ELEC-2110

Electric Circuit Analysis

FROM: Jacob Howard
TO: Markus Kreitzer
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LAB SECTION: 002

Introduction to MultiSim: DC Analysis

Introduction

The Objective of Lab 1 was to learn the basic features of the MultiSim Circuit Builder program. MultiSim is a circuit simulation software tool. This tool is a great way to learn circuit education in a safe environment, providing a circuit simulation without expensive tools and preventing possible damage to equipment and to the user.

Exercise 1

In exercise 1, we were asked to use MultiSim to find V_0 and I_x in the circuit in Fig. 1 [1]. Figure 1 is below.

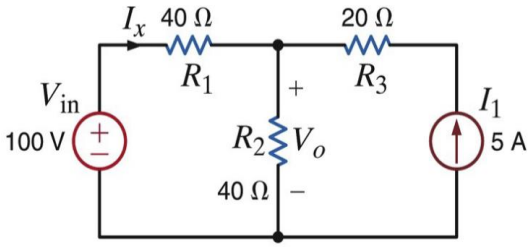

Figure 1

Figure 1 was used to construct a circuit in Multisim so we could use Multisim to calculate V_0(Unknown Volatage) and I_x (Unknown Current). The circuit constructed is below in figure 2.

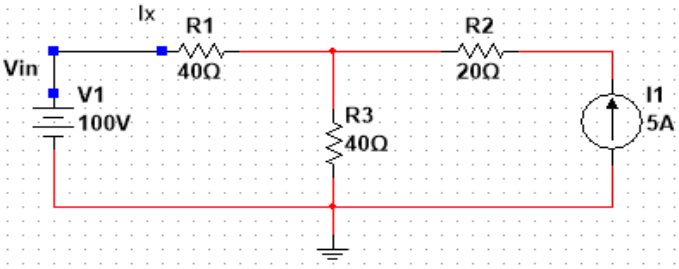

Figure 2

Using the circuit constructed in Multisim it was able to calculate V_0 and I_x. Found data is listed in Table 1 below.

V_0	150 V
I_x	-1.25A

Table 1

Exercise 2

In exercise 2, we were asked to use MultiSim to find V_0 and the power supplied by the 6-V source in Fig. 3. Figure 3 is included below [1].

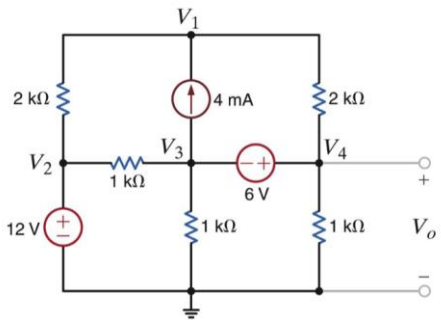

Figure 3

Using figure 3, a circuit was constructed in MultiSim so the software could be used to calculate V_0 and the power supplied by the 6-V source. Below, in figure 4, is the circuit constructed in MultiSim.

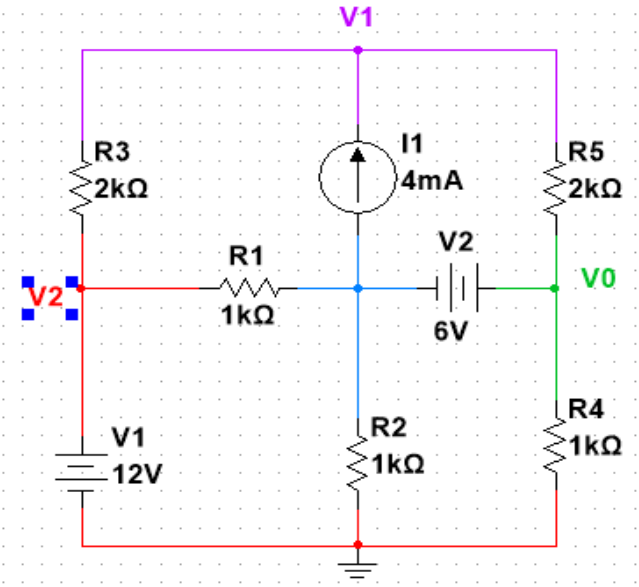

Figure 4

Using the circuit constructed in MultiSim from figure 4, The software was able to calculate V_0 and the power supplied by the 6-V source. The data collected is listed below in chart 2.

V_0	7.69231 V
6-V Source	27.69231 V

Table 2

Exercise 3

In exercise 3, we were asked to use the dc sweep feature of MultiSim to plot V_0 as the voltage V_{in} is varied between 50 V and 150 V in steps of 10 V in the circuit of Fig. 5. Figure 5 is listed below [1].

