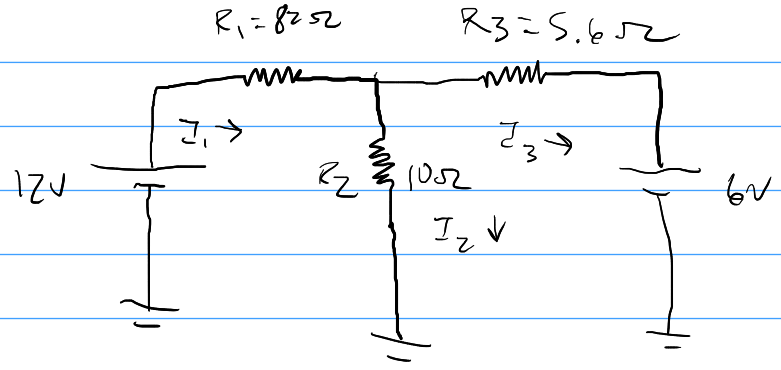
Chapter 9

Problem 11



$-12 + 8I_1 + 10I_2 = 0$

$5.6I_3 + 6 - 10I_2 = 0$

$I_1 = I_2 + I_3 + V_{2_1} + 6 - V_{8_2} = 0$

$8_2(I_2 + I_3) - 10I_2 = 12$

$5.6I_3 - 10I_2 = -6$

$8.2I_2 - 10I_2 + 8.2I_3 = 12$

$-1.8I_2 + 8.2I_3 = 12$

$5.6I_3 - 10I_2 = -6$

$$\begin{bmatrix} -1.8 & 8.2 \\ -10 & 5.6 \end{bmatrix} \begin{bmatrix} I_2 \\ I_3 \end{bmatrix} = \begin{bmatrix} 12 \\ -6 \end{bmatrix}$$

$$\frac{\begin{vmatrix} 12 & 8.2 \\ -6 & 5.6 \end{vmatrix}}{\begin{vmatrix} -1.6 & 8.2 \\ -10 & 5.6 \end{vmatrix}}$$

Chapter 9
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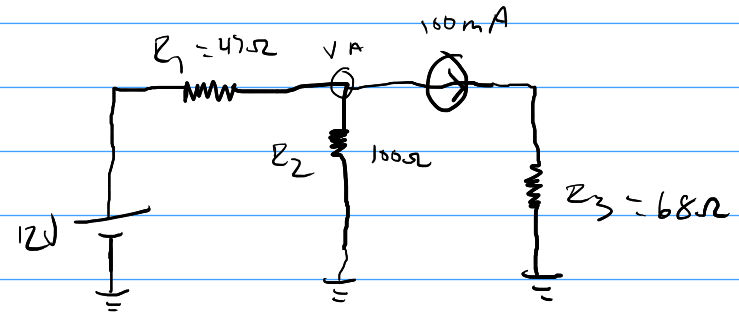
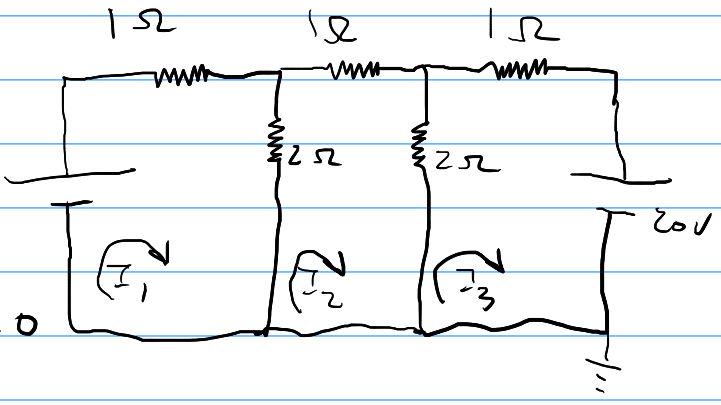


$$\frac{V_A - 12}{47} + \frac{V_A - 0}{100} + 0.100$$

$$\frac{V_A}{47} - \frac{12}{47} + \frac{V_A}{100} + 0.1$$

$$V_A\left(\frac{1}{47} + \frac{1}{100}\right) = \frac{12}{47} - 0.1$$

$$100(V_A - 12) + 47V_A + (0.1)(100)(47)$$



$$-10 + (1)I_1 + 2(I_1 - I_2) = 0$$

$$(1)I_2 + 2(I_2 - I_3) + 2(I_2 - I_1) = 0$$

$$(1)I_3 + 20 + 2(I_3 - I_2) = 0$$

$$3I_1 - 2I_2 = 10$$

$$-2I_1 + 5I_2 - 2I_3 = 0$$

$$-2I_2 + 3I_3 = -20$$

$$6I_1 - 4I_2 = 20$$

$$-6I_1 + 15I_2 - 6I_3 = 0$$

$11I_2 - 6I_3 = 20$

$-2I_2 + 3I_3 = -20$

$11I_2 - 6I_3 = 20$

$-4I_2 + 6I_3 = -40$

$7I_2 = -20$

$I_2 = \frac{-20}{7} = -2.86A$

$-2(-2.86) + 3I_3 = -20$

$3I_3 = -20 - 2(2.86)$

$I_3 = -8.57A$

$3I_1 - 2(-2.86) = 10$

$I_1 = 1.43A$

$3I_1 - 2I_2 + 0 \cdot I_3 = 10$

$-2I_1 + 5I_2 - 2I_3 = 0$

$0I_1 - 2I_2 + 3I_3 = -20$

$$\begin{bmatrix} 3 & -2 & 0 \\ -2 & 5 & 2 \\ 0 & -2 & 3 \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \\ I_3 \end{bmatrix} = \begin{bmatrix} 10 \\ 0 \\ 20 \end{bmatrix}$$

$$I_1 = \frac{\begin{vmatrix} 10 & -2 & 0 \\ 0 & 5 & -2 \\ -20 & -2 & 3 \end{vmatrix}}{\begin{vmatrix} 3 & -2 & 0 \\ -2 & 5 & -2 \\ 0 & -2 & 3 \end{vmatrix}}.$$

$$\begin{vmatrix} 10 & -2 & 0 & 10 & -2 \\ 0 & 5 & -2 & 0 & 5 \\ -20 & -2 & 3 & -20 & -2 \end{vmatrix}$$

$$= \frac{\begin{vmatrix} 3 & -2 & 0 & 3 & -2 \\ -2 & 5 & -2 & -2 & 5 \\ 0 & -2 & 3 & 0 & -2 \end{vmatrix}}{}$$

$$= \frac{(10)(5)(3) + (-2)(-2)(-20) + (0)(0)(2) - [(-2)(5)(0) + (10)(-2)(-2) + (-20)(3)(2)]}{(3)(5)(3) + (-2)(-2)(0) + (0)(-2)(-2) - [(0)(5)(-20) + (-2)(-2)(3) + (3)(-2)(2)]}$$