**Experiment 09**: Nodal Voltages and Circuit Simulation with LTspice

(Edit this document as needed)

Partner 1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Partner 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Part C*

Identify the nodes in the following circuit



*Part D*

Screenshot of the circuit with the nodes labelled.

Voltages across the parallel resistors determined using simulation results.

|  |  |
| --- | --- |
| VRparallel-simulation | [V] |

Measured results from experiment 6

|  |  |
| --- | --- |
| VRparallel-measured | [V] |

Are the simulation and measured results comparable?

Voltages across the series resistors calculated using simulation results.

|  |  |
| --- | --- |
| VRseries-simulation | [V] |

Measured results from experiment 6

|  |  |
| --- | --- |
| VRseries-measured | [V] |

Are the simulation and measured results comparable?

Application of the voltage divider equation to determine the voltages across R1 and R2.

|  |  |
| --- | --- |
| VR1 | [V] |
| VR2 | [V] |

Total series voltage for a range of source voltages

|  |  |
| --- | --- |
| VS | VRseries-simulation |
| 1V | [V] |
| 2V | [V] |
| 3V | [V] |
| 4V | [V] |
| 5V | [V] |

Plot of the total series voltage vs. the source voltage.

How would you describe the shape of the plot. (This concept we will see repeatedly throughout our coursework.)

Voltages across the series resistors calculated using simulation results when moving the ground node.

|  |  |
| --- | --- |
| VRseries-simulation | [V] |

Did the ground node affect the voltage across the total series resistance?

*Part E*

Use concepts developed previously to derive the expression for nodal voltage VA in terms of V1.

Use concepts developed previously to derive the expression for nodal voltage VB in terms of VA.

When V1 = 5V, determine VA and VB using LTspice.

|  |  |
| --- | --- |
| VA | [V] |
| VB | [V] |

Are the results consistent with the calculated values?

Solve the pair of equations and verify that you get the same results seen above.

Due: February. 17th, 2022 at 11:59 pm eastern on Gradescope

One student submits on Gradescope and adds their partner using “add group members” option on Gradescope.