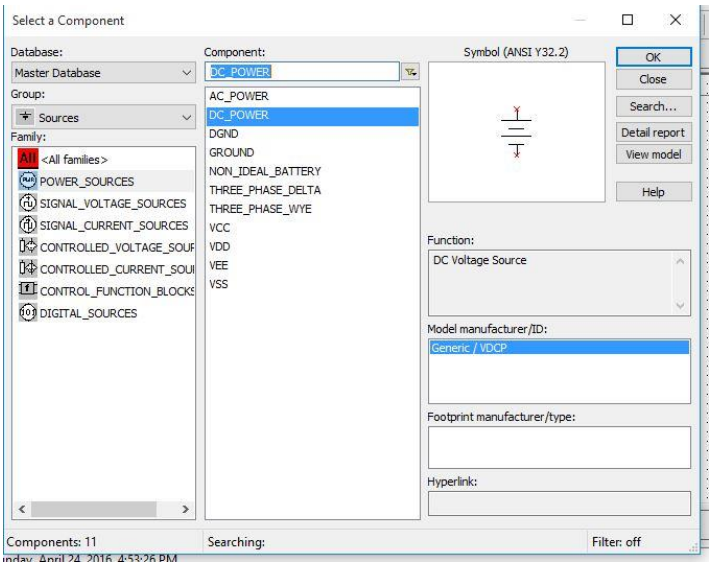


Fig_2

3. Type “DC power” for source voltage, “Resistor” for resistor, “DC current” for current
4. First search for “DC power” double click in it and the window show below shown up and se the value to 30

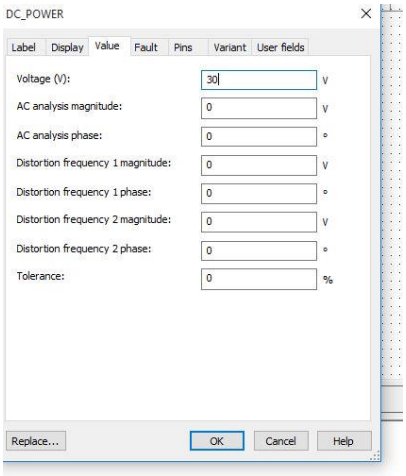


Fig_3

5. Using the same procedure for resistor and ground and connecting them with the red wire you can draw the circuit shown below

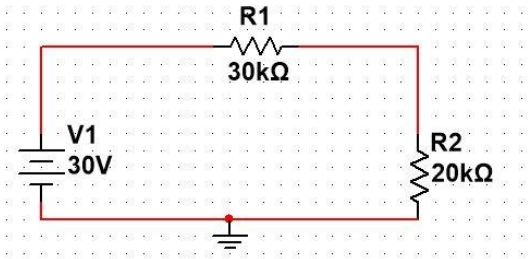


Fig_4

6. Then to measure the current and voltage across the circuit from instrument toolbar select “Multimeter” and connect it between R1 and R2 to measure the current. Connect the Multimeter with parallel to R1 to measure the voltage.

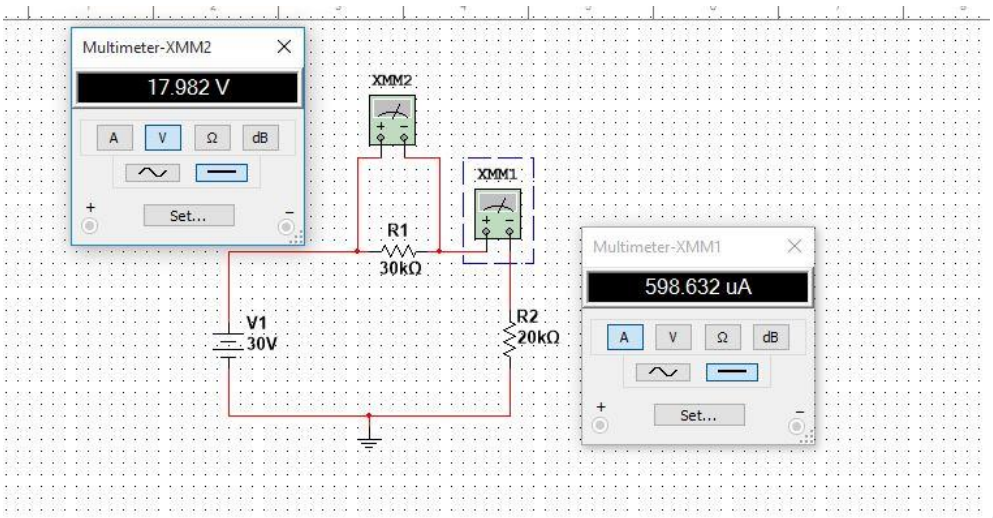


Fig_5

Exercise 1:

1. Build the circuit of Fig. 1 in NI Multisim 13.0.
2. Connect a voltmeter between nodes „a" and „b".
3. Connect an ammeter for the measurement of Ib0.

