EXPERIMENT 5
Recitation & MultiSim: Thevenin's and Norton's Theorems

R. Mark Nelms
Revised by Elizabeth Devore
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The objectives of this experiment are to:

- Learn how to determine the Thevenin and Norton equivalent circuits for a given circuit

You will work with your lab instructor to solve problems related to Thevenin's and Norton's theorems. It is recommended that you read the sections in your textbook related Thevenin's and Norton's Theorem.

Exercises

For all exercises, be sure to include in your report all hand calculations, simulation schematics, and simulation results (all circuit diagrams with all variables clearly labeled).

1) Use Thevenin's theorem to find V_0 in the circuit shown in Figure 1. Use MultiSim to verify your answer. Include in your report a screenshot of the schematic with V_0 displayed on that schematic.

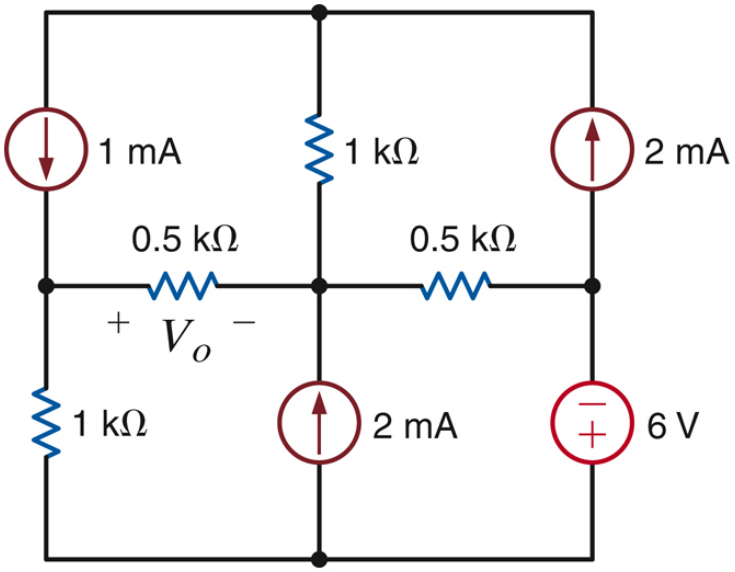

Figure 1: Circuit for Exercise 1

2) For the circuit in Figure 2, find R_L for maximum power transfer and the maximum power that can be transferred to R_L (P_{max}). Use MultiSim to verify your answer, and include in your report a screenshot of the MultiSim schematic and the plot P vs. R_L (use the plot's cursor function to locate the value of P_{max} and R_L at P_{max}). If necessary, review Experiment 1's lab manual for instructions on performing parameter sweeps in MultiSim.

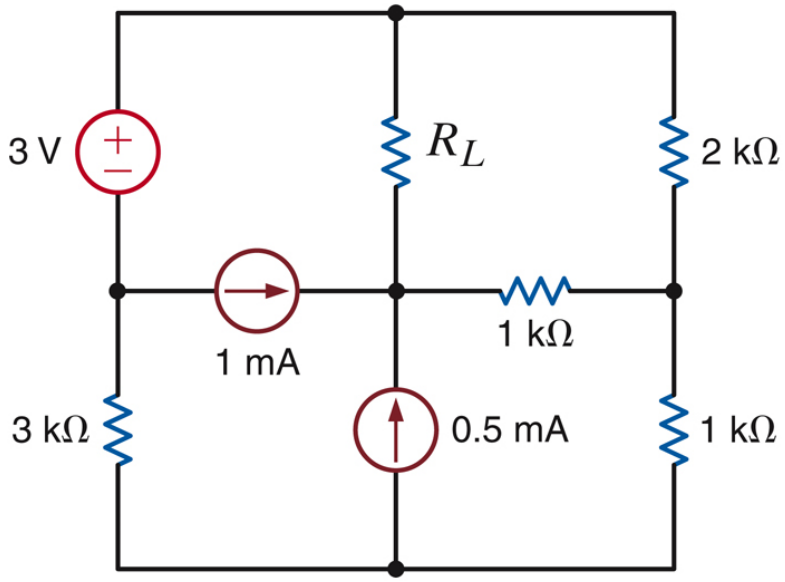

Figure 2: Circuit for Exercise 2

3) Use Thevenin's theorem to find Vx in the circuit shown in Figure 3. Use MultiSim to verify your answer. Include in your report a screenshot of the schematic with Vx displayed on that schematic.

