Année Univ: 2016/201

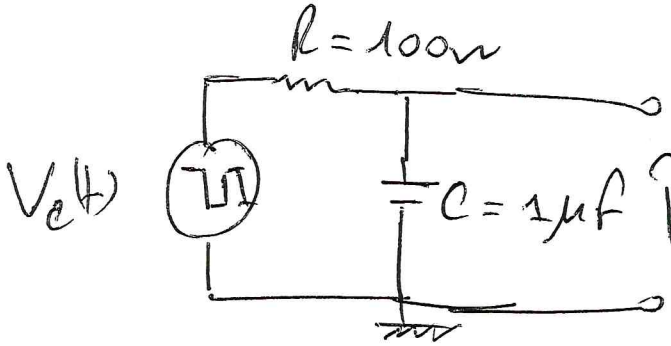
Chargé de module: GUERMAT Nourdil

Option: Electronique (3ème année LMD).

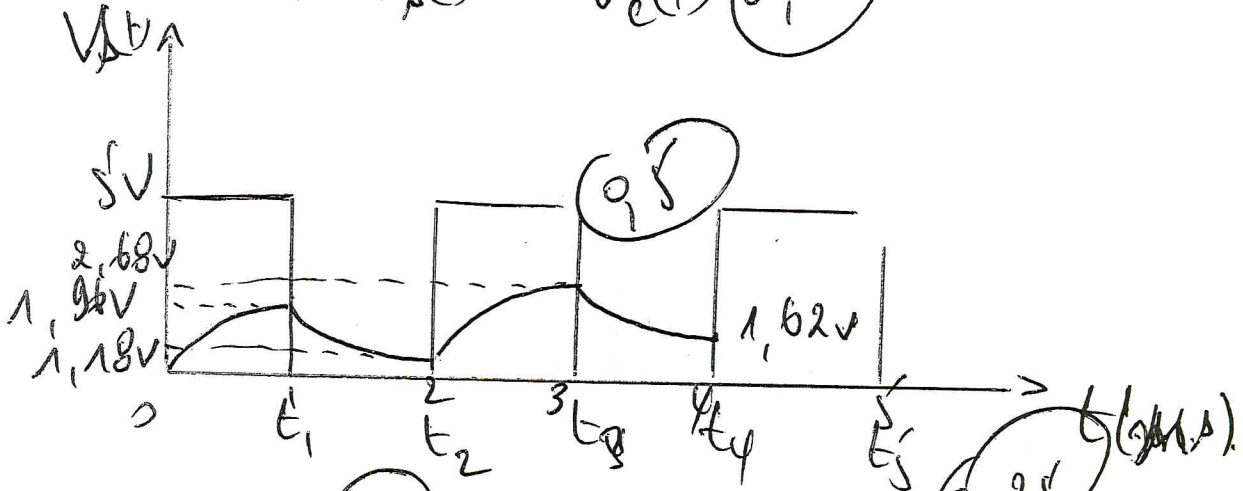
Correction du contrôle n° 1

Module: Electronique des impulsions.

Ex n° 1: (6 points).




$\Rightarrow V_s(t) = V_e(t)$ 0,25




0,5

$\tau = RC$ 0,25 $\Rightarrow$ A.N: $\tau = 10ms$ 0,25

* Pour $t_1 = t_2 = 5ms$. $\Rightarrow V_s(t_1) = E(1 - e^{-t_1/\tau})$ (charge) 0,25 0,5

$\Rightarrow$ A.N: $V_s(t_1) = 1,96V$. 0,5

* Pour $t_2 = 5ms$. (décharge) $\Rightarrow V_s(t_2) = E \cdot e^{-t_2/\tau}$ 0,25 0,5

A.N: $V_s(t_2) = 1,18V$. 0,5

- Pour $t_3 = 5\,ms$ . (calcul) $\Rightarrow V_s(t_3) = E + (V_s(t_3) - E)$ (0,25) (0,5)

