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Prova scritta di ELETTROTECNICA del 20-3-2023

1) La rete in figura 1 è a regime prima dell'istante t=0 s, in cui l'interruttore K si apre. Si calcoli la tensione $v_C(t)$ per t≥0.

$$R = 5\ \Omega,\ \ \alpha = 4,\ \ C_1 = \frac{1}{5}\ \text{F},\ \ C_2 = \frac{2}{25}\ \text{F},\ \ V_1 = 12\ \text{V},\ \ I_2 = 6\ \text{A},$$

STANDARD: $R_0 = 0\ \Omega$. $\left\langle \mathbf{v_C(t) = 50\,e^{-\frac{1}{2}t} - 20\,e^{-\frac{5}{4}t} + 24\ V} \right\rangle$ $\left\langle \left[v_{C_2}(t) = 25e^{-\frac{1}{2}t} + 20\,e^{-\frac{5}{4}t} + 60\,V \right] \right\rangle$

LIGHT: $G_0 = {}^{1}/_{R_0} = 0$ S. $\left\langle \mathbf{v_C(t) = 30\,e^{-\frac{5}{8}t} + 24\ V} \right\rangle$

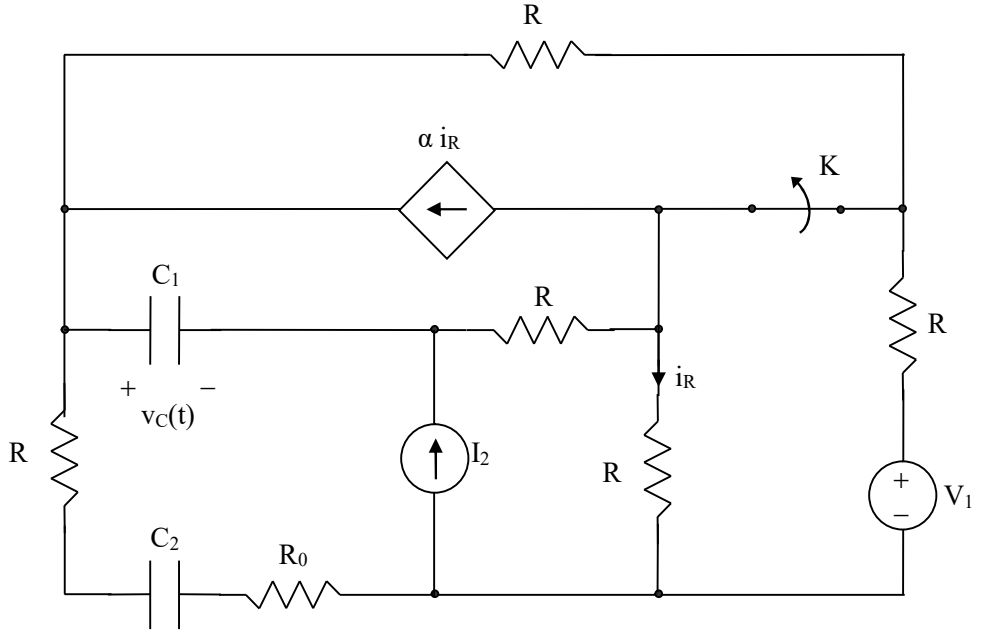

fig. 1

2) Data la rete di figura 2 in regime sinusoidale, calcolare il fasore della corrente $\dot{I}_R$.

STANDARD: $R_1 = R_2 = 1\ \Omega,\ \ R_3 = 3\ \Omega,\ \ R_4 = 4\ \Omega,$
$X_1 = 2\ \Omega,\ \ X_2 = 8\ \Omega,\ \ X_M = 1\ \Omega,\ \ \alpha = 2,$
$\dot{V}_G = 433(1 + j)$ V. $\left\langle \mathbf{\dot{I}_R = 41 + j22\ A} \right\rangle$

LIGHT: $R_1 = R_2 = R_3 = R_4 = 2\ \Omega,\ \ X_1 = X_2 = 2\ \Omega,$
$X_M = 0\ \Omega,\ \ \alpha = \frac{1}{2},\ \ \dot{V}_G = 125(1 + j)$ V. $\left\langle \mathbf{\dot{I}_R = 13 + j9\ A} \right\rangle$

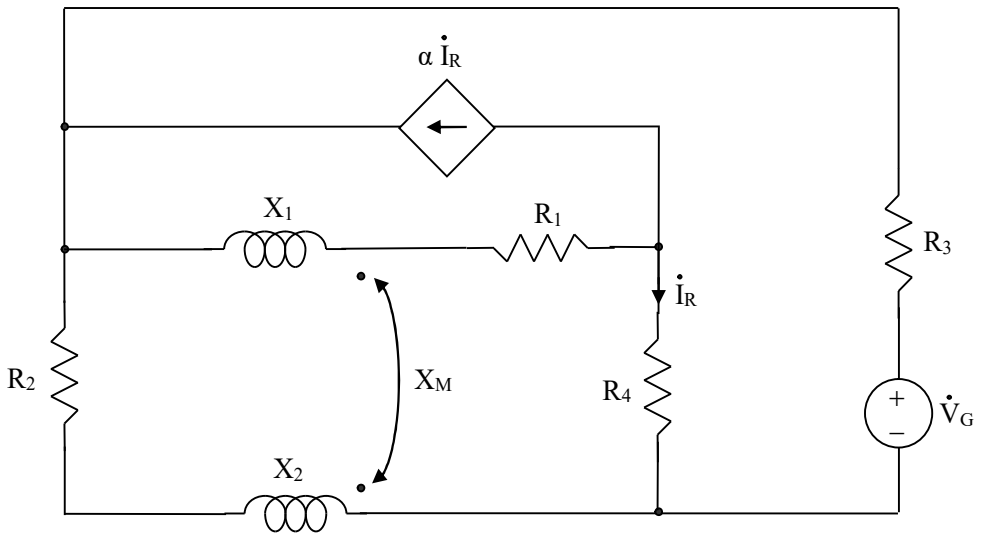

fig. 2