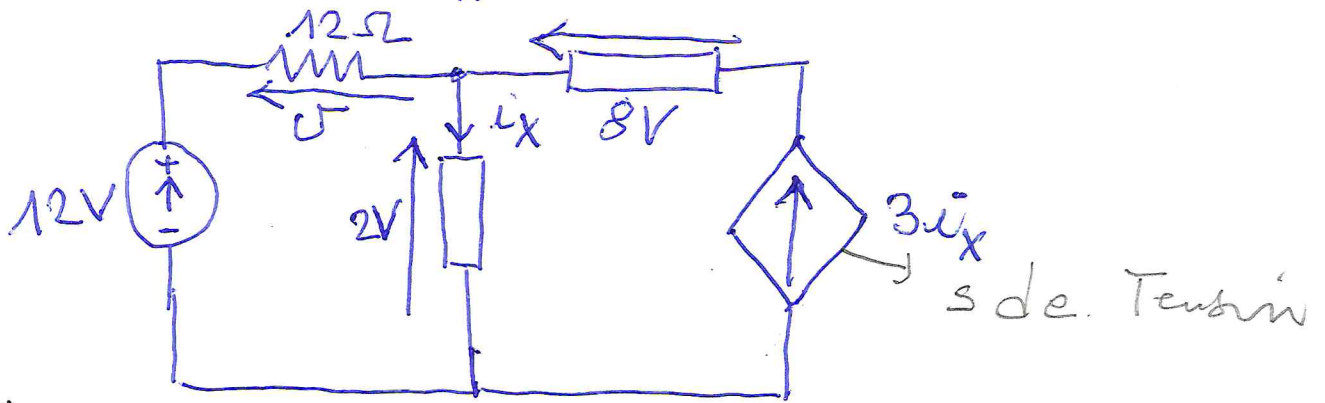


Ex 1

Q: calculer v et i_x dans le circuit ?

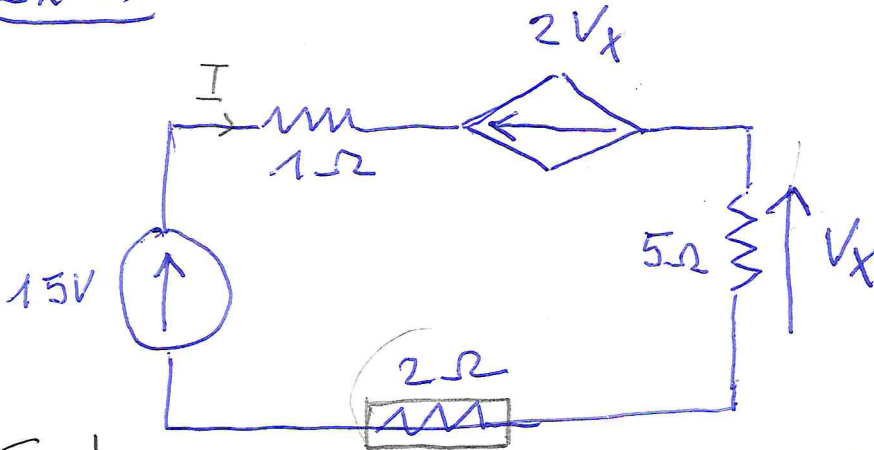


Sol

$$12 = v + 2 \Rightarrow v = 10V$$

$$2V = 8 + 3i_x \Rightarrow 3i_x = -6 \Rightarrow \boxed{i_x = -2A}$$

Ex 2



Q = trouver V_x dans le circuit.