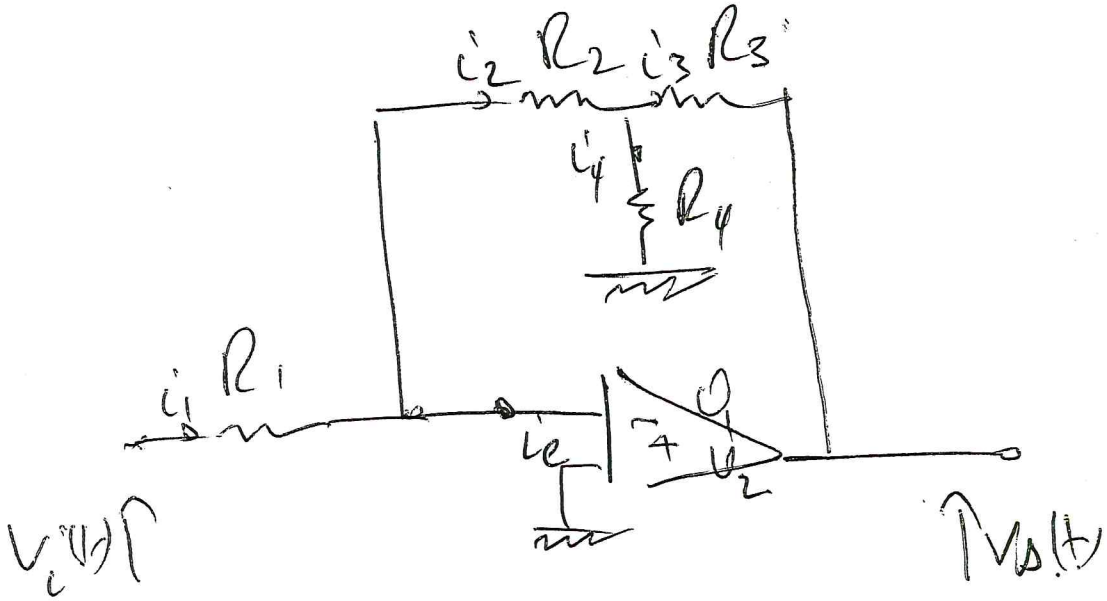
A.N : $V_s(t_3) = 2{,}68\,V$ (0,5)

- Pour $t_4 = 5\,ms$.

$\Rightarrow V_s(t_4) = V_s(t_3) \cdot e^{-t_4/\tau}$ (0,5) (calcul) (0,25)

A.N : $V_s(t_4) = 1{,}62\,V$ (0,5)

Exo 2 : (7 points)




1/ $v_i = ?\ f(R_1, i_1)$.

$\Rightarrow \boxed{v_i = R_1 \cdot i_1}$ (1) — (1)

$v_1 - v_i + R_1 i_1 = 0$.

2/ $i_2 = ?\ f(v_i, R_2)$ (0,25)

$\Rightarrow i_1 = i_2$ (0,25)

$\Rightarrow \boxed{i_2 = v_i / R_1}$ (1) — (2)

3°/ $i_4 \overset{?}{=} f(v_i, R_2, R_1, R_4)$.

$R_4 \cdot i_4 + i_2 \cdot R_2 - v_i = 0$ (0,25)

$\Rightarrow \boxed{i_4 = -\frac{R_2}{R_1 \cdot R_4} \cdot v_i}$ (1) — (4)

4°/ $i_3 \overset{?}{=} f(v_i, v_s, R_1, R_2, R_3)$.

