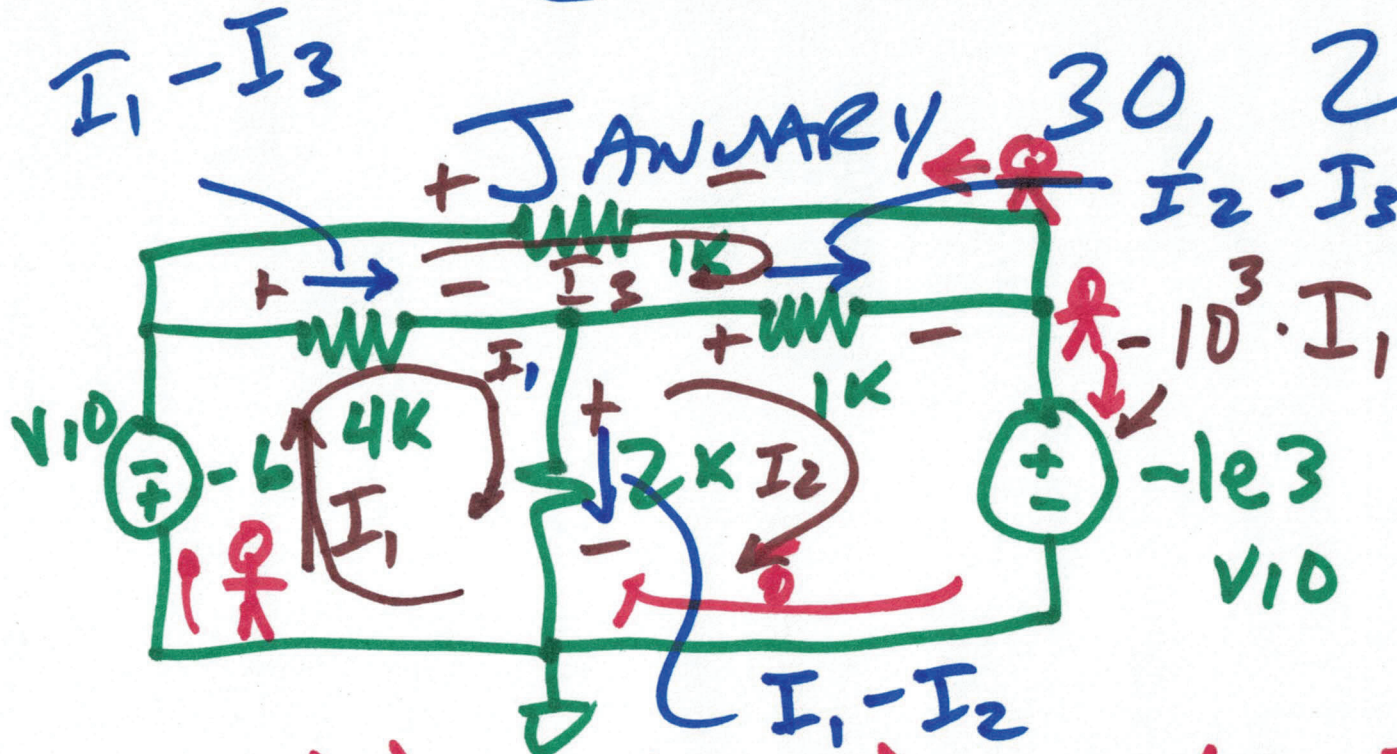


EE 221 CIRCUITS II

Lecture 4

JANUARY 30, 2023



$$-(-6) - 4k(I_1 - I_3) - 2k(I_1 - I_2) = 0$$

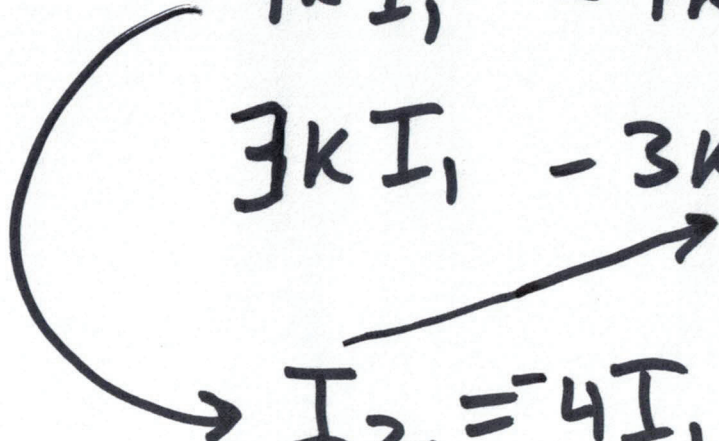
$$+1kI_3 - 4k(I_1 - I_3) - 1k(I_2 - I_3) = 0$$


