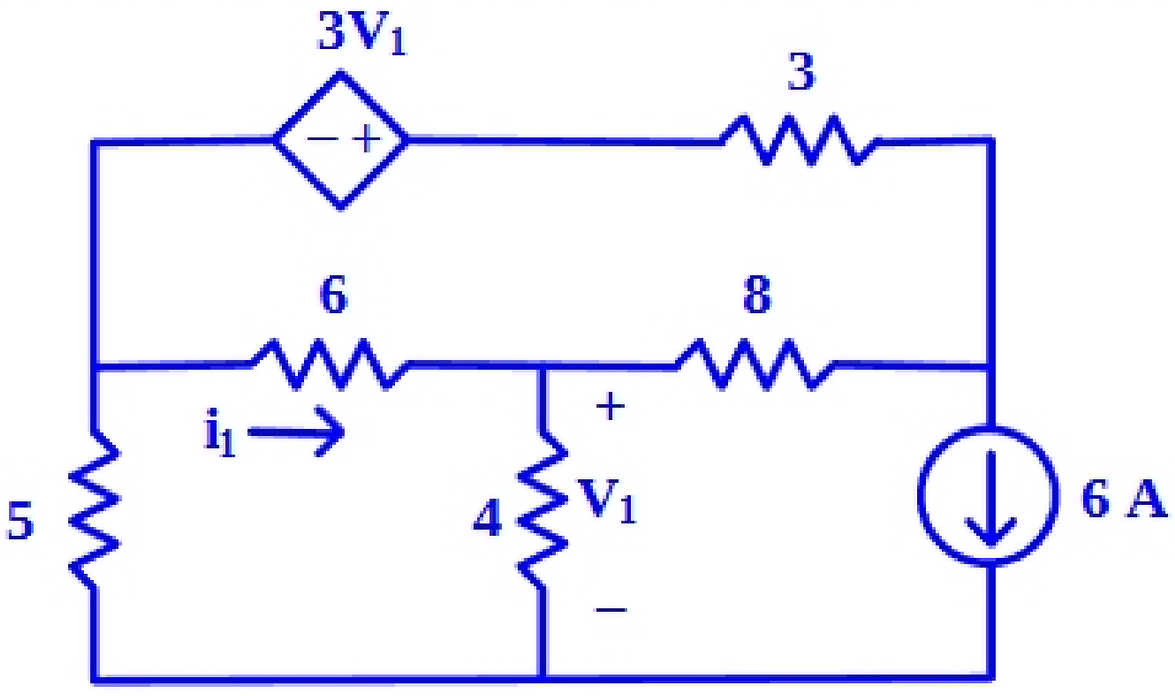
Reading Assignment: Sections 4.1-4.9 in *Electric Circuits, 9th Edition* by Nilsson

Mesh Equations (continued)

Dependent Sources:

The key to using mesh analysis on circuits with dependent sources is to ***redefine the control variables in terms of mesh currents.***

Example: Use mesh equations to determine V_1 and i_1 in the circuit shown below.

