## Solution #1

① $v_c(0^-) = 0$ (donné)

② $t \to \infty$ :

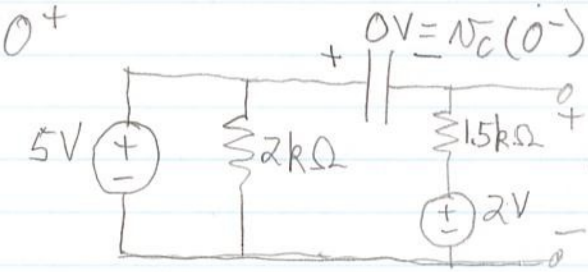

$v(\infty) = 2V$

③ $\tau = R_{eq} C$ où $R_{eq} = R_{Thévenin}$ dans le circuit


$R_{Thévenin} = R_{eq}\big|_{sources=0} = 1.5\,k\Omega$

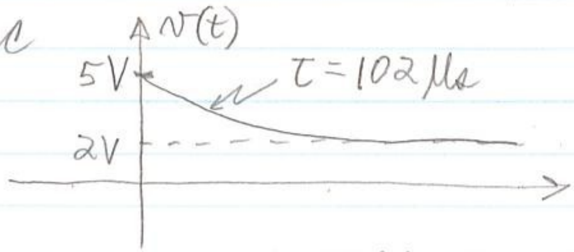
$\tau = 1.5\,k\Omega \times 0.068\,\mu F = 102\,\mu s$

④ $t = 0^+$




$v(0^+) = 5V$

Donc

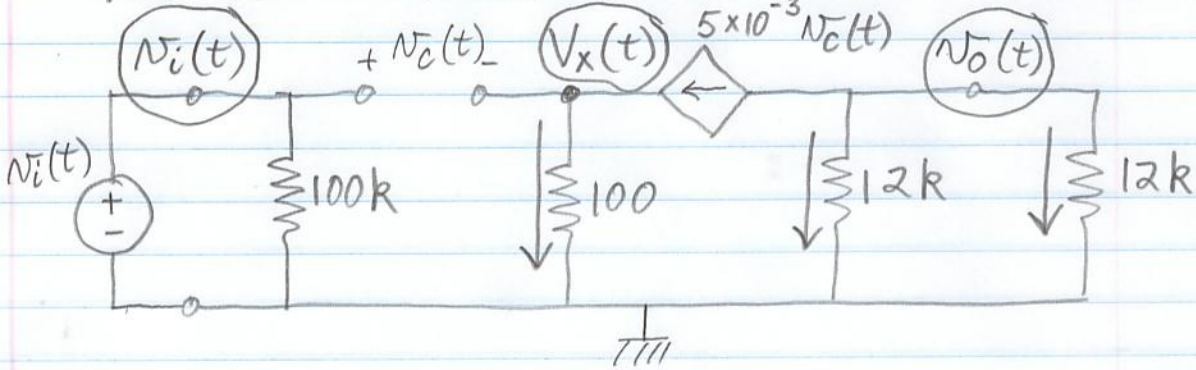



$\left.\begin{array}{l} K_1 + K_2 = 5 \\ K_1 = 2 \end{array}\right\} K_2 = 3$

$\Rightarrow v(t) = 2 + 3e^{-t/(102\,\mu s)}$ volts

# Solution #2

On utilise la méthode des tensions de noeuds:




(4 noeuds dans le circuit) 3 inconnues : $v_o(t)$, $V_x(t)$ et $v_c(t)$

Au noeud $V_x(t)$ on a

$$\frac{V_x(t)}{100} = 5\times10^{-3}\, v_c(t) \qquad (1)$$

Au noeud $v_o(t)$ on a

$$5\times10^{-3}\, v_c(t) + \frac{v_o(t)}{12\,k} + \frac{v_o(t)}{12\,k} = 0 \qquad (2)$$

Finalement on remarque que

$$v_c(t) = v_i(t) - V_x(t) \qquad (3)$$

De (1) on a $V_x(t) = 0.5\, v_c(t)$. En substituant dans (3) on obtient $1.5\, v_c(t) = v_i(t)$. En substituant dans (3) on obtient:

$$\frac{5\times10^{-3}\, v_i(t)}{1.5} + \frac{v_o(t)}{12k} + \frac{v_o(t)}{12k} = 0$$

$$\Rightarrow v_o(t) = -20\, v_i(t)$$