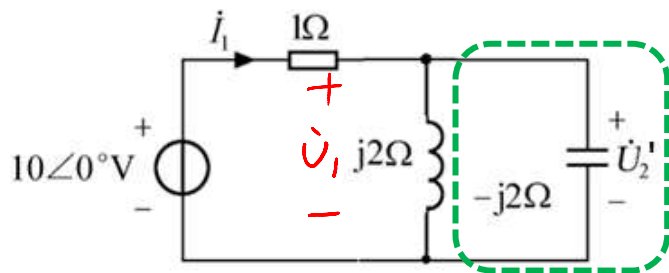
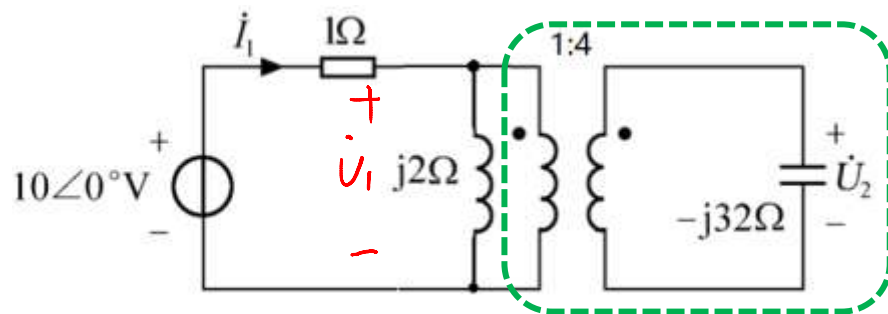
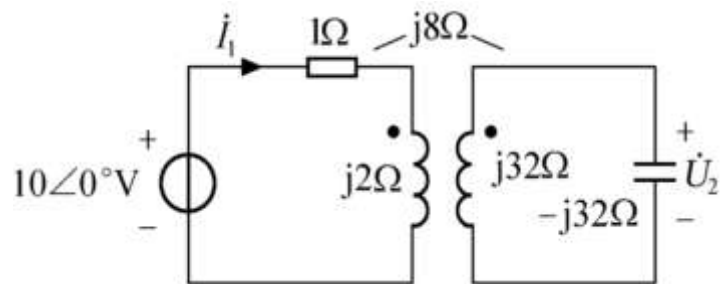




# 耦合电感和变压器

## 习题讲解（二）

1. 电路如题图所示，试求电流相量  $i_1$  和电压相量  $\dot{U}_2$  。

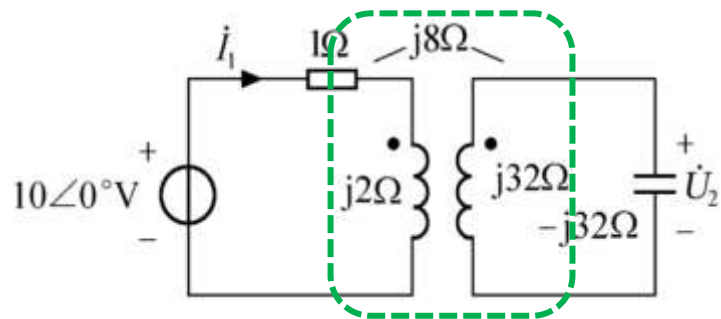


$$M = \sqrt{L_1 L_2}$$

$$\frac{n_1}{n_2} = \sqrt{\frac{L_1}{L_2}} = \frac{1}{4} \quad i_1 = 0$$

$$\dot{U}_1 = 10\angle 0^\circ \text{V} \quad \dot{U}_2 = 40\angle 0^\circ \text{V}$$