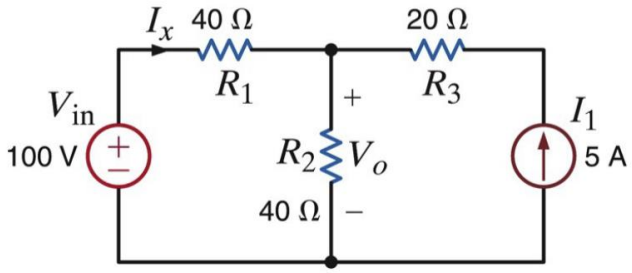

Figure 5

Using Figure 29 to construct the circuit and the dc sweep feature in MultiSim, MultiSim was able to show me a graph on how the voltage and the current varies. The circuit constructed in figure 6and the graphs in figure 7 and 8 are below.

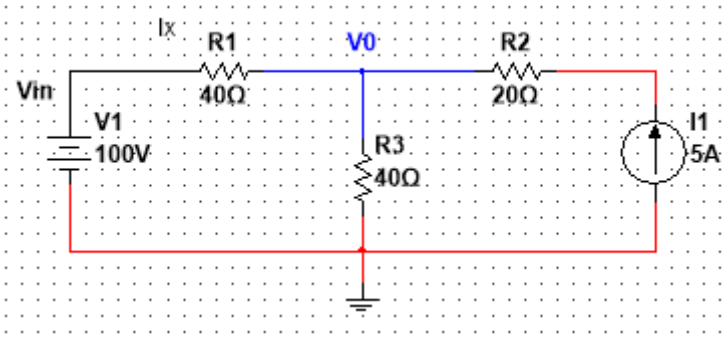

Figure 6

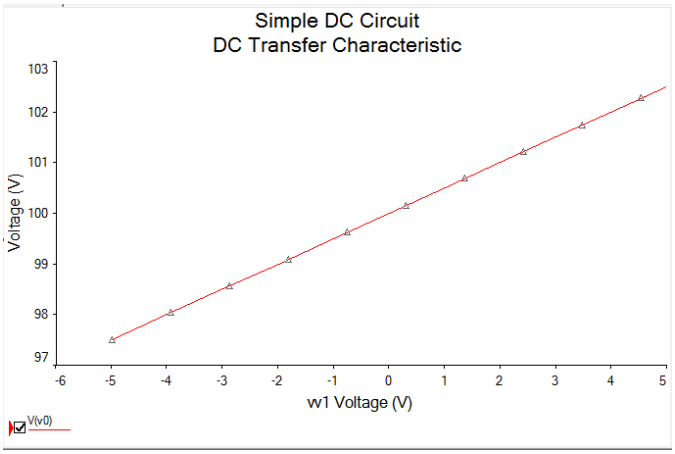

Figure 7 (Voltage Vary Graph)

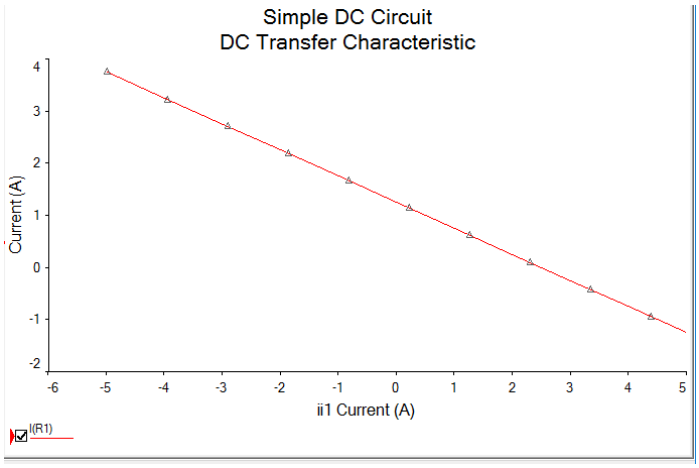

Figure 8 (Current Vary Graph)

Exercise 4

In exercise four, we were asked to use Figure 9 and MultiSim to solve for the voltage V_0 as R_b varies from 250 Ω to 3 kΩ in increments of 25 Ω. Also solve for the power dissipated in R_b (P_0) for each value of resistance. Figure 9 is below [1].

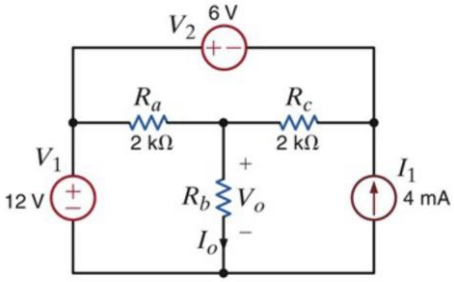

Figure 9

Using Figure 9 to construct a circuit, MultiSim was used to display a graph for the voltage V_0 as R_b varies from 250 Ω. The circuit constructed from figure 9 is shown below. The graphing data received from Multisim is also shown below in figure 11 to display V_0 as R_b varies and P_0 for each value of resistance.