$$-(10^3 \cdot I_1) + 2k(I_1 - I_2) - 1k(I_2 - I_3) = 0$$

$$6 \quad -6KI_1 + 2KI_2 + 4KI_3 = 0$$

$$-4KI_1 - 1KI_2 + 6KI_3 = 0$$

$$3KI_1 - 3KI_2 + 1KI_3 = 0$$


$$I_2 = -4I_1 + 6I_3$$


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

$$3I_1 + 12I_1 - 18I_3 + I_3 = 0$$

$$15I_1 = 17I_3$$

$$I_1 = \frac{17}{15} \cdot I_3$$

$$3\text{mA} - 3I_1 + I_2 + 2I_3 = 0$$

$$+ 4I_1 + I_2 - 6I_3 = 0$$

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



$$I_2 = -4I_1 + 6I_3$$

$$* 3\text{mA} - 3I_1 - 4I_1 + 6I_3 + 2I_3 = 0$$

$$3I_1 - 3(-4I_1 + 6I_3) + I_3 = 0$$

$$3I_1 + 12I_1 - 18I_3 + I_3 = 0$$

$$15I_1 - 17I_3 = 0$$

3)

$$3 \text{ mA} - 7I_1 + 8I_3 = 0$$

$$15I_1 - 17I_3 = 0$$

$$I_1 = \frac{17}{15} \cdot \frac{45}{2} \text{ mA}$$

$$I_1 = \frac{17}{15} I_3$$

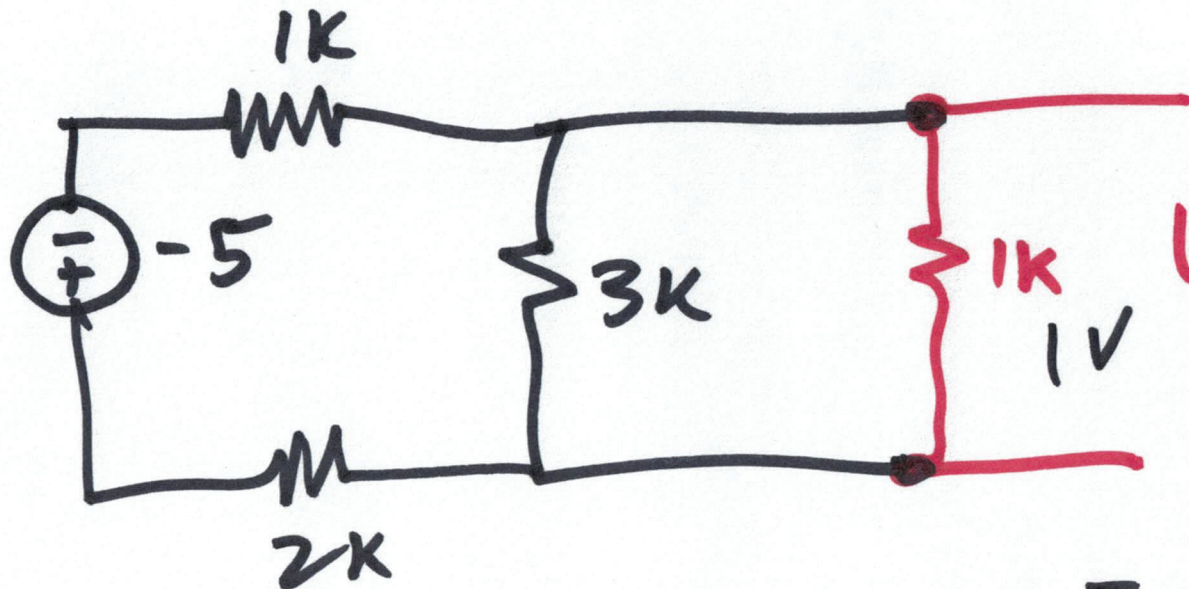
$$0 = 3 \text{ mA} - 7 \cdot \frac{17}{15} I_3 + 8I_3$$

