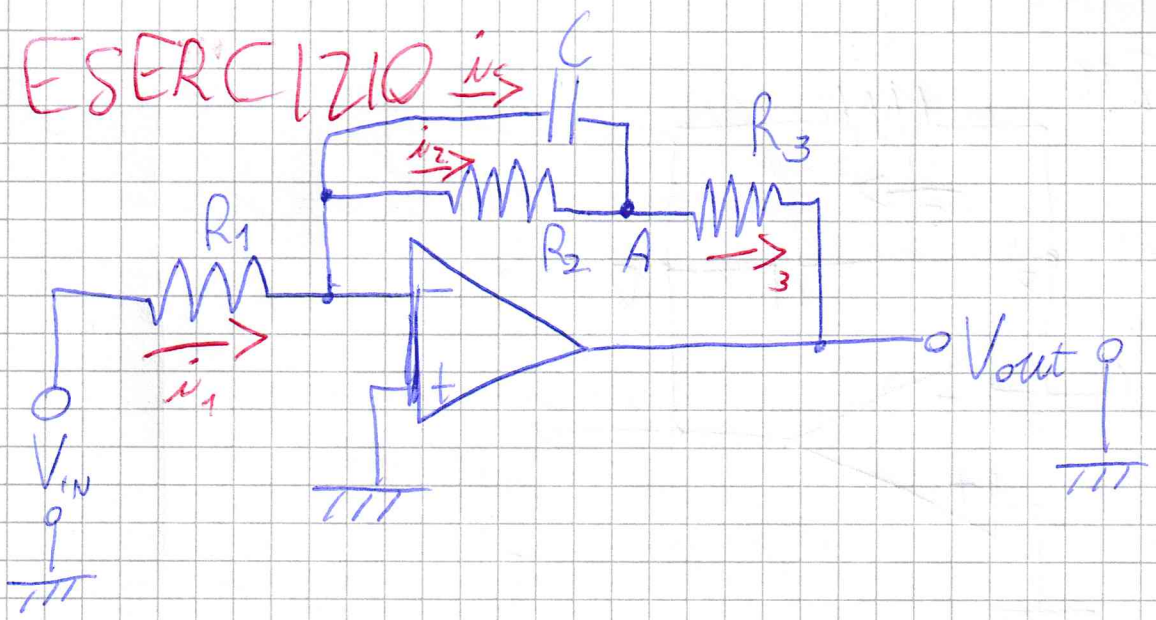
ESERCIZIO



$L^+ = |L^-| = 10V$

$R_1 = 100K\Omega$ $R_2 = 200K\Omega$ $R_3 = 100K\Omega$ $C = 10nF$

$t < 0$

$V_o = 0V$

$t \to +\infty$ C è in c.a., abbiamo ampl. invertente

$$V_o = V_{IN}\left(-\frac{R_2+R_3}{R_1}\right) = -3V_{IN} = -6V$$

trovo le equazioni del circuito

$$\begin{cases} V_{in} = i_1 R_1 \\ -V_A = V_C \\ -V_A = i_2 R_2 \\ i_2 + i_C = i_1 \\ V_A - V_0 = R_3 i_3 \\ i_3 = i_1 = i_2 + i_C \end{cases}$$

