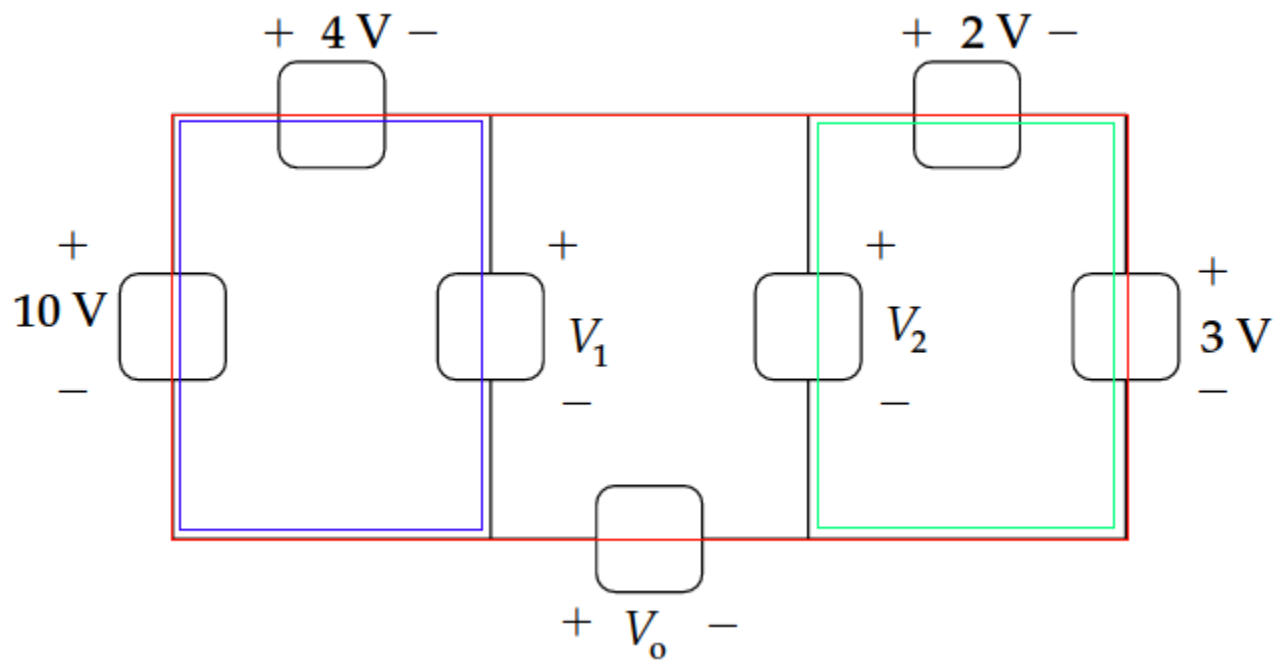




Solutions

Sayood - Exercise 9



Apply KVL in the blue loop:

$$V_1 + 4 - 10 = 0 \implies V_1 = 6V$$

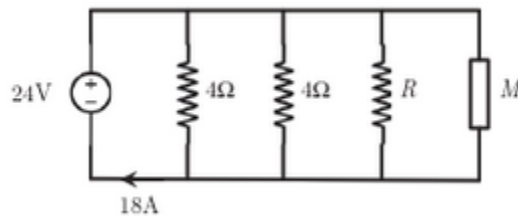
Apply KVL in the blue loop:

$$V_2 - 2 - 3 = 0 \implies V_2 = 5V$$

Apply KVL to the red loop:

$$V_0 + 10 - 3 - 2 - 4 = 0 \implies V_0 = -1V$$

Verification: KVL at the inner loop, $V_0 + V_1 + V_2 = -1 + 5 + 6 = 0$

Ergul – Exercise 2

Label the elements $\{4R, 4R, R, M\}$ from left to right as $\{1, 2, 3, 4\}$.

All elements are placed in parallel, thus they are subject to the same voltage $V = 24V$.

The total current is $18A$.

Apply Ohm's Law at element 1: $I_1 = V/R_1 = 24/(4) = 6A$.

Apply Ohm's Law at element 2: $I_2 = V/R_2 = 24/3 = 6A$.

Apply KCL at the common node.

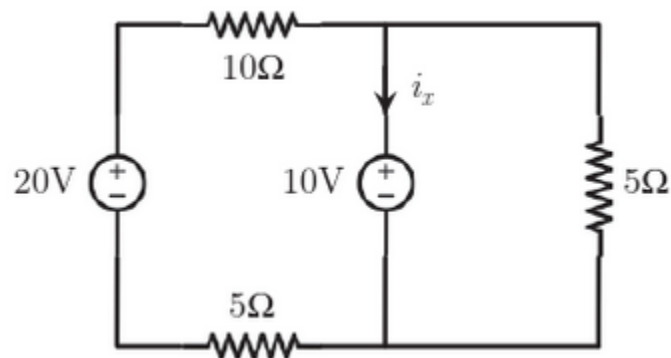
$$I_1 + I_2 + I_3 + I_4 = 18A \implies I_3 = 6 - I_4$$

Since $4A \leq I_4 \leq 6A$, then $0A \leq I_3 \leq 2A$.

Apply Ohm's Law at element 3:

$$R_3 = V_3/I_3 \implies R_3 \geq 12\Omega$$

Ergul – Exercise 4



Apply KVL in the left loop:

$$10I_1 + 10 + 5I_1 - 20 = 0V \implies I_1 = \frac{2}{3}A$$

Apply KVL in the right loop:

$$5I_2 - 10 = 0V \implies I_2 = 2A$$

$$I_x = I_1 - I_2 = \frac{2}{3} - 2 = -\frac{4}{3} \approx -1.33A$$