$$= 3 \text{ mA} - \frac{122}{15} I_3 + \frac{120}{15} I_3$$

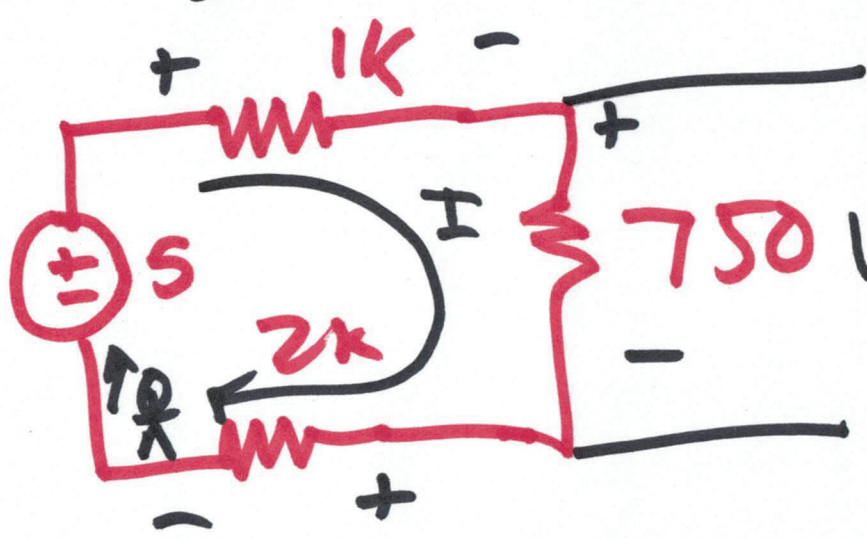
$$= 3 \text{ mA} - \frac{2}{15} I_3$$

$$\frac{2}{15} I_3 = 3 \text{ mA}$$

$$I_3 = \frac{45 \text{ mA}}{2} = 22.5 \text{ mA}$$



$$\frac{1.3}{1+3} = 750$$



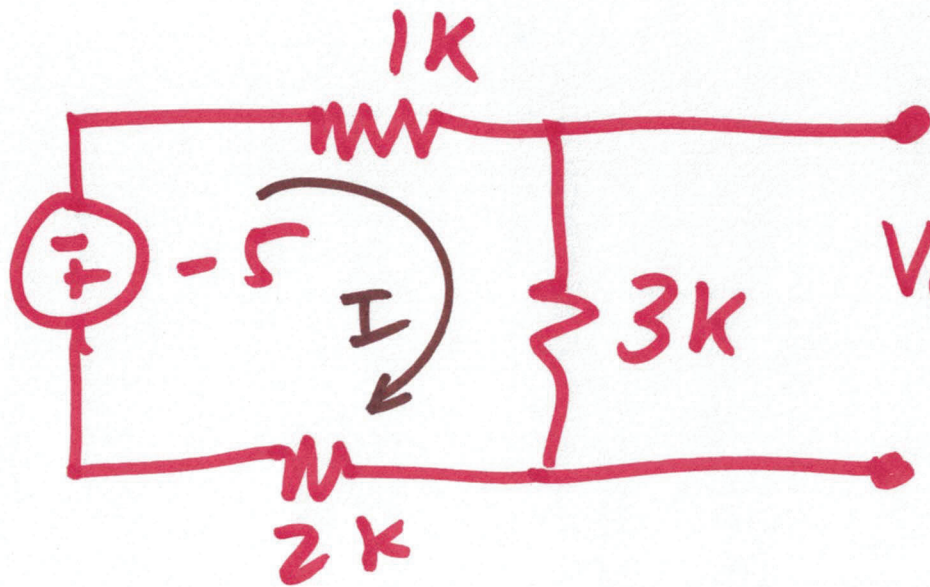
$$+ 5 - 1kI - 750I - 2kI = 0$$

$$5 - 3.75kI = 0$$

$$I = \frac{5}{3.75k}$$

$$V_{meas} = 750 \cdot I = 750 \cdot \frac{5}{3.75k} = \frac{5}{5} = 1$$

