

Supernode

Ex: Determine the nodal voltages V_1 & V_2 of Fig. using the concept of a supernode.

Sol

$$V_1 - V_2 = 12 \quad \text{--- (1)}$$

$$\sum I_i = \sum I_o$$

$$6 + \cancel{I_3} = I_1 + I_2 + 4 + \cancel{I_3}$$

$$I_1 + I_2 = 6 - 4$$

$$I_1 + I_2 = 2$$

$$\frac{V_1}{4} + \frac{V_2}{2} = 2 \quad \times 4$$

$$V_1 + 2V_2 = 8 \quad \text{--- (2)}$$

نؤب (1) و (2) يا (2)

$$V_1 = 12 + V_2$$

$$12 + V_2 + 2V_2 = 8 \Rightarrow V_2 = -1.333 \text{ V}$$

~~12 + 3.333 = 10.666~~

~~10.666 - 1.333 = 9.333~~

$$V_1 = 10.66 \text{ V}$$

