EGR 271 Due date: [See Due Dates Table](file:///E:\Courses\EGR271\PSPICE%20Assignments\DueDates.pdf)

Circuit Theory I

File: N271PS2

**PSPICE Assignment #2**

**Reference**: (also see the course web site)

***Sample PSPICE Report***

***PSPICE Lecture #2*** (DC Sweep Analysis and Graphing)

PSPICE Example: ***DC Circuit - Using voltage and current printers*** (File: DCPrint.opj)

PSPICE Example: ***Analyzing Circuits with Dependent Sources*** (File: DependentSources.opj)

**Assignment**:

1. **Using a DC Sweep analysis to analyze a circuit**: Problem 4.46a in Electric Circuits, 9E, by Nilsson
2. Analyze the circuit by hand (find VΔ and iΔ only).
3. Analyze the circuit using PSPICE as follows:
   * Use a **DC Sweep analysis** to find the quantities found in part A above.
   * Include a voltage printer and a current printer to measure the quantities specified.
   * Do not use a Bias Point analysis or show any Bias Point values on the schematic.
   * Be sure to add text to the schematic as indicated in the Sample Report.
   * Clearly box and label the required values in the .OUT file and include it in the report.
4. Print the schematic and the .OUT file. Include a table comparing hand values and PSPICE values. They should agree! Also include a brief discussion of the results.

2. **Using a DC Sweep analysis to generate a table of values in the .OUT file**: See Circuit 2 below:

1. Let R1 through R6 equivalent to the digits 1 through 6 in your StudentID in kΩ (use 10 kΩ for a digit of 0).
2. For example, if your StudentID is 9870654 then R1 =9 kΩ, R2 =8 kΩ, R3 = 7kΩ, R4 = 10kΩ, R5 = 6 kΩ and R6 = 4kΩ
3. Analyze Circuit 2 by hand to determine
4. The current through R5
5. The voltage across R2
6. Analyze Circuit 2 using PSPICE as follows:
7. Use a **DC Sweep analysis** to find the quantities listed in part A above. Let the voltage source vary from 0 to 50V in increments of 5V.
8. The .OUT file should contain two tables of values. One table will show the voltage across R2 as the source voltage varies. The line in the table where the source voltage is 25V should match your voltage calculation from part A (highlight this line when you print it.) Similarly, the second table will show the current through R6 as the source voltage varies. The line in the table where the source voltage is 25V should match your current calculation from part A (highlight this line when you print it.)
9. Do not use a Bias Point analysis or show any Bias Point values on the schematic.
10. Be sure to add text to the schematic as indicated in the Sample Report.
11. Print the schematic and the .OUT file. Include a table comparing hand values and PSPICE values from the .OUT file when the source voltage is 25V. Also include a brief discussion of the results.

R5

R1

R3

R4

R6

R2

25V

I5

+

V2

\_

Circuit 2

3. **Using a DC Sweep analysis to graph currents and voltages**

1. Let R1 through R4 equivalent to the digits 1 through 4 in your StudentID in kΩ (use 10 kΩ for a digit of 0).
2. For example, if your StudentID is 9870654 then R1 =9 kΩ, R2 =8 kΩ, R3 = 7kΩ and R4 = 10kΩ
3. Analyze Circuit 3 by hand to determine
4. The currents through R2 and R4
5. The voltages across R1 and R3
6. Analyze Circuit 3 using PSPICE as follows:
7. Use a **DC Sweep analysis** and let the voltage Vx vary from 0 to 100V in increments of 2V.
8. Note that current and voltage printers are not required since the results will only be graphed.
9. Be sure to add text to the schematic as indicated in the Sample Report.
10. Do not use a Bias Point analysis or show any Bias Point values on the schematic.
11. Be sure to label all of the nodes.
12. Create a graph showing the currents through R2 and R4 (if they are negative, you will need to rotate the resistors by 180 degrees). The voltage Vx should be on the x-axis. Turn on a cursor in and place it as close as possible to where Vx = 50V on I(R2). Mark this point. Move the cursor to the waveform for I(R4) and similarly mark the point where Vx = 50V. These points should match your results from part A. Be sure to add text to each graph (name, course, problem number, and purpose).
13. Create a second graph showing the voltages across R1 and R3. Note that the voltage V1 will be referred to as V(A,B) as PSPICE only uses node voltages. Similarly mark points on each curve where Vx = 50V. Again add text as required for all graphs.
14. Print the schematic and both of the graphs. Include a table comparing all hand values with all PSPICE values marked on the graphs when the source voltage is 50V. Also include a brief discussion of the results.



Circuit 3