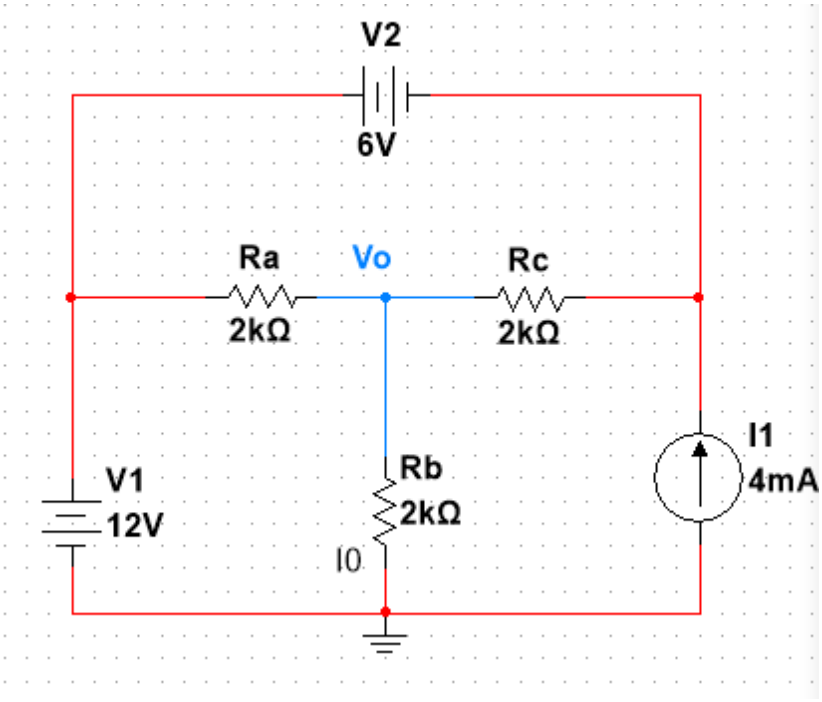

Figure 10

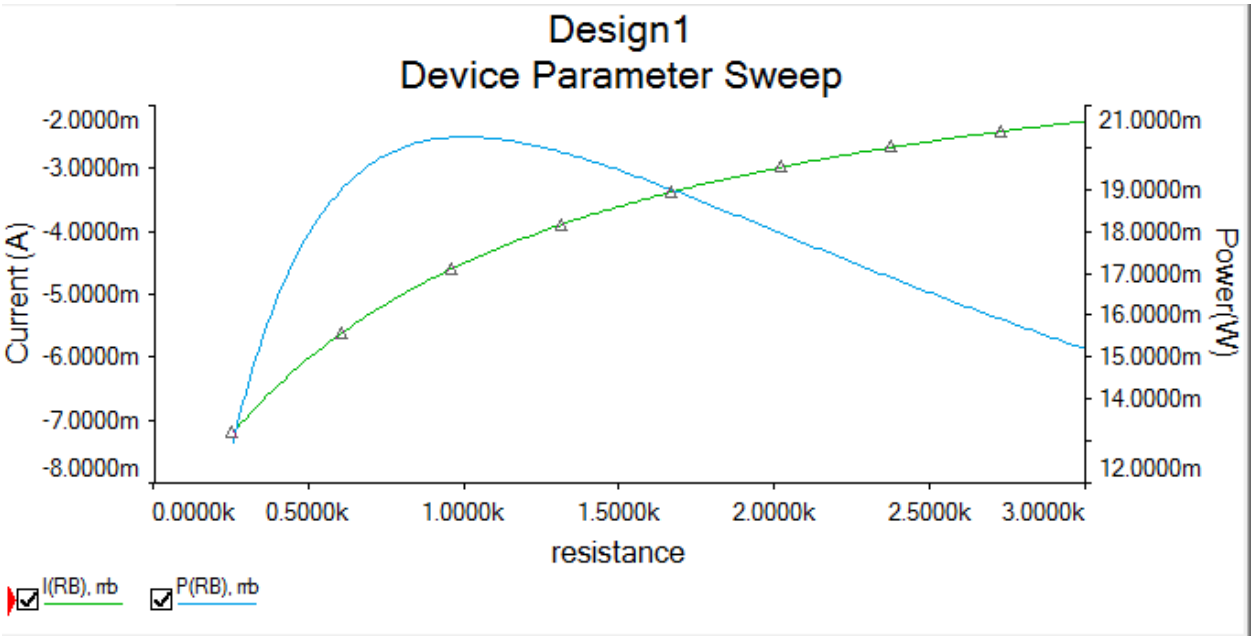

Figure 11

(Voltage V_0 as R_b Varries Graph Green)

(Power P_0 for each value of resistance Blue)

Exercise 5

In exercise five, we were asked to Determine I_0 in the circuit in Fig. 12 using MultiSim. Figure 13 is shown below [1].

