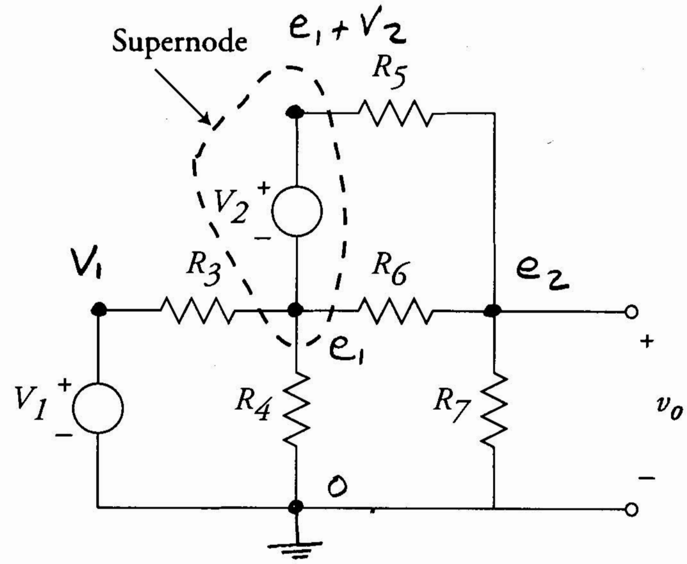
The nodes are labeled as below:



Note that 4 of the nodes (ground, V_1, e_1, e_2) are labeled normally. The 5th node is labeled as $e_1 + V_2$, not e_3, since there is a known potential difference across V_2.

To start, apply KCL at e_2:

$$e_2 : \quad \frac{e_2 - 0}{R_7} + \frac{e_2 - e_1}{R_6} + \frac{e_2 - (e_1 + V_2)}{R_5} = 0$$

$$\Rightarrow -\left(\frac{1}{R_5} + \frac{1}{R_6}\right)e_1 + \left(\frac{1}{R_5} + \frac{1}{R_6} + \frac{1}{R_7}\right)e_2 = \frac{V_2}{R_5}$$

This result is typical of the node method in simpler problems.

Next, apply KCL at nodes e_1 and $e_1 + V_2$:

$$e_1: \quad \frac{e_1 - V_1}{R_3} + \frac{e_1 - 0}{R_4} + \frac{e_1 - e_2}{R_6} - i_2 = 0$$

$$e_1 + V_2: \quad \frac{e_1 + V_2 - e_2}{R_5} + i_2 = 0$$

Note that the constitutive law for the V_2 source gives no information about i_2. However, we can eliminate i_2 by <u>adding</u> the two equations above:

$$\text{supernode:} \quad \left(\frac{1}{R_3} + \frac{1}{R_4} + \frac{1}{R_5} + \frac{1}{R_6}\right) e_1 - \left(\frac{1}{R_5} + \frac{1}{R_6}\right) e_2$$

$$= \frac{1}{R_3} V_1 - \frac{1}{R_5} V_2$$

Plugging in values, we have

$$2.5\, e_1 - e_2 = 2.5$$
$$-e_1 + 2e_2 = 2.5$$

Solving for e_1, e_2, we have

$$e_1 = 1.875 \text{ V} \qquad e_2 = 2.1875 \text{ V}$$

Since $v_0 = e_2 - 0$,

$$\boxed{v_0 = 2.1875 \text{ V}}$$