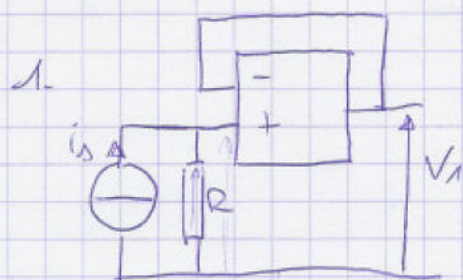


A ETUDE DU CAPTEUR



$$V^+ = V^-$$

$$V^+ = R i_s = V_1$$

$$R = \frac{V_1}{i_s} = \frac{12}{20 \cdot 10^{-6}} = 600 \text{ k}\Omega$$

2.

pas de zéro car $f_0 \approx 0$

1^{er} ordre : -20 dB/dec

(2^d ordre) : -40 dB/dec

$$U_s = 0,01 U_e$$

$$\frac{U_s}{U_e} = T = 0,01$$

$$G = -20 \log T = -20 \log 0,01$$

$$G = -40 \text{ dB/dec}$$

$20 \text{ dB/dec} \rightarrow 40 \text{ dB/dec}$
 $\rightarrow 2 \text{ dec}$

$$2 \text{ dec} = 100$$

$$f_0 = 100 f_c$$

$$f_c = 5 \text{ kHz}$$

3



$$T = \frac{V_2}{V_1} = \frac{Z_c}{Z_c + R} = \frac{\frac{1}{j\omega C}}{R + \frac{1}{j\omega C}} = \frac{1}{1 + j\omega RC}$$

$$= \frac{1}{1 + (RC\omega)^2}$$

$$RC 2\pi f_c = 1$$

$$f_c = \frac{1}{2\pi RC} \Rightarrow C = \frac{1}{2\pi R f_c} = 4,7 \cdot 10^{-10} \\ = 0,47 \text{ nF}$$

4) Avant échelon $V_2 = V_1$

Après échelon $V_2 = V_1 + \Delta V_1$

$$V_1 = V_2 + RC \frac{dV_2}{dt}$$

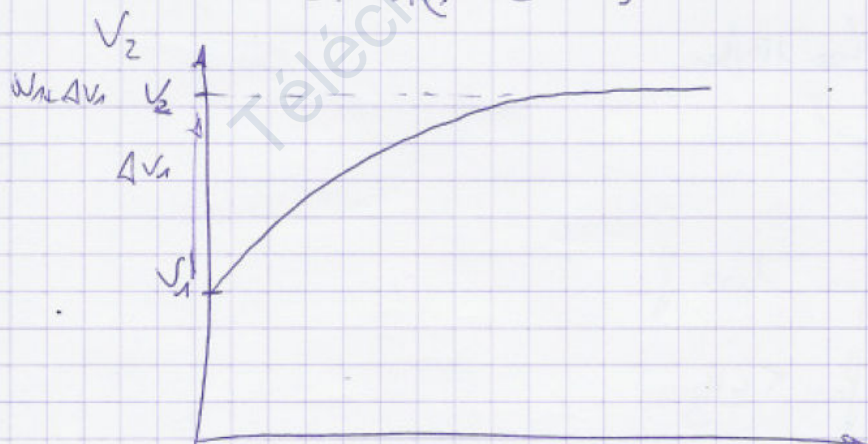
$$\left. \begin{array}{l} \text{Sol. générale: } V_2 = K e^{-\frac{t}{RC}} \\ \text{Sol. particulière: } V_2 = V_1 + \Delta V_1 \end{array} \right\} V_2 = K e^{-\frac{t}{RC}} + V_1 + \Delta V_1$$

à $t=0$ $V_2 = V_1$

$$V_1 = K + V_1 + \Delta V_1$$

$$K = -\Delta V_1$$

$$V_2 = \Delta V_1 (1 - e^{-\frac{t}{RC}}) + V_1$$



B - ETUDE D'UN C.A.N

I Dimensionnement

$$1) \quad 2^3 < 9999 < 2^{14}$$

$$8192 < 9999 < 16384$$

$$3) \quad 14 \text{ bits}$$

II ETUDE DU CAN

$$1) \quad B_0 \Pi = R$$

$$B_1 \Pi = \frac{(R+R)(2R)}{R+R+2R} = R$$

$$B_2 \Pi = R$$

$$B_3 \Pi = R$$

$$2) \quad V_0 = J R$$

$$J = \frac{V_0}{R}$$

$$3) \quad 2RI = 2RI_0$$

$$I = I_0$$

$$2RI_1 = 2RI + 2RI$$

$$I_1 = 2I$$

$$2RI_2 = 4IR + 2IR + 2RI$$

$$I_2 = 4I$$

$$2RI_3 = 8IR + 4IR + 2IR + 2RI$$

$$I_3 = 8I$$

$$J = 8I + I_3 = 16I$$

$$I_1 = \frac{V_0}{8R} \quad I_2 = \frac{V_0}{4R} \quad I_3 = \frac{V_0}{2R}$$

$$4) \quad J_1 = I_0 = \frac{V_0}{16R}$$

$$J_1 = I_3 = \frac{V_0}{2R}$$

$$\text{1011} \Rightarrow J_1 = I_3 + I_1 + I_0$$

$$= \frac{V_0}{16R} + \frac{V_0}{4R} + \frac{V_0}{2R}$$

$$J_1 = \frac{13V_0}{16R}$$

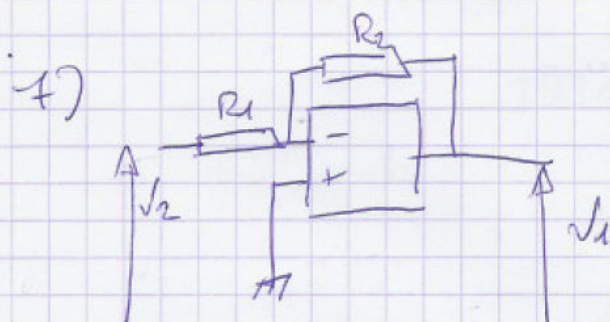
$$\begin{aligned} 5) \quad J_1 &= A_0 I_0 + A_1 I_1 + A_2 I_2 + A_3 I_3 \\ &= \frac{A_0 V_0}{16R} + \frac{A_1 V_0}{8R} + \frac{A_2 V_0}{4R} + \frac{A_3 V_0}{2R} \\ &= \frac{V_0}{16R} [A_0 + 2A_1 + 4A_2 + 8A_3] \\ &= \frac{V_0}{2^4 R} [2^3 A_3 + 2^2 A_2 + 2^1 A_1 + 2^0 A_0] \end{aligned}$$

$$\Delta J_1 = \frac{V_0}{16R} = \frac{8}{16 \times 10^3} = 95 \cdot 10^{-4} \text{ A}$$

$$\approx 905 \text{ mA}$$

J_1 peut prendre 16 valeurs

$$\begin{aligned} 6) \quad V_2 &= -R J_1 \\ &= -\frac{V_0}{2^4} [2^3 A_3 + 2^2 A_2 + 2^1 A_1 + 2^0 A_0] \end{aligned} \quad q = \frac{V_0}{2^4}$$



$$\left. \begin{aligned} V_1 &= -\frac{R_2}{R_1} V_2 \\ R_1 &= R_2 \end{aligned} \right\} V_1 = -V_2$$