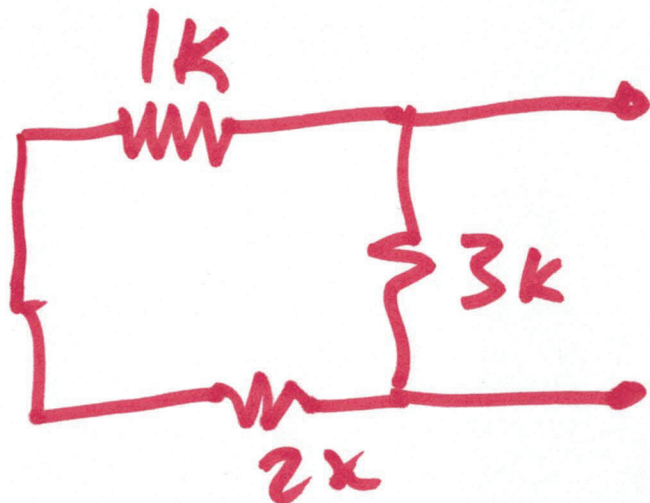
$$V_{meas} = 1V$$



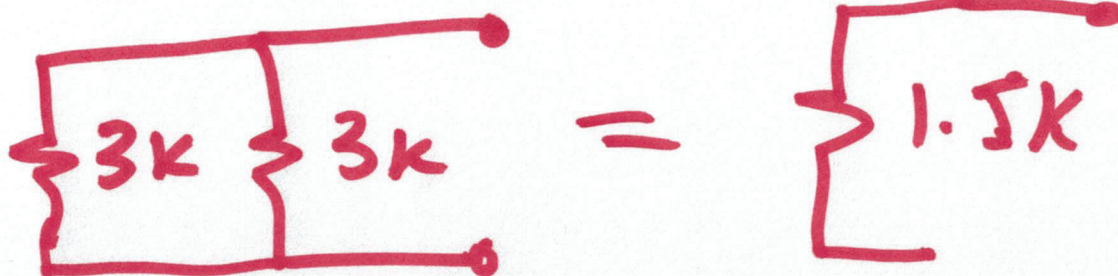
$$V_{oc} = I \cdot 3k$$

$$= \frac{5}{6k} \cdot 3k = 2.5V$$

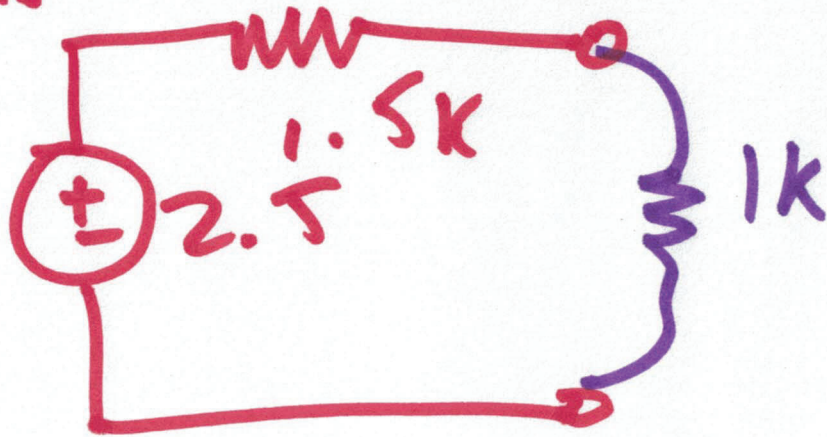
$V_{THN} = 2.5V$



$$\frac{3 \cdot 3}{3 + 3} = 1.5$$



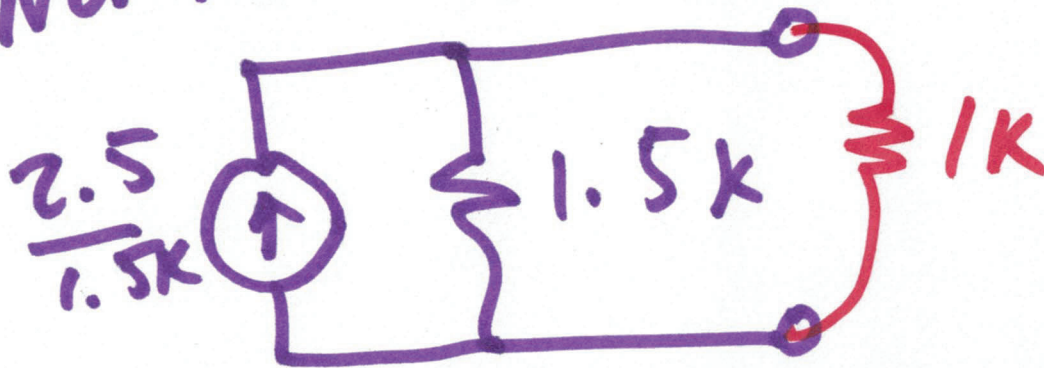
Thévenin



$$\frac{2.5 \cdot 1k}{1k + 1.5k}$$

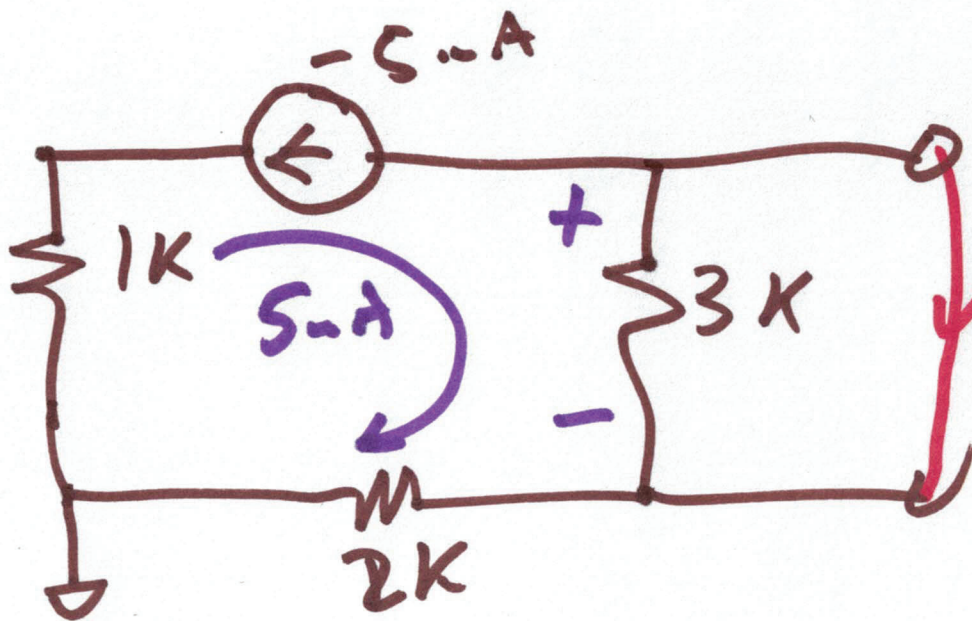