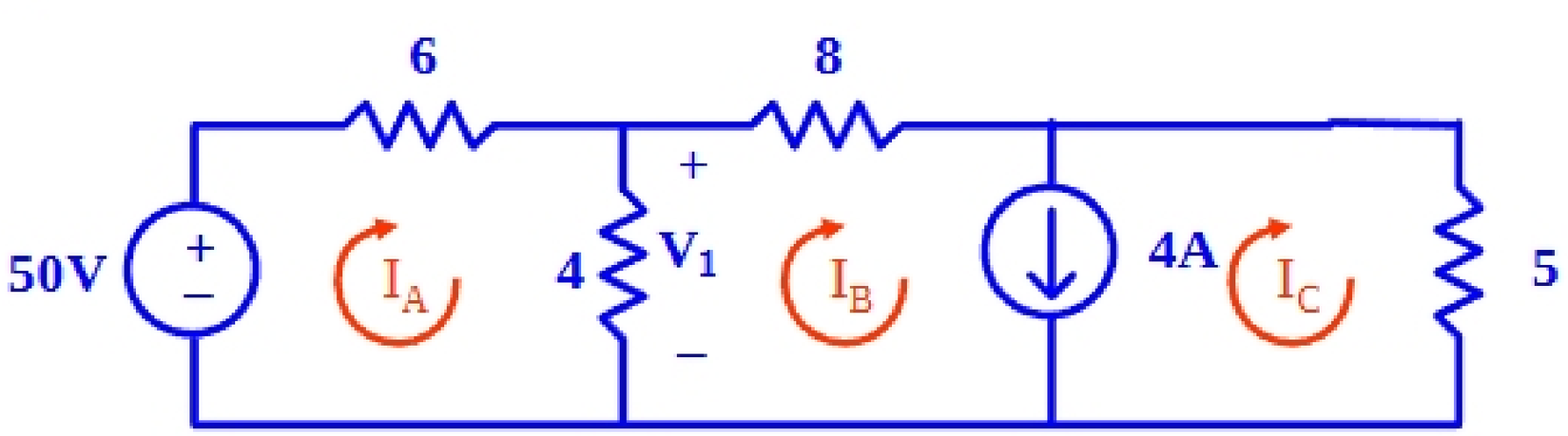


Supermesh

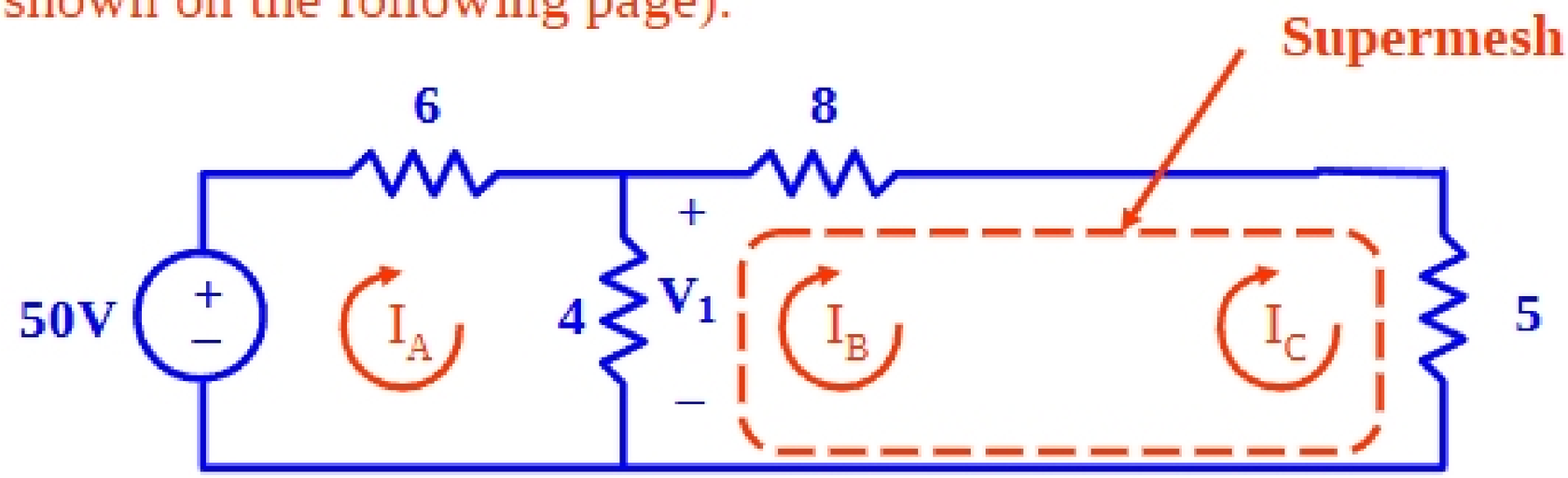
If a circuit contains an internal current source, a supermesh is required in order to perform mesh analysis. A supermesh is the new, larger mesh that is created by removing the internal current source. A new mesh current is not added. The supermesh simply shows the path for a KVL equation around the supermesh.

Example:

1) Note that the following circuit has an internal current source, so a supermesh is required.

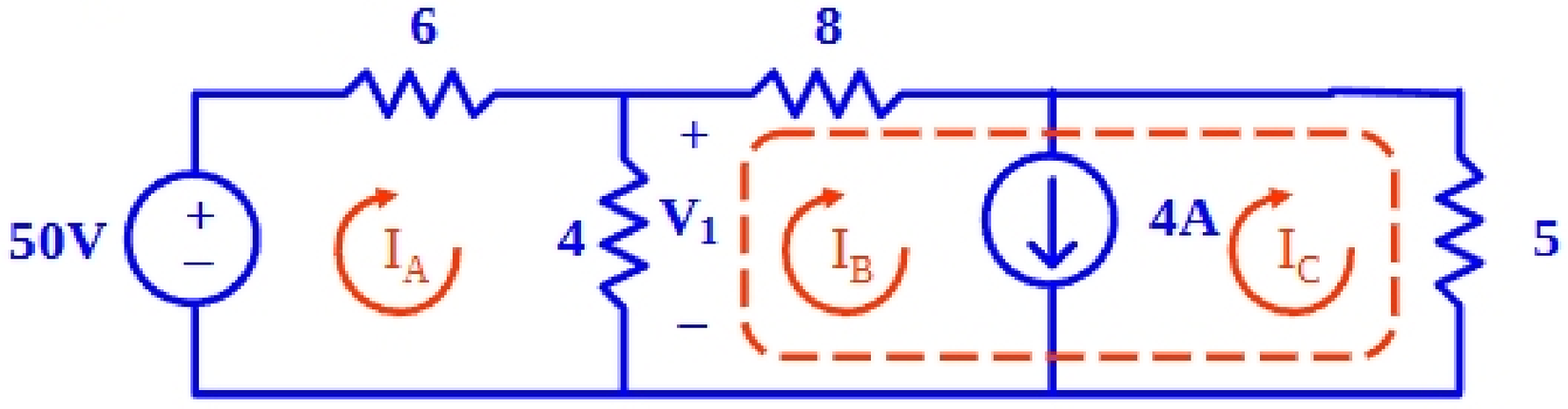


2) The supermesh is the new, larger mesh created by removing the current source (as shown on the following page).



3) Note that the supermesh defines a path for a KVL equation. No new mesh current is defined.

4) Also note that the internal current source can be used to form a relationship between currents I_B and I_C. In general, this is referred to as the **supermesh relationship**.



Supermesh relationship:

$I_B - I_C = 4$