

$$(a) \quad 1. \bar{Z}_1 = \frac{j2 \times (j1)}{j2 + j(j1)} = -2j$$

$$\bar{Z}_{\Sigma} = 1 - 2j$$

$$(b) \quad \bar{Z} = 1 + \frac{-j(1+j)}{-j+1+j} = 2-j$$

$$(c) \quad \bar{Z} = \frac{(40+j40)(40-j40)}{40+j40+40-j40} = 40$$

$$(d) \quad \dot{U} = j\dot{I}WL - \gamma\dot{I}$$

$$= jWL\dot{I} - \gamma\dot{I}$$

$$\bar{Z} = \frac{\dot{U}}{\dot{I}} = -\gamma + WLj$$

9-4.

$$\dot{U}_S = 16\angle 60^\circ$$

$$\dot{I} = 5\angle \varphi$$

$$\dot{I}_2 = I_2\angle \varphi_2$$

$$\dot{I}_1 = I_1\angle \varphi_2 + 90^\circ$$

$$5\angle \varphi = I_2\angle \varphi_2 + I_1\angle \varphi_2 + 90^\circ$$

$$16\angle 60^\circ = 20\angle \varphi_2 + 90^\circ + 3I_2\angle \varphi_2, \text{ 两式左右同除 } 1\angle \varphi_2, \text{ 设 } \varphi_2 - \varphi = \varphi', -60^\circ - \varphi_2 = \varphi_2' = \varphi_2'$$

取实数解得

$$\begin{cases} 15\cos\varphi' - 20\sin\varphi' = 16\cos\varphi_2' \\ 20\cos\varphi' = 16\sin\varphi_2' \end{cases}$$

$$I_1 = 5\sin\varphi'$$

$$I_2 = 5\cos\varphi'$$

$$\text{解得 } \begin{cases} I_1 = 3\angle -60^\circ A \\ I_2 = 4\angle -50^\circ A \end{cases} \quad I = 5\angle 13.3^\circ A$$

$$I_1 = 4.799\angle -12.9^\circ A, I_2 = 1.404\angle 55.1^\circ A, I = 5\angle 13.3^\circ A$$

\therefore 电流表A₁读数为4.8A, 读数为4A或A₁为4.799A, A₂为1.404A



$$\dot{I} = \dot{I}_C + \dot{I}_L$$

$$= I_2(-1000WC + 1 + 400jWC)$$

$$U_S = \dot{I} \cdot \dot{Z}_1 + \dot{I}_L \cdot \dot{Z}_L$$

$$= I_2(-1000WC + 1 + 400jWC)(10 + 50j) + I_2(400 + j1000)$$

$$= \cancel{-1000WC + 1 + 400jWC}$$

$$\therefore -10000WC + 10 - 20000WC + 400 = 0$$

$$WC = \frac{41}{3000} = 1.367 \times 10^{-4} S$$

9.8

$$\text{设 } U = 8 \angle 0^\circ$$

$$\dot{Z}' = \frac{\dot{Z}_1 \dot{Z}_2}{\dot{Z}_1 + \dot{Z}_2} = 1 + 0.5j \Omega$$

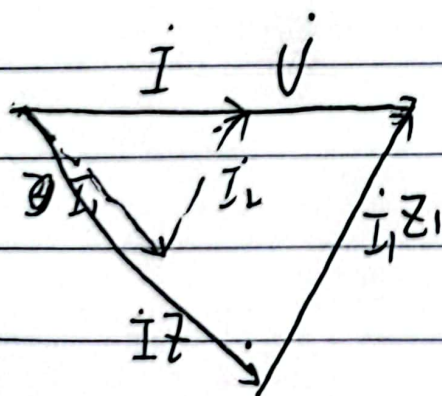
$$\dot{Z}_{\text{总}} = \dot{Z}' + \dot{Z} = 2 \Omega, \quad \gamma = \frac{1}{Z} = 0.5 S$$

$$\dot{I} = \frac{U}{\dot{Z}_{\text{总}}} = 4 \angle 0^\circ, \quad \dot{I} \dot{Z} = 4 - 2j$$

$$\dot{I}_1 = \dot{I} \cdot \frac{\dot{Z}_2}{\dot{Z}_1 + \dot{Z}_2} = (3 - j) A$$

$$\dot{I}_L = \dot{I} - \dot{I}_1 = 1 + j A$$

画相量图如图:



9-9.

设电路中电流

$$\dot{I} = I \angle 0^\circ, I = \frac{U_C}{X_C} = 1A$$

$$\dot{U} = \dot{I} \cdot j\omega X_C + \dot{I} Z_X$$

$$U = 100V$$

$$\frac{U_C + (IZ_X) = U}{2U_C I Z_X} = \cos \varphi'$$

$$\varphi = 150^\circ \text{ 或 } 30^\circ, U = 100V < U_C = 100\sqrt{3}V, \varphi_X = 60^\circ, \varphi = 30^\circ$$

$$\text{解得: } Z_X = 100 \text{ 或 } 200\Omega$$

$$\therefore Z_X = 100 \angle 60^\circ \text{ 或 } 200 \angle 60^\circ$$

$$Z_X = 50 + j50\Omega \text{ 或 } Z_X = 100 + j100\Omega$$

$$Z = Z_X + Z_C$$

$$Z = 50 - j50\Omega \text{ 或 } 100\Omega$$

