ENGR 065 Circuit Theory

Laboratory 3

Series and Parallel Circuits and Node Voltages

Objectives

- Analyze series and parallel circuits
- Study and verify node-voltage methods
- KVL verification for a more complicated circuit

Equipment and components

- A computer
- Matlab software

Preliminary

1. Refer to Chapters 3 and 4 of the textbook if necessary.
2. Complete the theoretical calculations related to this lab.

Procedure

1. Open Matlab
2. Create the Simulink model of the circuit shown below by following the procedure in Lab 1
3. Fill up your simulation results in the following table. Please note that V_X is the voltage across the point X and ground and I_{R_x} is the current flowing through R_x.

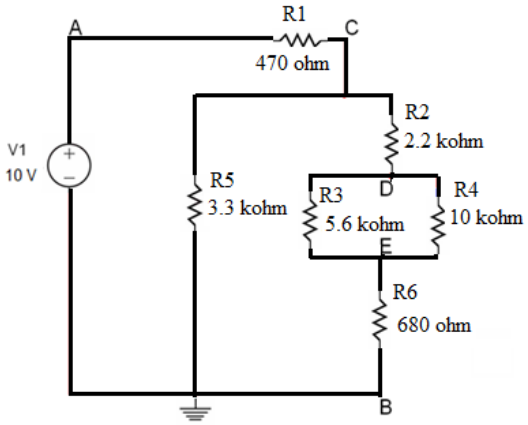


Table 1 Currents Flowing Through Each Resistor

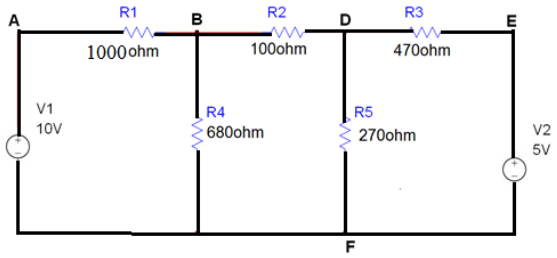
	Theoretical Results	Simulation Results
I_{R1}		
I_{R2}		
I_{R3}		
I_{R4}		
I_{R5}		
I_{R6}		

Table 2 Node Voltages at Each Node

	Theoretical Results	Simulation Results
V_A		
V_B		
V_C		
V_D		
V_E		

- If R_1 is removed from the circuit, what would be the value of V_D? Explain.
- If R_6 is removed from the circuit, what would be the value of V_D? Explain.
- If R_5 is removed from the circuit, would the current in R_1increase or decrease?

4. Create the Simulink model of the circuit shown below to verify KVL.



5. Fill up the simulation results and check each closed loop (6 in total) to show that the KVL holds true.

Table 3 Voltages across Each Resistor

Symbol	Simulation Results
V_{AB}	
V_{BD}	
V_{DE}	
V_{EF}	
V_{AF}	
V_{BF}	
V_{DF}	

Questions and conclusions

- Summarize your findings and explanations in response to the questions posed in this lab.