

Laboratory 5

Superposition

Objectives

- Study and verify the principle of superposition.

Equipment and components

- A computer
- Matlab software

Preliminary

1. Read section 4.13 of the textbook.
2. Compute the theoretical calculations related to this lab and fill in the tables.

Procedure

1. The purpose of this lab is to verify the superposition principle by using the following circuits (Problems 4.92 and 4.98 in Assignment 3).
2. Open Matlab and create Simulink model of the circuit. Measure the voltage across the $10\ \Omega$ resistor.
3. Fill up your simulation results in Table 1.

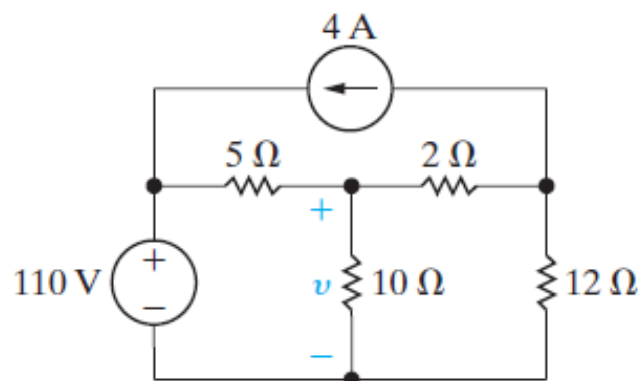


Table 1

	Theoretical Results (v)	Simulation Results (v)
Both sources are in place		
110 V voltage source is in place		
4 A current source is in place		

What did you find?

4. Add a diode in the circuit as shown below and create its Simulink model in Matlab. Measure the voltage across the diode and 10 Ω resistor.
5. Fill up your results in Table 2.

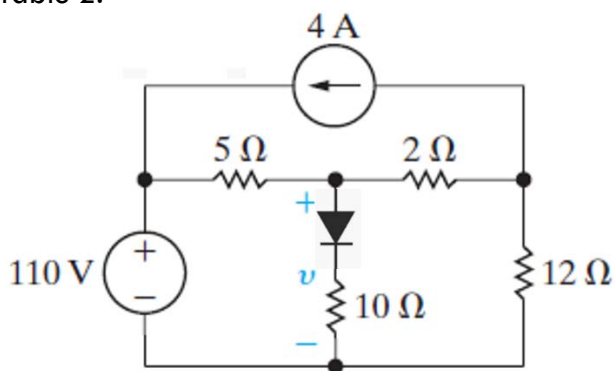


Table 2

	Simulation Results (v)
Both sources are in place	
110 V voltage source is in place	
4 A current source is in place	

What did you find? Does the superposition principle still hold for the circuit? Why? Please search the website to know about diodes.

6. Create the Simulink model for the following circuit. Learn how to add dependent sources in the Simulink model. Measure the voltage across the 20 k Ω resistor.
7. Fill up Table 3.

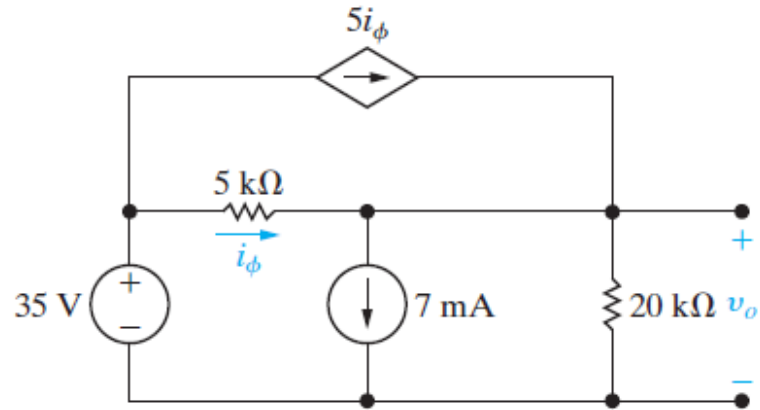


Table 3

	Theoretical Results (v)	Simulation Results (v)
Both sources are in place		
110 V voltage source is in place		
4 A current source is in place		

What did you find?

Questions and conclusions

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