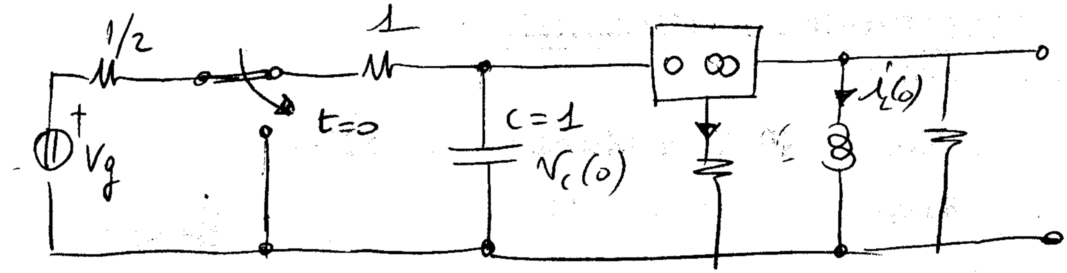
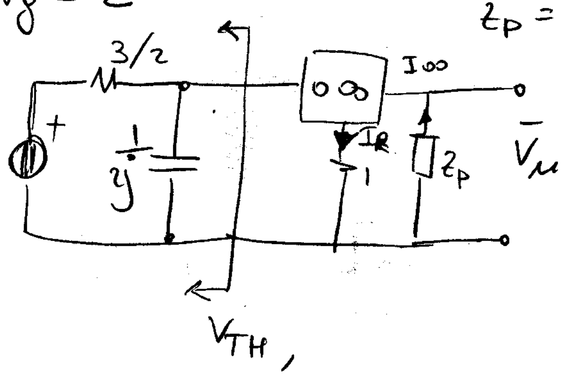


$$+\quad v_r(t)\quad -$$ per tutto l'asse dei tempi

$\forall\, t \leq 0 \Rightarrow$ FASORI: determino $v_c(t)$, $i_L(t)$ e $v_r(t)$

$\bar{V}_g = 2$

$z_p = \dfrac{2j}{1+2j}$



$$\bar{V}_{TH} = \bar{V}_c = \frac{\bar{V}_g}{\frac{3}{2} + \frac{1}{j2}} \cdot \frac{1}{jc} = \frac{2}{2+6j}$$

$$\bar{V}_u = -z_p \cdot I_R = -z_p \cdot \frac{\bar{V}_c}{R} = -\frac{2j}{(1+2j)} \cdot \frac{2}{(2+6j)} = \frac{2}{5}\,\frac{j}{1-j} = \frac{1}{5}(-1+j)$$

$$= \frac{\sqrt{2}}{5}\, e^{j\,\mathrm{arctg}(-1)}$$

$$\Rightarrow \boxed{v_u(t) = \frac{\sqrt{2}}{5}\cos\left(2t - \pi/4\right) \quad t \leq 0}$$

$\forall$ Calcolo delle c. i.

$$-\ \bar{V}_c = \frac{1}{10}(1-3j) \Rightarrow v_c(t) = \frac{\sqrt{10}}{10}\cos\left(2t + \mathrm{arctg}(-3)\right)$$

$$v_c(0) = \frac{\sqrt{10}}{10}\cos\left(\mathrm{arctg}(-3)\right) = \frac{1}{10}\ [V]$$

$$-\ \bar{I}_L = \frac{\bar{V}_u}{2j} = \frac{1}{10}\left(-\frac{1}{j} + \frac{j}{j}\right) = \frac{1}{10}(1+j) \Rightarrow$$

