

C.d.L. Ingegneria Informatica
 Prova scritta di ELETTROTECNICA del 20-7-2022

1) Si calcoli la corrente $i_R(t)$ per $t \geq 0$, sapendo che la rete in figura 1 è a regime prima dell'istante $t=0$ s, in cui avviene la chiusura dell'interruttore K.

$$R_0=1\Omega, \quad R=2\Omega, \quad \gamma=2, \quad C=\frac{1}{5}\text{ F}, \quad I_0=100\text{ A}, \quad v_g(t)=260\cos(\omega t)\text{ V},$$

STANDARD: $\omega=1\text{ rad/s}$, $L=1\text{ H}$.

$$\left\langle \begin{aligned} i_R(t) &= -\frac{297}{2} e^{-7t} + \frac{135}{2} e^{-5t} + 111 \cos(t) + \frac{21}{2} \sin(t) = -148.5 e^{-7t} + 67.5 e^{-5t} + 111.5 \cos(t - 0.094) \text{ A} \\ \left[\begin{aligned} v_C(t) &= -99 e^{-7t} + 45 e^{-5t} + 74 \cos(t) + 7 \sin(t) \text{ V} \\ i_L(t) &= -\frac{297}{5} e^{-7t} + 45 e^{-5t} + \frac{97}{5} \cos(t) - \frac{4}{5} \sin(t) \text{ A} \end{aligned} \right. \end{aligned} \right\rangle$$

LIGHT: $\omega=0\text{ rad/s}$, $L=0\text{ H}$. $\left\langle \begin{aligned} i_R(t) &= -\frac{570}{7} e^{-\frac{35}{2}t} + \frac{780}{7} \text{ A} \\ v_C(t) &= -\frac{380}{7} e^{-\frac{35}{2}t} + \frac{520}{7} \text{ V} \end{aligned} \right\rangle$

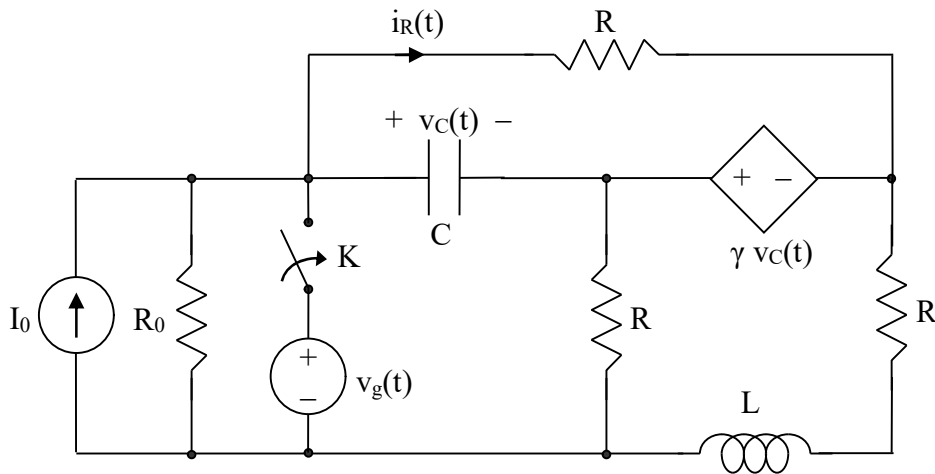


fig. 1

2) Dato il doppio bipolo di figura 2 in regime sinusoidale, calcolare la matrice di trasmissione diretta [T].

$$n=2, \quad R=1\Omega, \quad X_L=2\Omega, \quad X_C=-1\Omega,$$

STANDARD: $X_M=1\Omega$, $r_m=1\Omega$.

$$\left\langle [T] = \frac{1}{5} \begin{bmatrix} 12 + j15 & 14 + j18\Omega \\ 1 + j5 & 3 + j \end{bmatrix} \right\rangle$$

LIGHT: $X_M=0\Omega$, $r_m=0\Omega$.

$$\left\langle [T] = \frac{1}{4} \begin{bmatrix} 6 + j & 8 + j5\Omega \\ j5 & 2 + j \end{bmatrix} \right\rangle$$

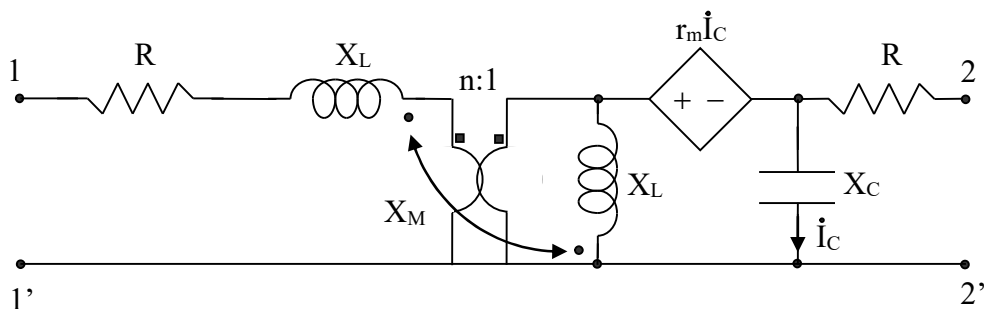


fig. 2