Circuit Analysis Techniques

Objectives

- Mesh and Nodal analysis
- Solve problems on Mesh and Nodal analysis

Mesh analysis

Analysis using KVL to solve for the currents around each closed loop of the network.

Mesh analysis procedure:

1. Assign currents to each closed loop of the network.
2. Apply KVL around each closed loop of the network.
3. Solve the resulting simultaneous linear equation for the loop currents.

Nodes analysis

Analysis using KCL to solve for voltages at each common node of the network

Nodal analysis procedure:

1. Determine the number of common nodes and reference node within the network.

2. Assign current and its direction to the each nodes in the network.

3. Apply KCL at each of the common nodes in the network

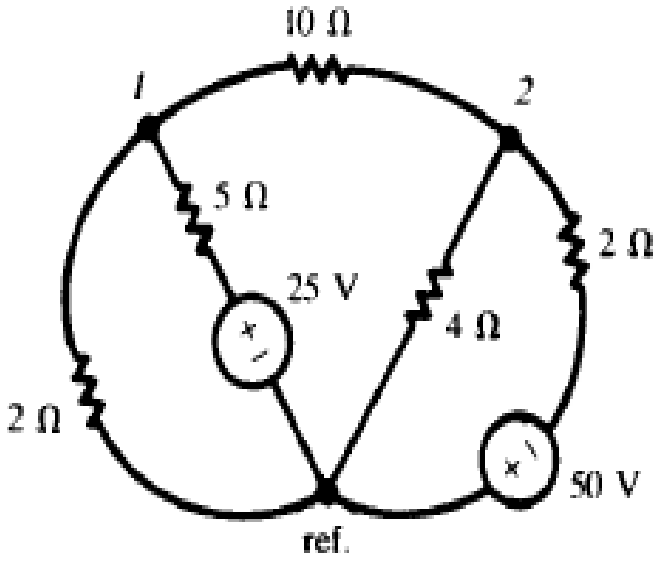
4. Solve the resulting simultaneous linear equation for the nodal voltages.

5. Determine the currents through and voltages across each the elements in the network.

Problems

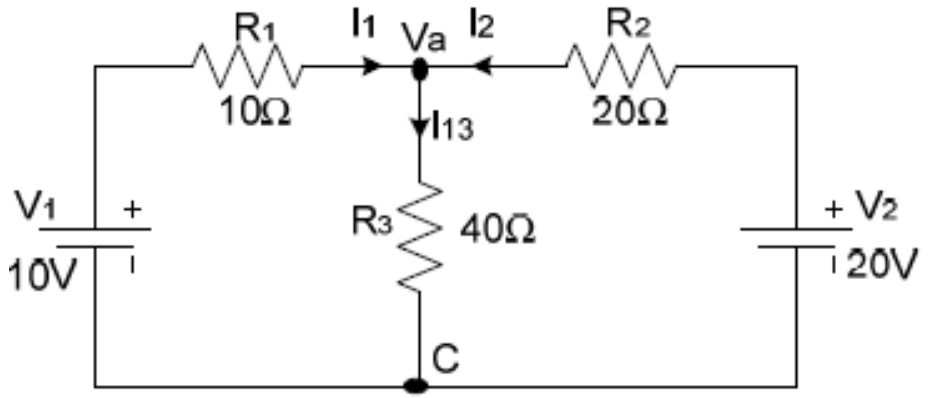
Problem 1

Solve Problem by the node voltage method



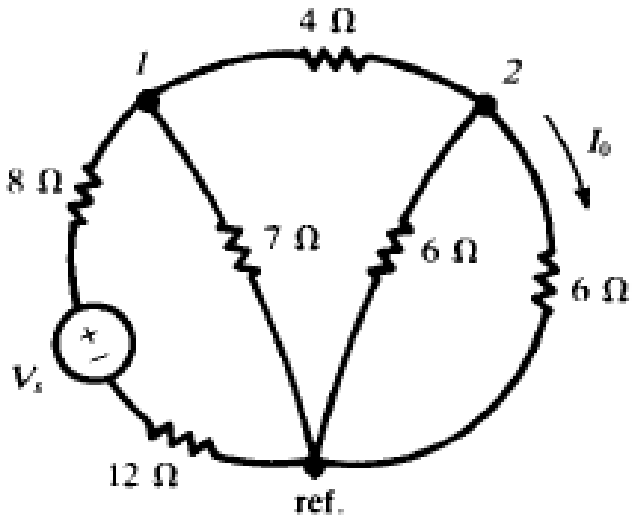
Problem 2

Solve Problem by the node voltage method



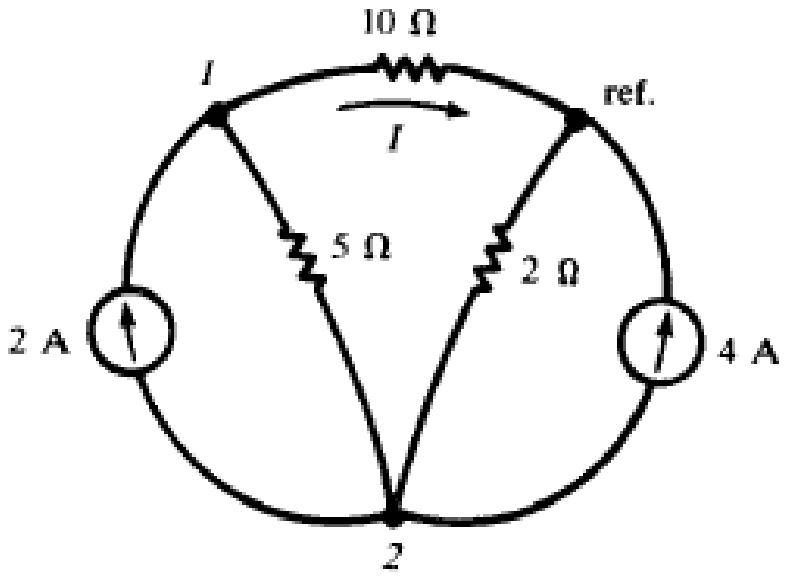
Problem 3

For the network shown in Fig, find Vs which makes I_o = 7.5 mA.



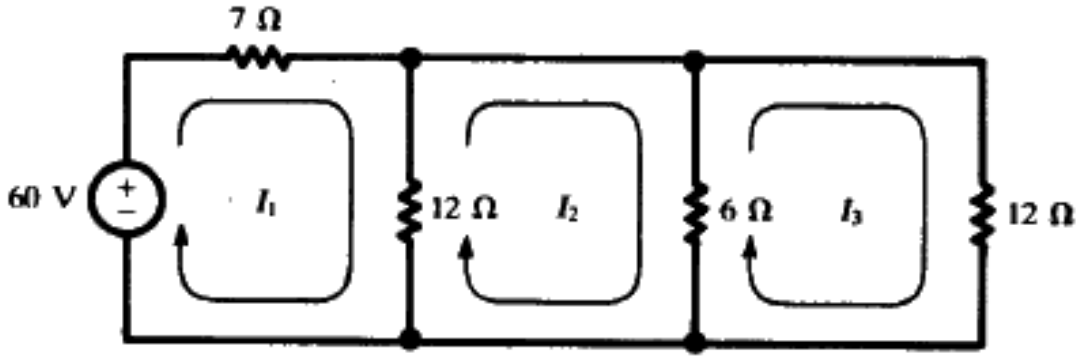
Problem 4

In the network shown, find the current in the 10Ω resistor.



Problem 5

Solve by the mesh current method



Problem 6

Write the mesh current matrix equation for the network of Fig by inspection, and solve for Currents.