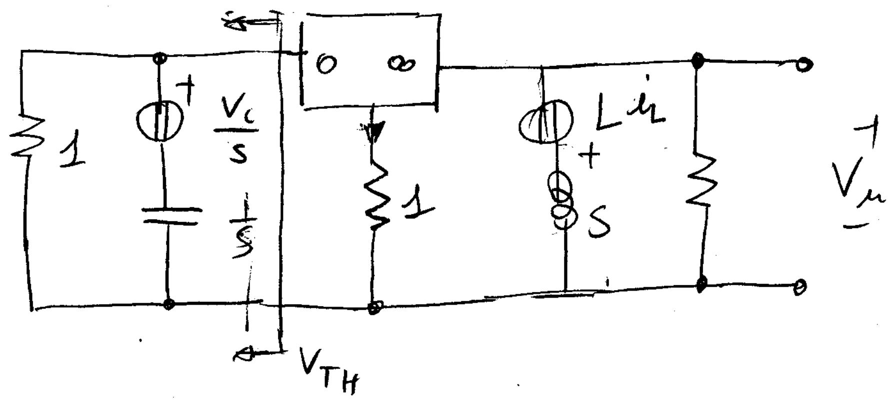
$$i_L(t) = \frac{\sqrt{2}}{10}\cos\left(2t + \pi/4\right)$$

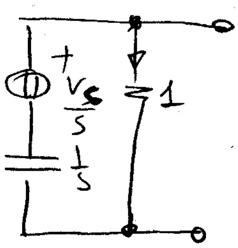
$$i_L(0) = \frac{1}{10}\ [A]$$

$$\boxed{\begin{array}{l} v_c = \frac{1}{10} \\ i_L = \frac{1}{10} \end{array}}$$

• $t > 0$ Transitorio per c.i. $\neq 0$

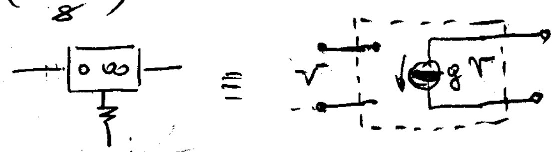
il circuito da considerare è:

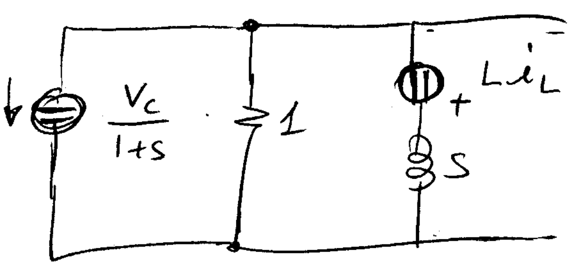




$$V_{TH} = \frac{V_c}{s\left(\frac{1}{s}+1\right)} = \frac{V_c}{\cancel{s}\left(\frac{1+s}{\cancel{s}}\right)} = \frac{V_c}{1+s} \Rightarrow$$

per il calcolo dell'uscita $\Rightarrow$





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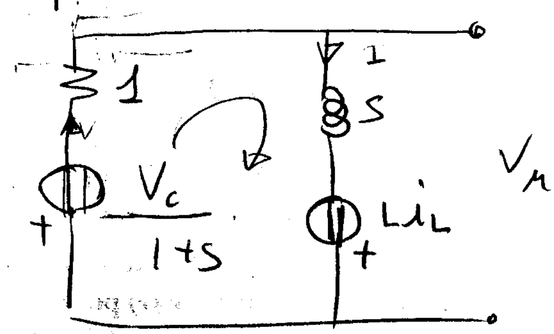

$$I = \frac{i_L - \frac{V_c}{1+s}}{1+s} = \frac{i_L(1+s) - V_c}{(1+s)(1+s)} = \frac{\cancel{\frac{1}{10}} + \frac{s}{10} - \cancel{\frac{1}{10}}}{(1+s)^2}$$

$$V_u = I \cdot s - i_L = \frac{s^2}{10(1+s)^2} - \frac{1}{10} = -\frac{2s+1}{10(s+1)^2}$$

$$= \frac{A}{(1+s)^2} + \frac{B}{(1+s)}$$

$$A = -\left.\frac{2s+1}{10}\right|_{s=-1} = \frac{1}{10} \; ; \quad B = \frac{d}{ds}\left[-\frac{2s+1}{10}\right] = -\frac{2}{10} \Rightarrow$$

$$V_u(s) = \frac{1}{10(1+s)^2} - \frac{2}{10(1+s)} \Rightarrow$$

$$\boxed{v_u(t) = \left[\frac{1}{10}\, t e^{-t} - \frac{2}{10}\, e^{-t}\right] u_{-1}(t)}$$