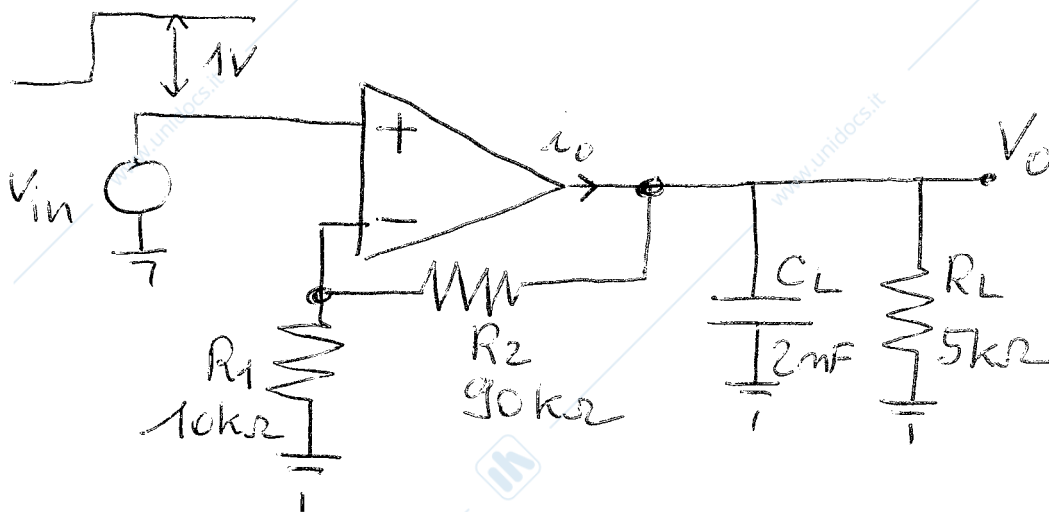


ESERCIZIO

1/

DATO L'AMPLIFICATORE IN FIGURA, SI APPLICA UN GRADINO DI 1V IN INGRESSO.

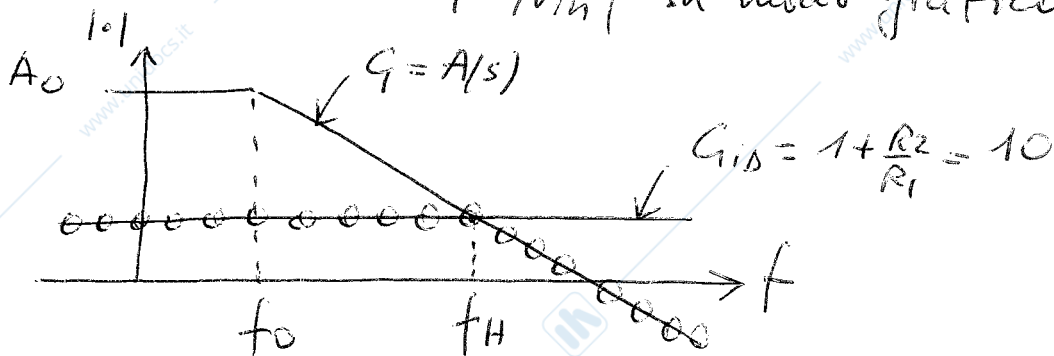
ASSUMENDO CHE $|i_o|_{\max} = 10 \text{ mA}$, GRAFICARE L'ANDAMENTO DI $i_o(t)$ E VERIFICARE SE LA LIMITAZIONE IN CORRENTE INTERVIENE O NEMO.

DATI:

$$GBWP = 10 \text{ MHz}$$

SOLUZIONE

Calcolo della FST $|V_o/V_{in}|$ in modo grafico:



Calcolo f_H (polo ad anello chiuso):

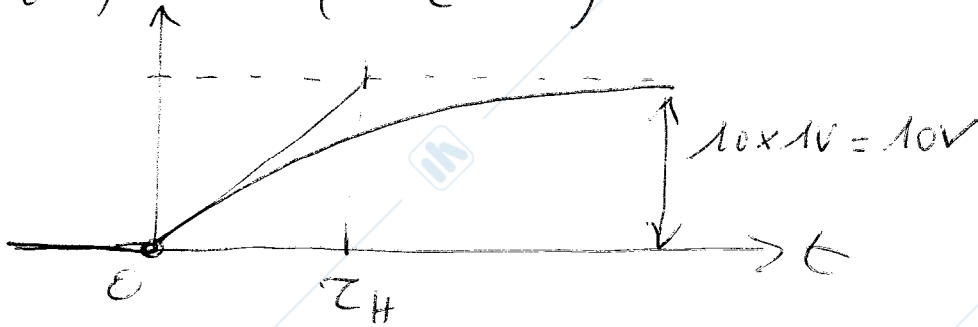
$$|A(f)| \approx \frac{A_0 f_0}{f} \quad \text{per } f \gg f_0 \Rightarrow \frac{A_0 f_0}{f_H} = 10 \Rightarrow \boxed{f_H = 1 \text{ MHz}}$$