Sol

$$1) \quad 15 = (1+2)I + 3V_x = 3I + 3V_x$$

$$2) \quad V_x = 5I \Rightarrow 15 = \frac{3V_x}{5} + \frac{3V_x}{5}$$

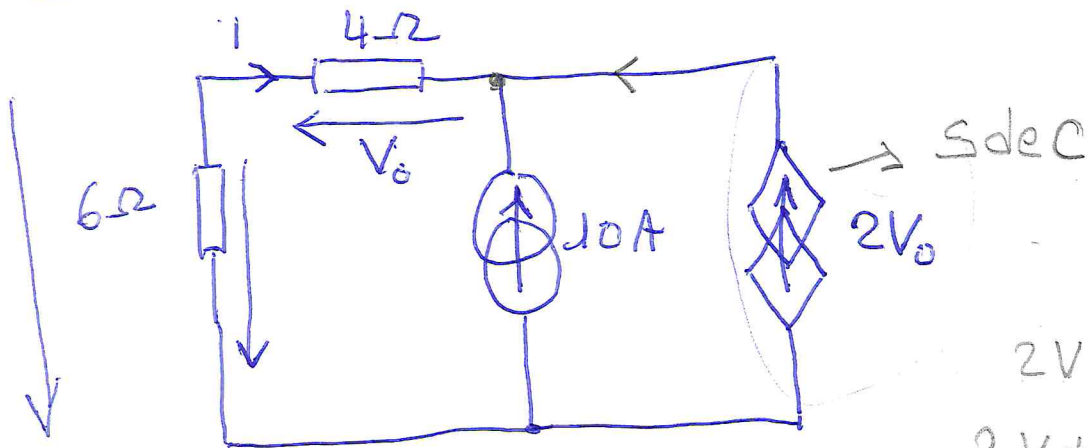
$$\frac{3V_x}{5} + \frac{15V_x}{5} = 15 \Rightarrow \frac{18V_x}{5} = 15$$

$$\frac{18V_x}{5} = 15 \Rightarrow V_x = \frac{15 \times 5}{18}$$

$$= \frac{25}{6} = \boxed{4,16V}$$

Ex 3

trouver V_0 dans le circuit et la puissance dissipée par la source contrôlée



SOL

$$I = \frac{V_0}{4} \Rightarrow \frac{V_0}{4} + 10 = -2V_0$$

$$\frac{V_0}{4} + \frac{8V_0}{4} = -10 \Rightarrow \frac{9V_0}{4} = -10$$

$$\boxed{V_0} = -\frac{40}{9} = -4,44V$$

- le courant de la source contrôlée = $2 \cdot V_0 = -8,88A$

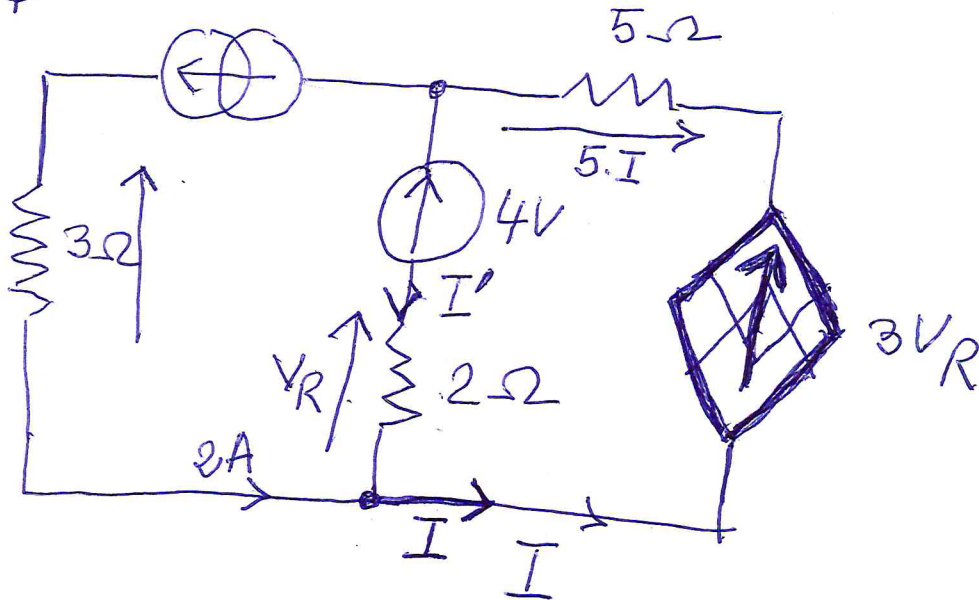
la tension aux bornes de la source contrôlée

$$V = +V_0 + 6 \cdot \frac{V_0}{4}$$

$$= +V_0 \left(1 + \frac{6}{4}\right) = +V_0 \left(\frac{10}{4}\right) = +\frac{10V_0}{4}$$

$$P = -4,44 \cdot -8,88 = 39,27W$$
$$= -11,11$$
$$= \boxed{98,75W}$$

Ex 2 Source Contrôlée: Démontrer que la valeur du courant I est égal à -12 A ~~avec~~
~~compte~~ 2 A