$$\frac{2.5}{2.5} = \underline{\underline{1V}}$$

Norton



$$\frac{2.5}{1.5k} \cdot \frac{1.5k \cdot 1k}{1.5k + 1k}$$

$$\frac{2.5}{2.5} = \underline{\underline{1V}}$$



$$R_{TH} = 3\text{k}$$

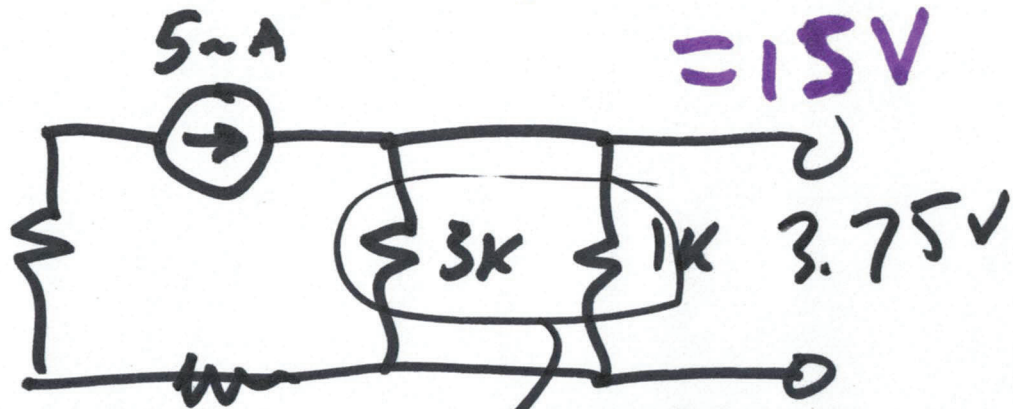
$$I_{SC} = 5\text{mA}$$

$$V_{THN} = 5\text{mA} \cdot 3\text{k}$$

$$3\text{k} = 15\text{V}$$

$$V_{OC} = V_{THN} = 5\text{mA} \cdot 3\text{k}$$

$$= 15\text{V}$$



$$750$$

$$5\text{mA} \cdot 750$$

$$= 3.75\text{V}$$

