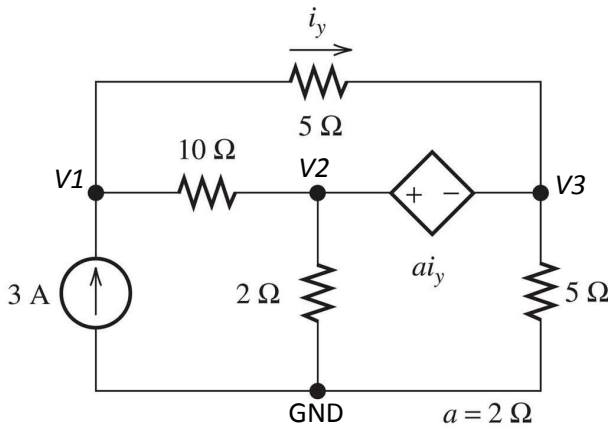


Quiz #4, problem 2

(note that this is Exercise 2.15b on page 77)



Solution example using node equations.

(1) Note: $i_y = (V1 - V3)/5$

(2) Note: $V2 = V3 + a i_y = V3 + a (V1 - V3)/5$

With $a = 2$ ohms, $V2 = 0.6 V3 + 0.4 V1$ ← Equation I

(3) At node 1:

$3 = 0.1 (V1 - V2) + 0.2 (V1 - V3)$ ← Equation II

(4) At node 2:3 (supernode):

$0.1 (V1 - V2) + 0.2 (V1 - V3) = 0.5 V2 + 0.2 V3$ ← Equation III

(5) Solving the equations:

$V1 = 12.53$ volts

$V2 = 5.60$ volts

$V3 = 0.989$ volts

So $i_y = (V1 - V3)/5 = \mathbf{2.31}$ amps