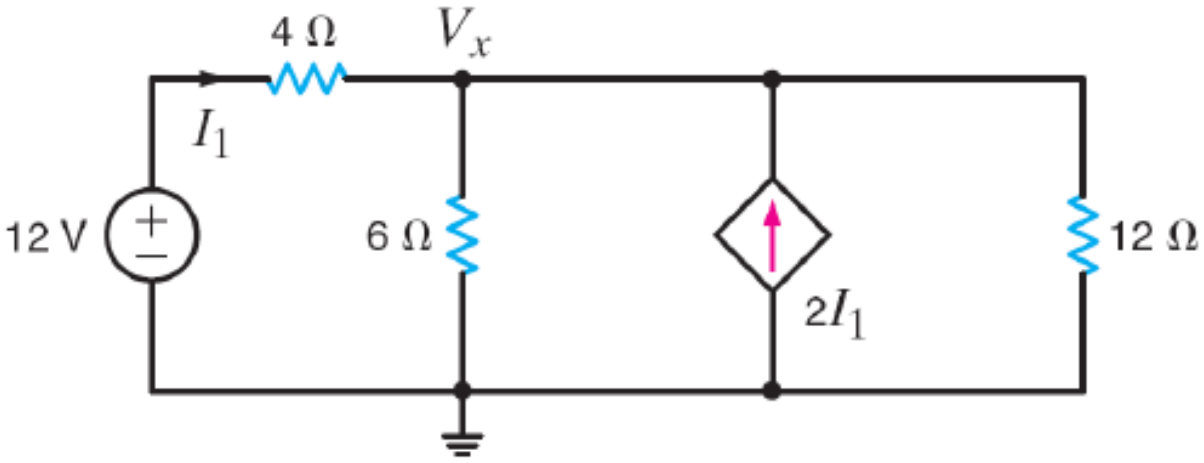

Figure 3: Circuit for Exercise 3

4) Find the Thevenin equivalent circuit between nodes A & B for the circuit shown in Figure 4. Build the circuit in MultiSim and use its ohmmeter (choose the "Multimeter" tool and set it to measure resistance) to verify the Thevenin equivalent resistance between A & B.

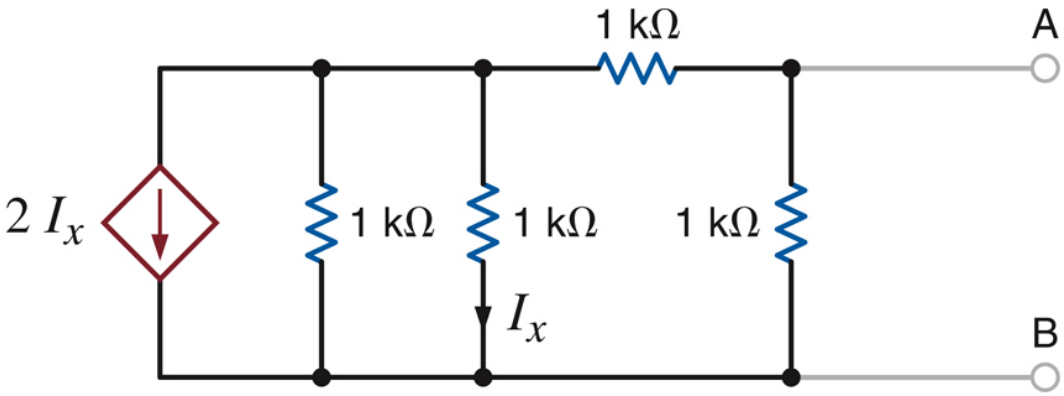

Figure 4: Circuit for Exercise 4

5) For the circuit in Figure 5, find R_L for maximum power transfer and the maximum power that can be transferred to R_L (P_{max}). Use MultiSim to verify your answer, and include in your report a screenshot of the MultiSim schematic and the plot P vs. R_L (use the plot's cursor function to locate the value of P_{max} and R_L at P_{max}). If necessary, review Experiment 1's lab manual for instructions on performing parameter sweeps in MultiSim.

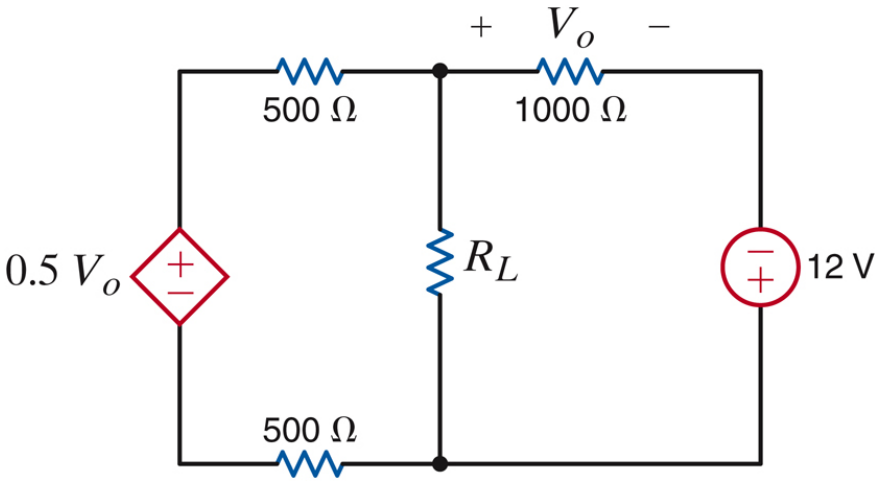

Figure 5: Circuit for Exercise 5