EXPERIMENT - 3

(A) MESH ANALYSIS

2.1 AIM

The study of mesh analysis is the objective of this exercise, specifically its usage in multi-source DC circuits. Its application in finding circuit currents and voltages will be investigated.

2.2 APPARATUS:

S.No.	Equipment	Range	Type	Quantity
1.	Resistors	-	-	
2.	Ammeter			
3.	R.P.S			
4.	Bread Board	-	-	
5.	Connecting Wires			required

2.3 THEORY:

Multi-source DC circuits may be analyzed using a mesh current technique. The process involves identifying a minimum number of small loops such that every component exists in at least one loop. KVL is then applied to each loop. The loop currents are referred to as mesh currents as each current interlocks or meshes with the surrounding loop currents. As a result there will be a set of simultaneous equations created, an unknown mesh current for each loop. Once the mesh currents are determined, various branch currents and component voltages may be derived.

2.4 CIRCUIT DIAGRAM:

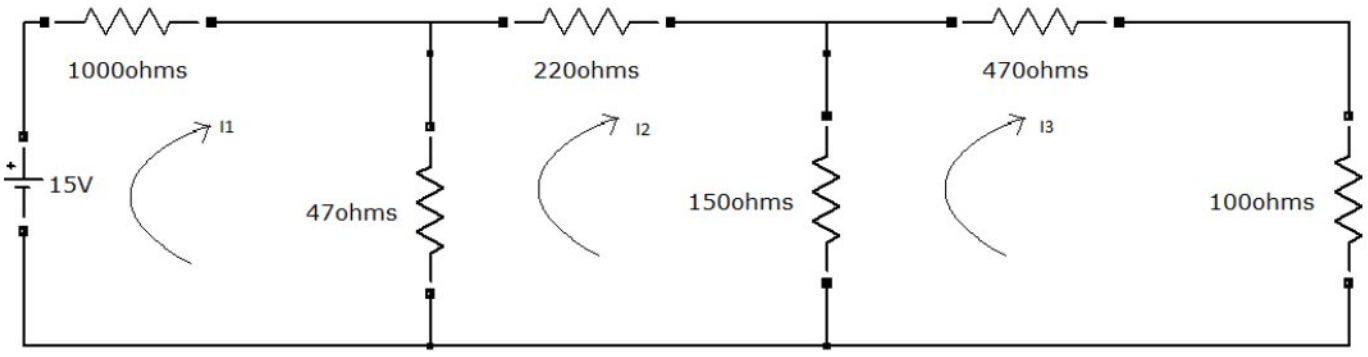

Figure – 2.1 Mesh analyses

2.5 PROCEDURE

1. Connect the circuit diagram as shown in Figure 2.1.
2. Switch ON the supply to RPS.

3. Apply the voltage (say 15v).
4. Gradually increase the supply voltage in steps.
5. Connect ammeters in the loop and find the currents I_1, I_2 and I_3.
6. Verify the practical results obtained with theoretical results

2.6 OBSERVATIONS:

Applied Voltage V (volts)	Loop current(I_1)		Loop current (I_2)		Loop current(I_3)	
	Theoretical	Practical	Theoretical	Practical	Theoretical	Practical

2.7 PRECAUTIONS:

1. Check for proper connections before switching ON the supply
2. Make sure of proper color coding of resistors
3. The terminal of the resistance should be properly connected.

2.8 RESULT:

(B) MESH ANALYSIS USING DIGITAL SIMULATION

AIM:

To verify mesh analysis using digital simulation.

2.9 APPARATUS:

S. No	SOFTWARE USED	DESKTOP QUANTITY
1	MATLAB	01

2.10 SIMULATION DIAGRAMS:

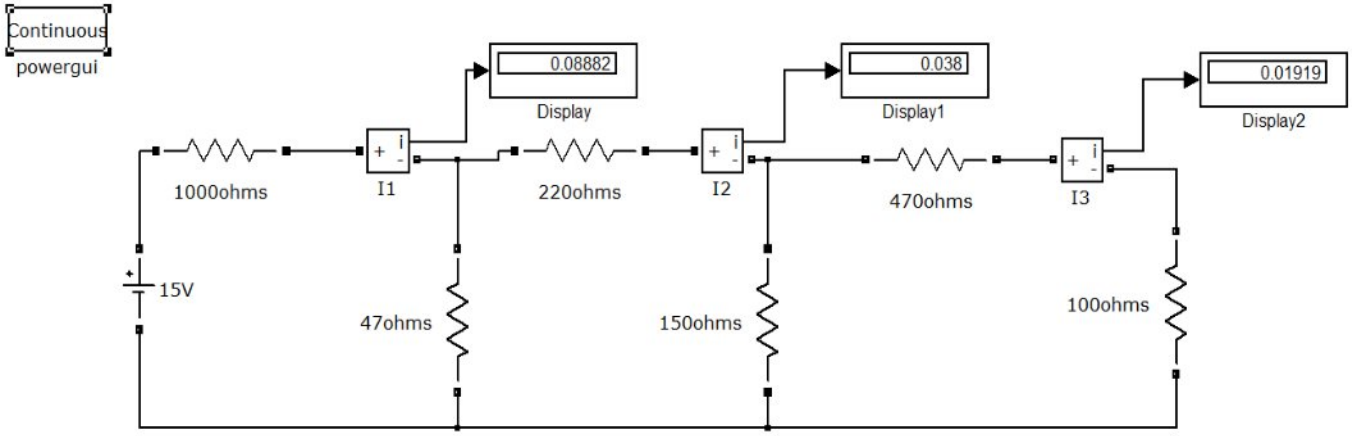

Figure – 2.2 Mesh analysis in MATLAB

2.11 PROCEDURE:

1. Make the connections as shown in the circuit diagram by using MATLAB Simulink.
2. Measure current in each resistor.
3. Verify the mesh analysis.

2.12 OBSERVATIONS:

Applied Voltage V (volts)	Loop current(I_1)		Loop current (I_2)		Loop current(I_3)	
	Theoretical	Practical	Theoretical	Practical	Theoretical	Practical

2.13 RESULT

2.14 PRE LAB VIVA QUESTIONS:

1. On which law is the mesh analysis based?
2. What is mesh analysis?
3. When do we go for super mesh analysis?
4. What is the equation for determining the number of independent loop equations in mesh current method?

2.15 POST LAB VIVA QUESTIONS:

1. How do we calculate branch currents from loop currents?
2. How do we calculate branch voltages from loop currents?