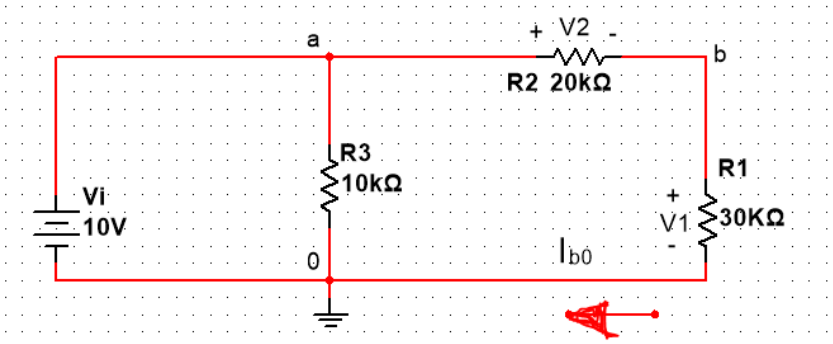


Fig_6

Procedure:

1. Following the step on the procedure 1 you can draw the circuit given above
2. Measurement
    a. To measure the current in I_{b0} put a Multimeter between the ground and R1.

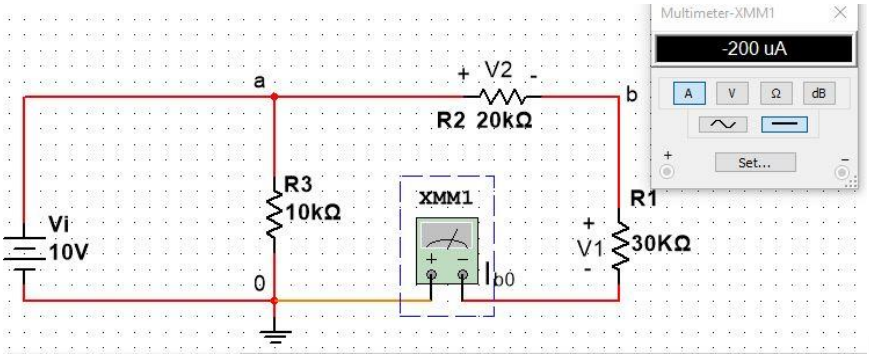


Fig_7

    b. To measure the voltage at R2 connect a Multimeter at node 'a' and node 'b'

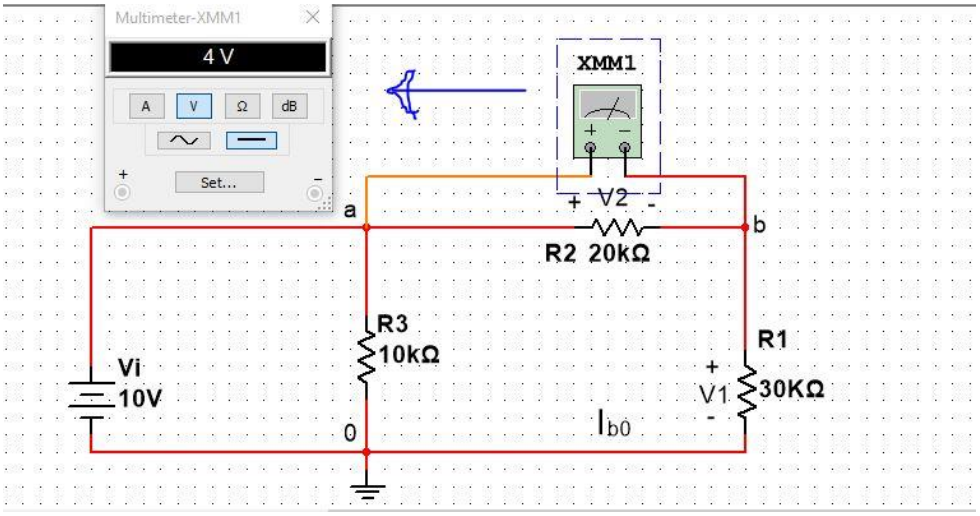


Fig_8

Analysis/Result:

In this section it's been looked that the comparison between the calculated values for the circuit and the actual measurements we got by using the Multimeter in series and in parallel with the different parts of the circuit have been summarized by Hand calculation and the table below

Calculation:

1. **Calculate I_{b0} x**

    From 0 – a – 0 loop

    -10v +R3(i3) = 0

    -10 + 10(i3) = 0

    I_3 = 1 mA

From a-b-0 loop

-10k(1mA) + 20k(Ib0) + 30k(Ib0) = 0

I_{b0} = 0.2A

2. **Calculate V_2**

   V_2 = R2*Ib0

   V_2 = 20K*0.2A

   V_2 = 4 V

	Ib0	V_2
Measured	-0.2A	4V
Calculated	0.2A	4V

Table_1

Conclusion:

As it can be inferred from the above tables, (table 1) most of the measured values are more or less close to their respective calculated values. However, the current is negative on the measured value but it can be taken as positive because it's only a matter of polarity. The current is positive when the direction changed.

Appendix I

V_2 = 4

I_{b0} = -0.2A