1. 电路如题图所示，试求电流相量  $\dot{I}_1$  和电压相量  $\dot{U}_2$ 。

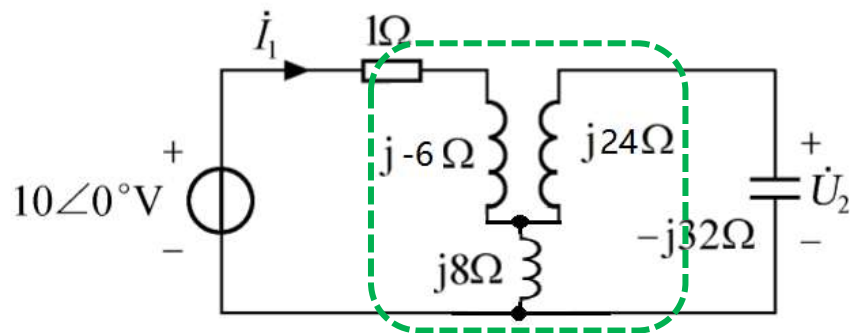


$$\begin{cases} [1 + j(-6) + j8]\dot{I}_1 - j8\dot{I}_2 = 10\angle 0^\circ \\ (j8 + j24 - j32)\dot{I}_2 - j8\dot{I}_1 = 0 \end{cases}$$

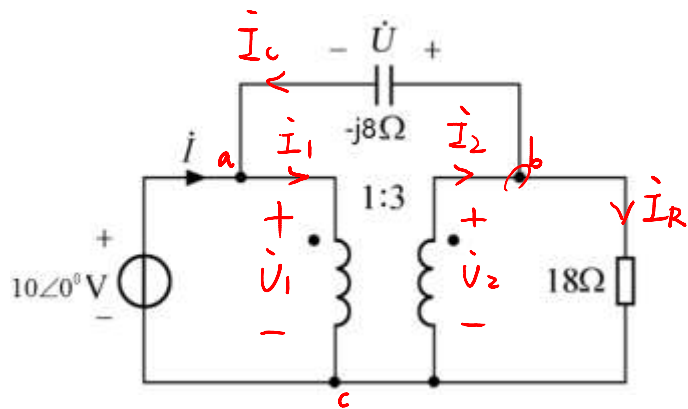
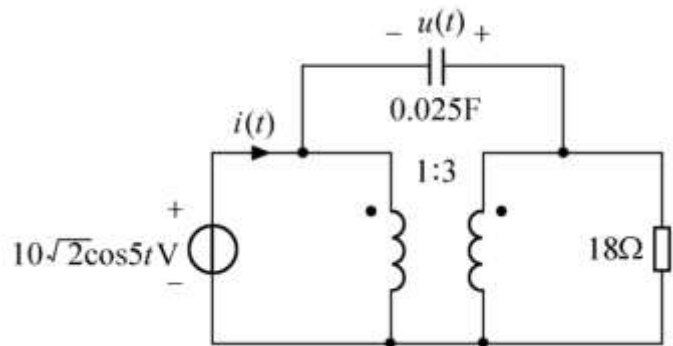
$$\dot{I}_1 = 0$$

$$\dot{I}_2 = \frac{5}{4} \angle 90^\circ \text{ V}$$

$$\dot{U}_2 = 40 \angle 0^\circ \text{ V}$$



2. 求题图所示正弦稳态电路中的  $u(t)$  和  $i(t)$ 。



$$\dot{U} = 30\angle 0^\circ - 10\angle 0^\circ = 20\angle 0^\circ \text{ V}$$

$$u(t) = 20\sqrt{2} \cos 5t \text{ V}$$

$$\dot{I}_C = \frac{\dot{U}}{-j8} = \frac{5}{2} \angle 90^\circ \text{ A} \quad \dot{I}_R = \frac{30\angle 0^\circ}{18} = \frac{5}{3} \angle 0^\circ \text{ A}$$

$$\dot{I}_2 = \dot{I}_C + \dot{I}_R = \frac{5}{3} + j\frac{5}{2} \text{ A} \quad \dot{I}_1 = 5 + j\frac{15}{2} \text{ A}$$

$$\dot{I} = \dot{I}_1 - \dot{I}_C = 5\sqrt{2} \angle 45^\circ \text{ A}$$

$$i(t) = 10 \cos(5t + 45^\circ) \text{ V}$$

THE END