~~$$I + I' = 2 \Rightarrow I' = 2 - I$$~~

~~$$3V_R - 5I = 4 + V_R \Rightarrow 2V_R = 4 + 5I$$~~

~~$$V_R = 2I' = 2(2 - I) = 4 - 2I$$~~

~~$$2(4 - 2I) = 4 + 5I$$~~

~~$$8 - 4I = 4 + 5I$$~~

~~$$= \cancel{3I}$$~~

$$I = 2 + I'$$

$$3V_R - 5I = V_R + 4 \Rightarrow 2V_R = 4 + 5I$$

$$V_R = 2I' = 2(I - 2) = 2I - 4$$

$$2(2I - 4) = 4 + 5I$$

$$4I - 8 = 4 + 5I$$

$$\boxed{I = -12\text{ A}}$$

Exercice

Calculer la valeur de la source de Tension V_s de la fig si le courant I_ϕ est égal à $5A$

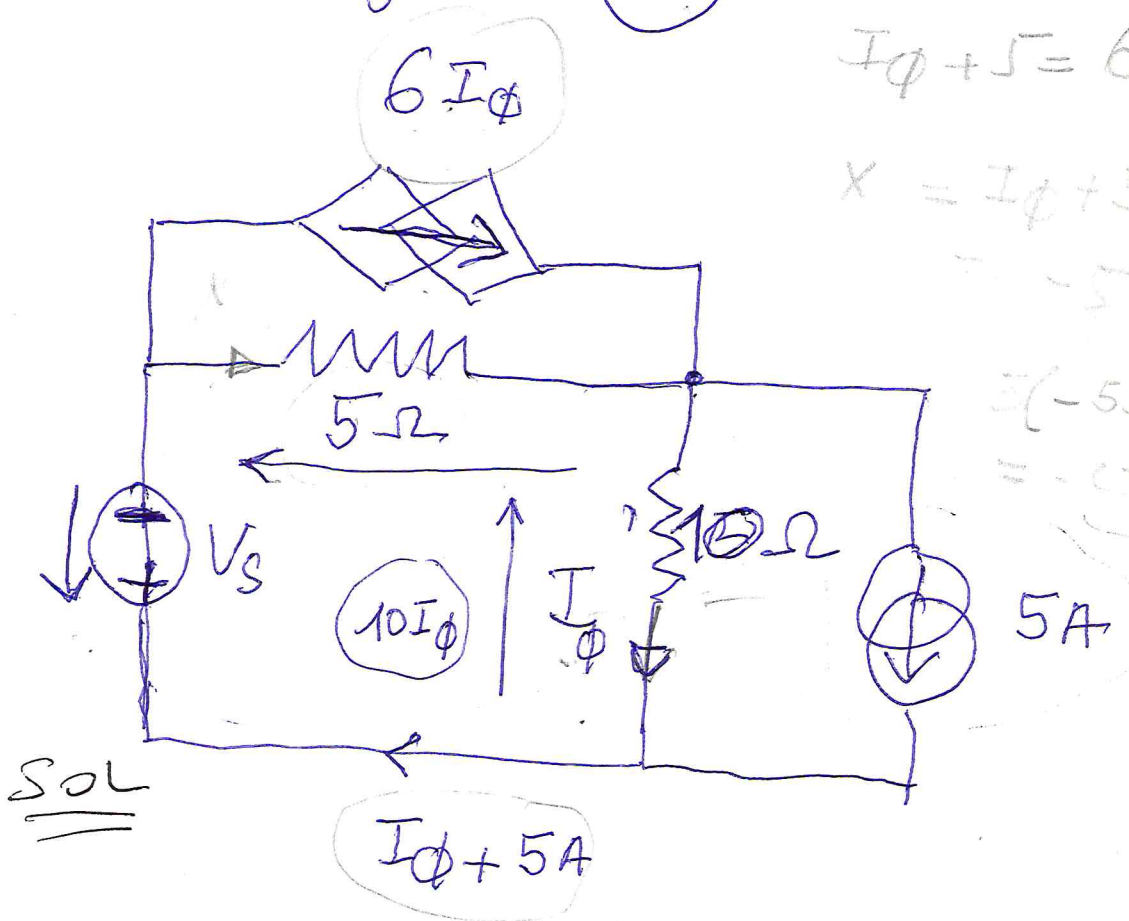
$$I_\phi + 5 = 6I_\phi + X$$

$$X = I_\phi + 5 - 6I_\phi$$

$$= -5I_\phi + 5$$

$$3(-5I_\phi + 5)$$

$$= -15I_\phi + 25$$



$$-V_s = 5 \cdot (I_\phi + 5 - 6I_\phi) + 10I_\phi$$

$$= -25I_\phi + 10I_\phi + 25$$

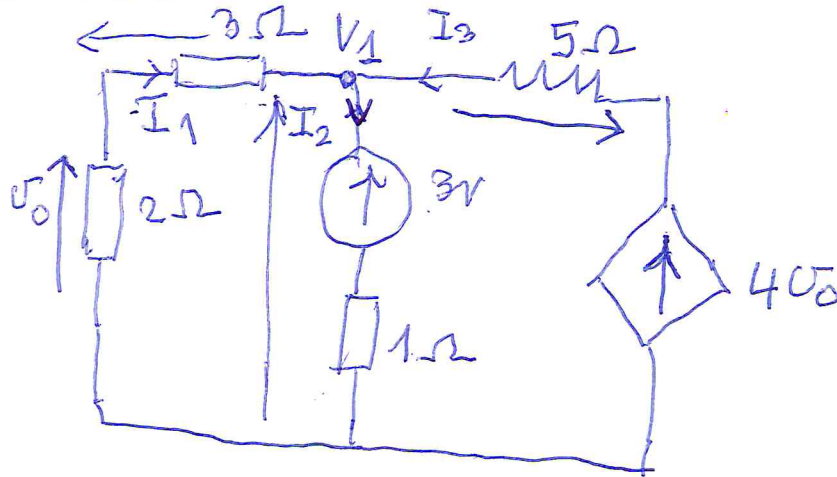
