Eastern Mediterranean University
"For Your International Career"

Department of Electrical and Electronic Engineering

INFE 221

Electrical Circuits

Forth Lab Session

The principle of linear in Resistive Circuits

Student Name	*Student Number*
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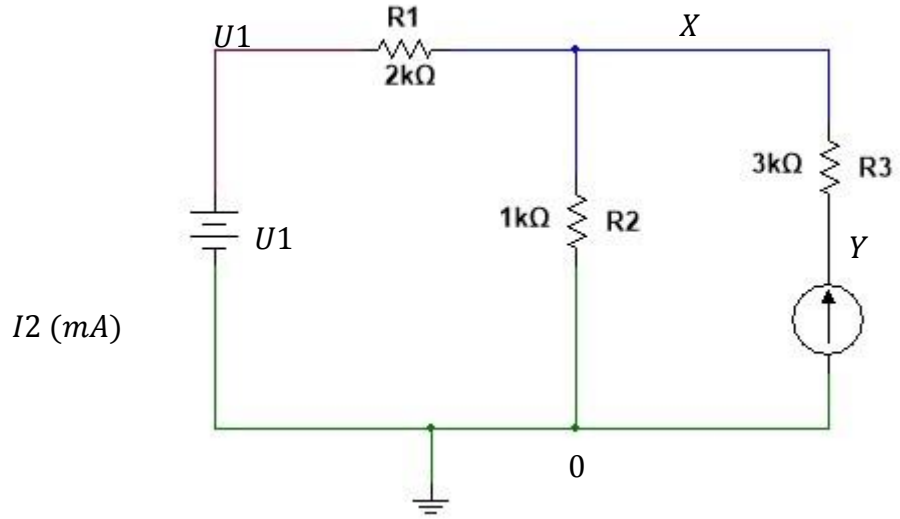
Scope: Demonstrate and verify the principle of linear circuits

Linearity Theorem: For any circuit containing resistors and voltage and current sources, every node voltage and branch current is a linear function of the source values and has the form $\sum \alpha_i U_i$ where the U_i are the source values and the α_i are suitably dimensioned constants. This is true for a circuit containing dependent or independent sources whose values are proportional to voltages or currents elsewhere in the circuit.

Consider the following circuit, suppose we use variables instead of fixed values for all of the independent voltage and current sources. We can then use nodal analysis to find all node voltages in terms of the source values.



Label all the nodes, the KCL equations are as follow

$$\frac{X - U1}{2} + \frac{X}{1} + \frac{X - Y}{3} = 0$$

$$\frac{Y - X}{} + (-I2) = 0$$

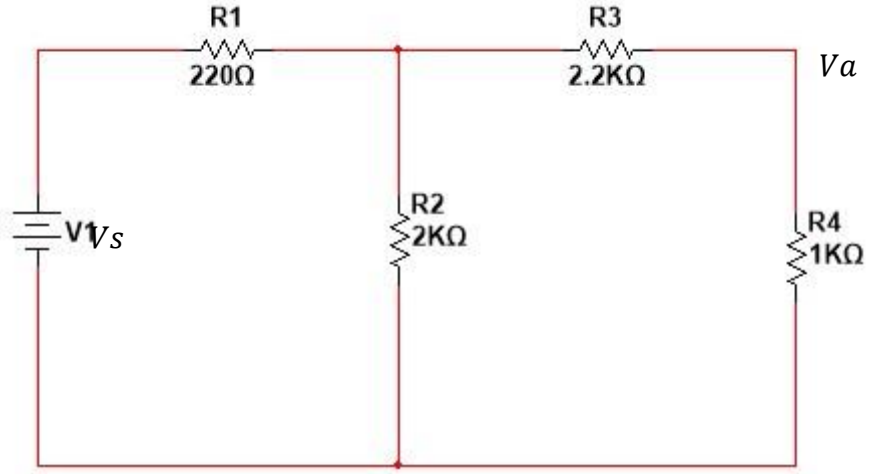
Solve for the node voltages

$$X = \frac{1}{3} U1 + \frac{2}{3} I2$$

$$Y = \frac{1}{3} U1 + \frac{11}{3} I2$$

Practical Section

1- Construct the following Circuit



2- Fill the following Table

Input Voltage Vs	Voltage Va
0 V	
1 V	
2 V	
3 V	
4 V	
5 V	
6 V	
7 V	
8 V	
9 V	
10 V	

3- Compare your experimental results to your prelab prediction (Theoretical Results).

Vs	Va (Theoretical)	Vs	Va (Theoretical)	Vs	Va (Theoretical)
0 V		4 V		8 V	
1 V		5 V		9 V	
2 V		6 V		10 V	
3 V		7 V			

4- Plot Va as a function of Vs as a graph