

NODAL ANALYSIS

Summary of Technique

1. Identify all nodes that have three or more connections.
2. Pick one of these nodes as the reference node and ground it.
3. Label each remaining node with a node voltage variable (V_1 , V_2 , etc).
4. Write KCL equations summing the current leaving each node. Make sure that each term has units of amps.
5. Solve the equations for the node voltage variables.

Remember the hierarchy for writing the terms in your KCL equations:

1. Is the element or does the series string of elements have a current source?

If so, write down the number or the expression noting the sign for the correct direction (i.e. leaving the node).

If not, go to 2.

2. Is the element or does the series string of elements contain a resistor(s)?

If so, write Ohm's Law ($I=V/R$) for the total series resistance in terms of the node voltage variables.

If not, go to 3.

3. If you can't answer yes to one or two, then the only thing you can do is to label a current variable **and** a direction. This will be an additional unknown to your node voltage variables. You will need to identify an additional expression.