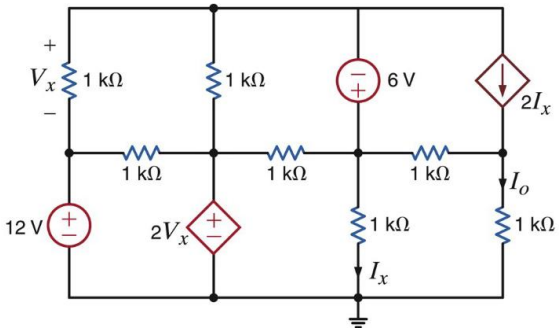

Figure 12

Using MutliSims online tool, a circuit was constructed to find I_0. The circuit constructed is show below in figure 13 along with I_0 in Table 3.

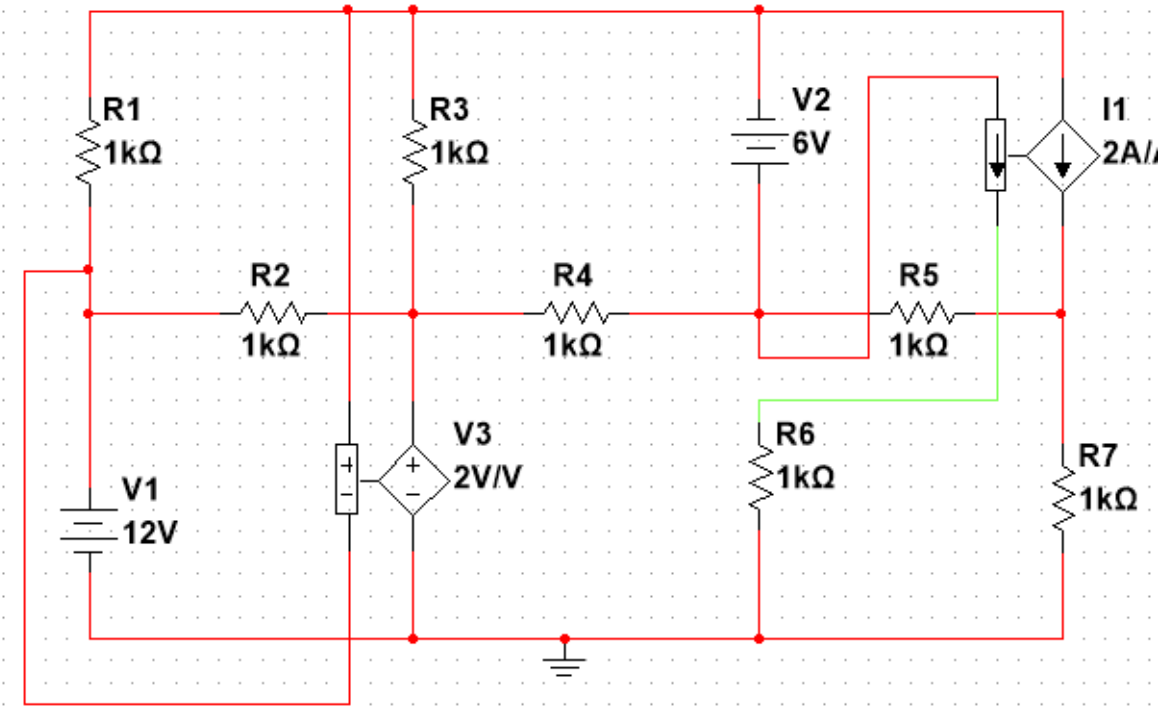

Figure 13

I_0	-48mA

Table 3

Conclusion

This lab was used as an introduction on how to use MultiSim. The lab went step by step to show us how to build and simulate a circuit and showed how useful and powerful MultiSim can be. We were able to learned the basics of MultiSim and how to construct circuits, along with displaying certain data, but I did run into some problems. In one instance, I received an incorrect answer. The TA and some fellow students were very helpful at correcting my errors. Overall, this lab was a good way to introduce everyone on the basics of MultiSim and how to use it.

Bibliogrophy

[1] Markus Kreitzer Suraj Sindia Elizabeth Devore Bei Zhang. “EXPERIMENT 1 Introduction to Multisim”. Updated In: (January 2020)

url:ftp://ftp.eng.auburn.edu/pub/irwinjd/lab_manuals/Lab%201_Multisim_Introduction%20and%20DC%20Analysis.pdf.