$$\left(\tau_H = \frac{1}{2\pi f_H} = 0.16 \mu\text{s} \right)$$

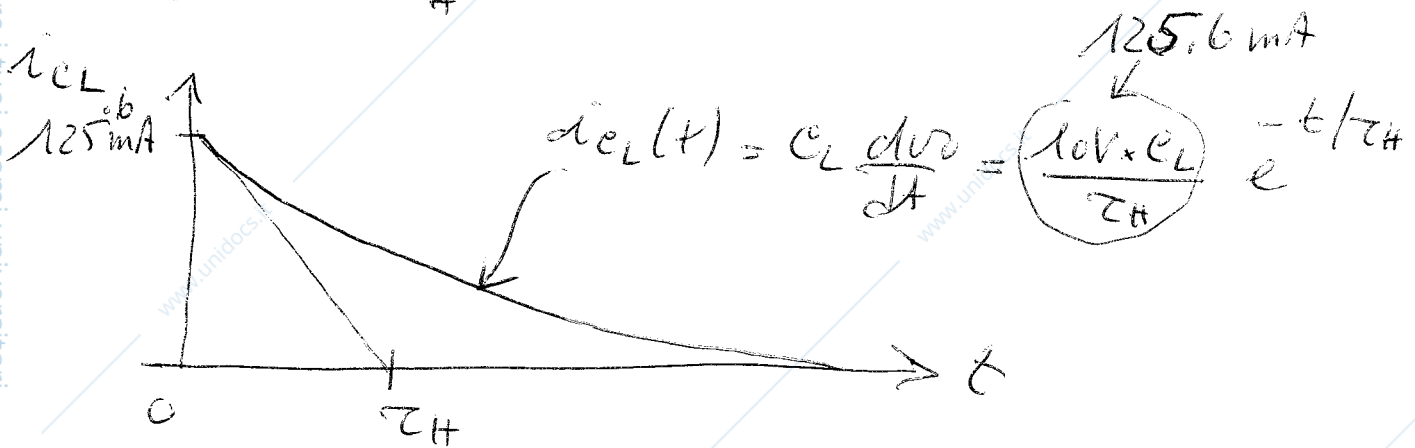
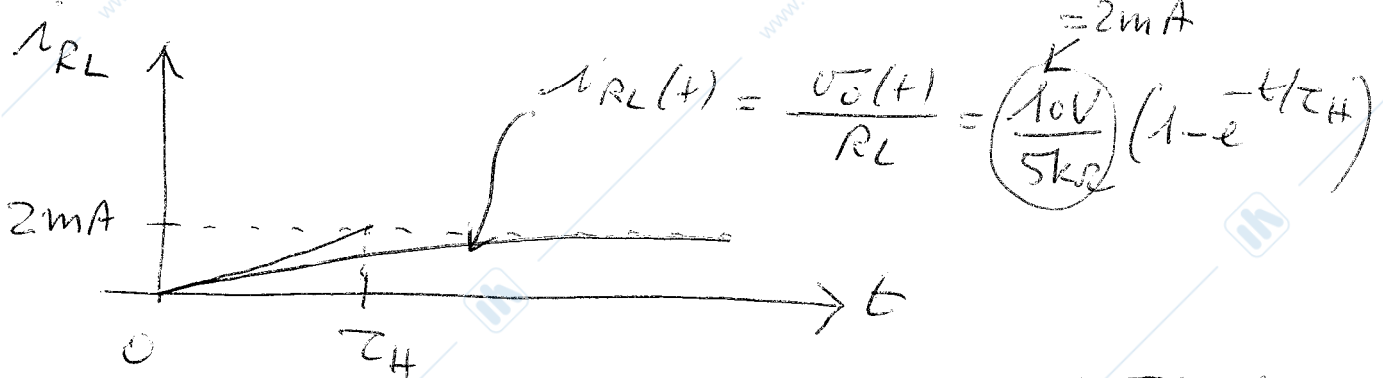
$$\Rightarrow D \frac{V_o}{V_{in}}(s) = \frac{G_{dB}}{1 + s\tau_H}$$

Dato che $v_o/v_{in}(s)$ ha 1 singolo polo, la risposta al gradino sarà:

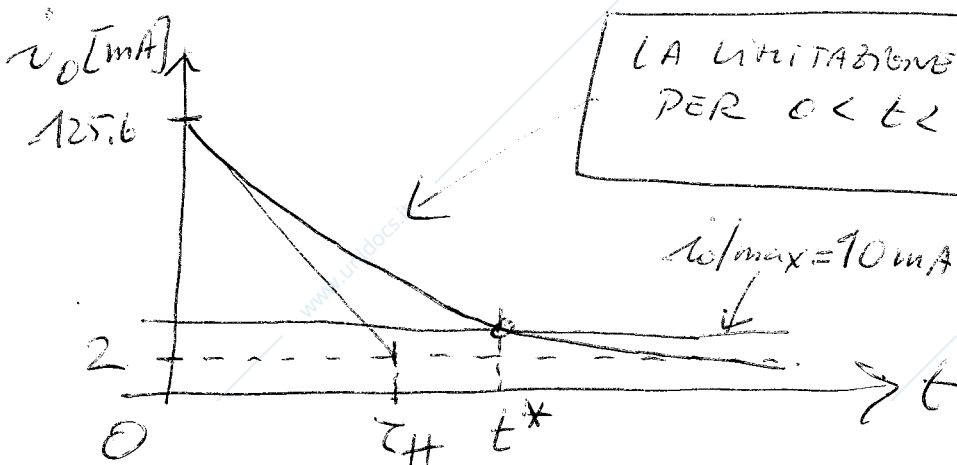
$$v_o(t) = 10V (1 - e^{-t/\tau_H})$$



Posso allora calcolare e disegnare $i_{RL}(t)$, $i_{CL}(t)$.



Da cui la corrente di uscita $i_o(t) = i_{RL} + i_{CL}$



LA LIMITAZIONE IN CORRENTE INTERVIENE PER $0 < t < t^* \approx 2.74 \tau_H \approx 0.44 \mu s$