C.d.L. Ingegneria Informatica

Prova scritta di ELETTROTECNICA del 8-9-2022*

1) La rete in figura 1 è a regime prima dell'istante t=0 s, in cui l'interruttore k si chiude. Si calcoli la corrente $i_{L2}(t)$ per t≥0.

$$R_1 = 1\ \Omega,\ \ R_2 = 2\ \Omega,\ \ \alpha = \frac{1}{2},\ \ L_1 = 1\ \text{H},\ \ v_g(t) = 125\cos(\omega t)\ \text{V},$$

STANDARD: $L_2 = 2\ \text{H},\ \ \omega = 1\ {}^{\text{rad}}/_{\text{s}}.$

$$\left\langle \mathbf{i_{L2}(t) = -\,20\,e^{-2\,t} - \,6\,e^{-\frac{3}{4}t} + 26\cos(t) + 18\sin(t) = -20\,e^{-2\,t} - \,6\,e^{-0.75\,t} + 31.6\cos(t + 5.68)\ A} \right\rangle$$

$$\left[i_{L1}(t) = -\,60\,e^{-2\,t} + 12\,e^{-\frac{3}{4}t} + 48\,cos(t) + 14\,sin(t)\ A \right]$$

LIGHT: $L_2 = 0\ \text{H},\ \ \omega = 0\ {}^{\text{rad}}/_{\text{s}}.$ $\left\langle \mathbf{i_{L2}(t) = \frac{125}{3} + \frac{25}{3}e^{-\frac{6}{5}t}\ A} \right\rangle$ $\left[i_{L1}(t) = \frac{125}{3}\left(1 - e^{-\frac{6}{5}t}\right)\ A \right]$

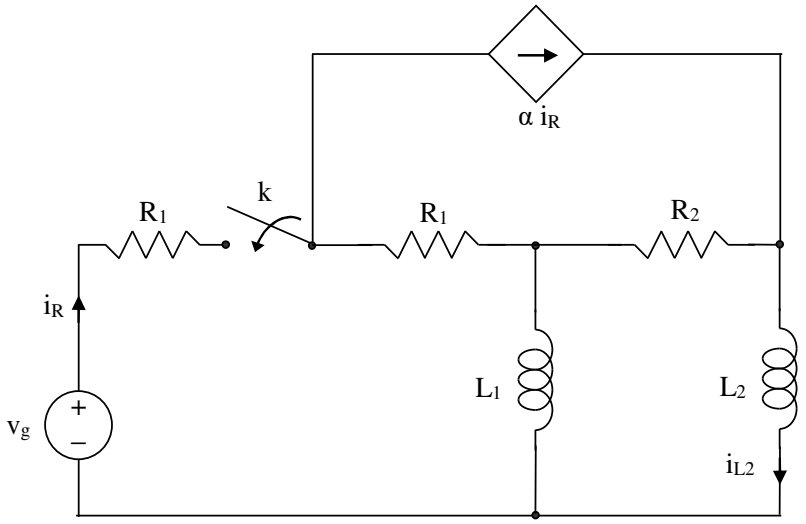

fig. 1

2) Calcolare la potenza attiva assorbita complessivamente dai resistori del circuito in regime sinusoidale di figura 2 (supponendo i fasori assegnati mediante il valore massimo).

$$R_1 = R_2 = R_3 = 5\ \Omega,\ \ X_C = -5\ \Omega,\ \ X_L = 5\ \Omega,$$

γ=1, $X_M = 5\ \Omega,\ \ \dot{I}_g = 26\ e^{j\frac{\pi}{2}}$ A.

STANDARD: $\left\langle \mathbf{P_R = Re\left\{A_{I_g} + A_\gamma\right\} = Re\{(1625 - j325) + (455 - j390)\} = 2080\ W;} \right\rangle$

LIGHT: γ=0, $X_M = 0\ \Omega.,\ \ \dot{I}_g = 5\ e^{j\frac{\pi}{2}}$ A. $\left\langle \mathbf{P_R = Re\left\{A_{I_g}\right\} = Re\left\{\left(\frac{125}{2} + j\frac{125}{2}\right)\right\} = 62.5\ W;} \right\rangle$

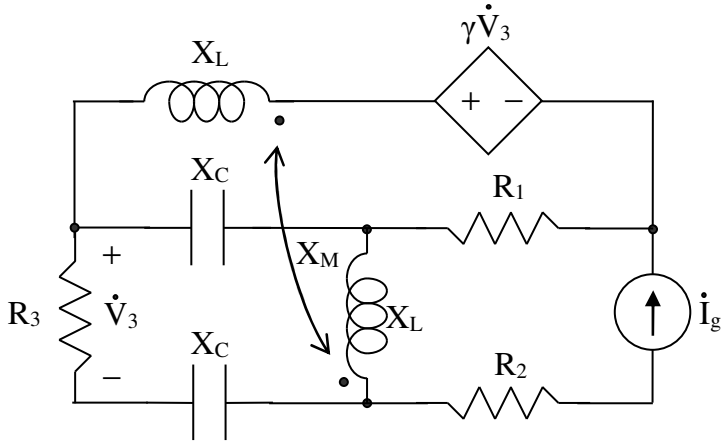

Fig. 2

* *in calendario il 5-9-2022*