$v_s + R_3 \cdot i_3 - R_4 \cdot i_4 = 0$. (0,25)

$\Rightarrow \boxed{i_3 = -\frac{R_2}{R_1 \cdot R_3} \cdot v_i - \frac{v_s}{R_3}}$ (1) — (6)

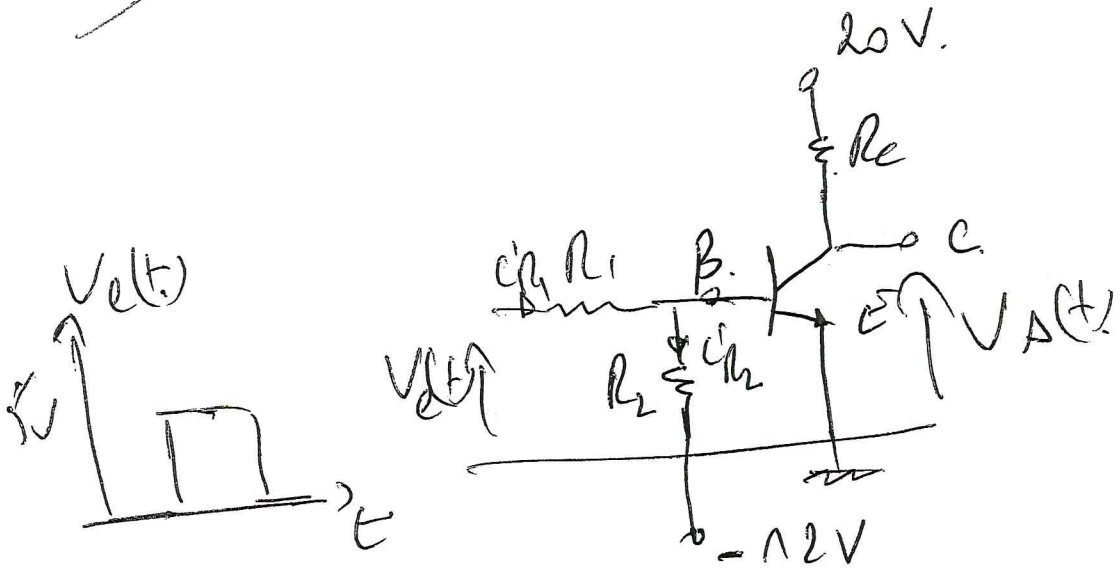
5°/ $A_v \overset{?}{=} \frac{v_s}{v_i}$

$\boxed{A_v = -\frac{R_3}{R_1} \cdot \left(\frac{R_2}{R_3} + \frac{R_2}{R_4} + 1\right)}$ (1) — (6)

6°/ $A_v = ?$ pour $R = R_1 = R_2 = R_3 = R_4$.

$\Rightarrow \boxed{A_v = -3}$ (1)

Ex n° 3




$\Rightarrow R_c = \dfrac{V_{cc} - V_{CE(sat)}}{I_C}$ (0,5)

A.N: $R_c = 985\ \Omega$ (1)

T est saturé :

$i_{R_1} = \dfrac{V_e(t) - V_{BE(sat)}}{R_1}$ (0,5)

A.N: $i_{R_1} = \dfrac{4,4}{R_1}$

$i_{R_2} = \dfrac{V_{BE(sat)} - (-12)}{R_2}$ (0,5)

12,6/

$$i_{R_1} = i_{R_2} + i_\beta$$

$$\boxed{\frac{4,4}{R_1} = 0,4\,10^{-3} + \frac{12,6}{R_2}} \quad (1)$$

* Test blocage :

$$i_{R_1} = \frac{-V_{BE(bloq)}}{R_1} \quad (0,5)$$

AN $\quad \boxed{i_{R_1} = \frac{0,6}{R_1}}$ —

$$i_{R_2} = \frac{12 + V_{BE(bloq)}}{R_2} \quad (0,5)$$

AN $\quad \boxed{i_{R_2} = \frac{11,4}{R_2}}$ —

$$\Rightarrow \boxed{R_2 = 19\,R_1} \quad (1)$$

$$\Rightarrow \begin{cases} R_1 = 9,35\ k\Omega & (0,5) \\ R_2 = 177,65\ k\Omega & (0,5) \end{cases}$$