$$i_1 = \frac{V_{in}}{R_1}$$

$$V_C = i_2 R_2 = -V_A$$

$$-V_0 = R_3 i_3 - V_A = R_3 i_3 + V_C$$

$$V_{out} = -V_C - i_3 R_3 = -V_C - \frac{R_3}{R_1} V_{in} = -V_C - V_{in}$$

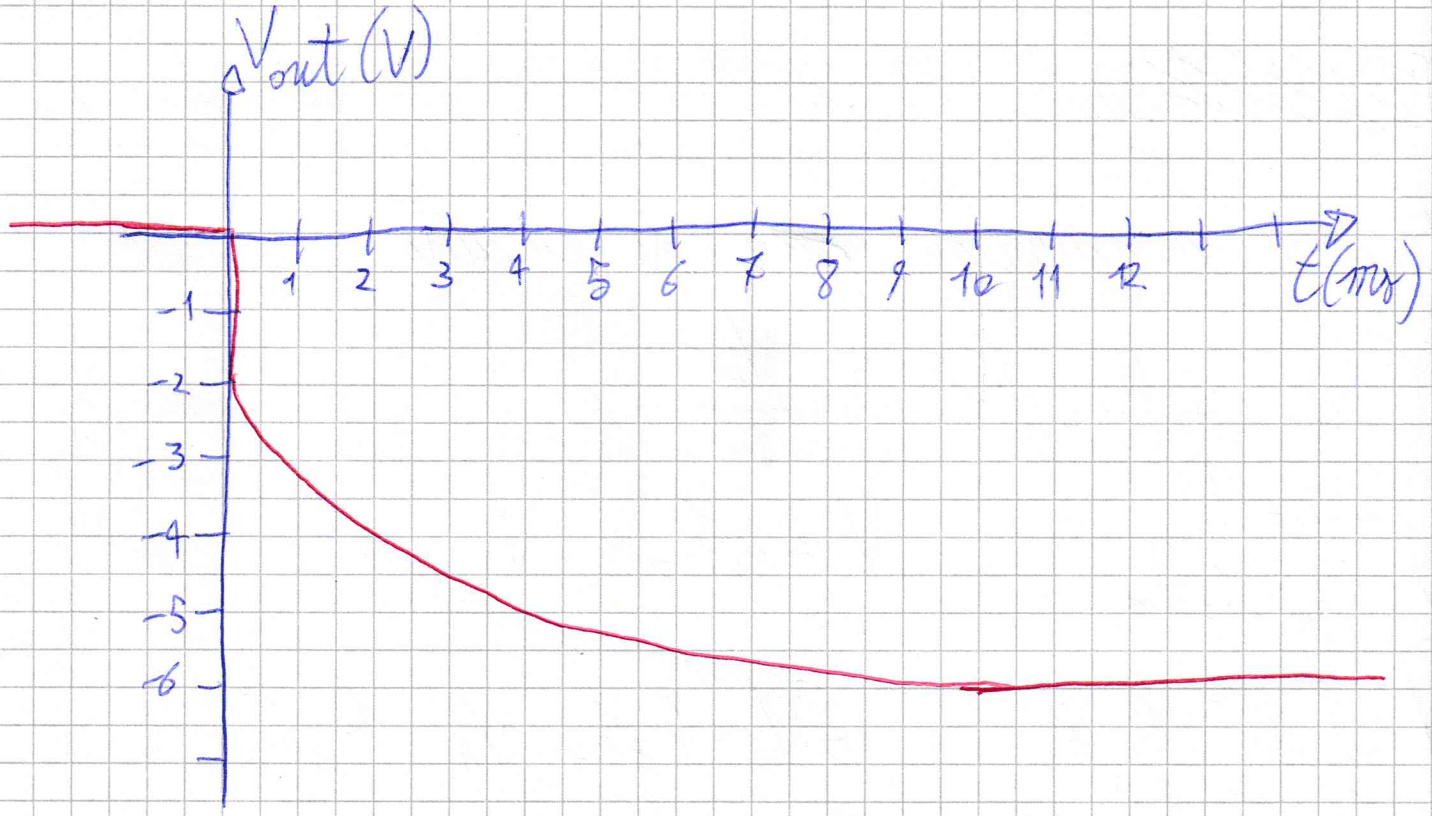
per $t = 0^-$ C è in C.A.

$V_{in} = 0\,V$

$V_{out} = 0\,V$

per $t = 0^+$ $\quad V_0 = 0 - 2V = -2V$

$$\tau = R_2 C = 200 \cdot 10^3 \cdot 10 \cdot 10^{-9} = 2000 \cdot 10^{-6} = 2\,ms$$


V_{out} (V)
1
2
3
4
5
6
7
8
9
10
11
12
t(ms)
-1
-2
-3
-4
-5
-6