$$-V_s = -15I_\phi + 25 = -15 \cdot 5 + 25$$

$$= -75 + 25 =$$

$$V_s = 50V$$

Ex 4

En utilisant l'analyse nodale
trouver U_0 dans le circuit



$$U_1 = 4U_0 - 5I_3$$

$$5I_3 = 4U_0 - U_1$$

I

$$U_0 = -2I_1$$

$$U_1 = U_0 - 3I_1$$

$$3I_1 = U_0 - U_1$$

$$I_1 + I_2 + I_3 = 0$$

~~$$\frac{U_0 - U_1}{3} + \frac{U_1 - 3}{1} + \frac{-U_1 + 4U_0}{5} = 0$$~~

~~$$U_1 = U_0 - 3I_1$$~~

~~$$3I_1 = U_0 - U_1 \Rightarrow I_1 = \frac{U_0 - U_1}{3}$$~~

$$I_1 = \frac{U_1}{5}$$

$$U_1 = 3V + 1 \cdot I_2 \Rightarrow I_2 = \frac{U_1 - 3}{1}$$

$$U_1 = 4U_0 - 5I_3 \Rightarrow 4U_0 - U_1 = 5I_3$$

$$I_3 = \frac{4U_0 - U_1}{5}$$

$$\frac{U_1}{5} + \frac{U_1 - 3}{1} + \frac{4U_0 - U_1}{5} = 0$$

~~$$U_1 + 5U_1 - 15 + 4U_0 - U_1 = 0$$~~

$$U_0 = \frac{2}{5}U_1$$