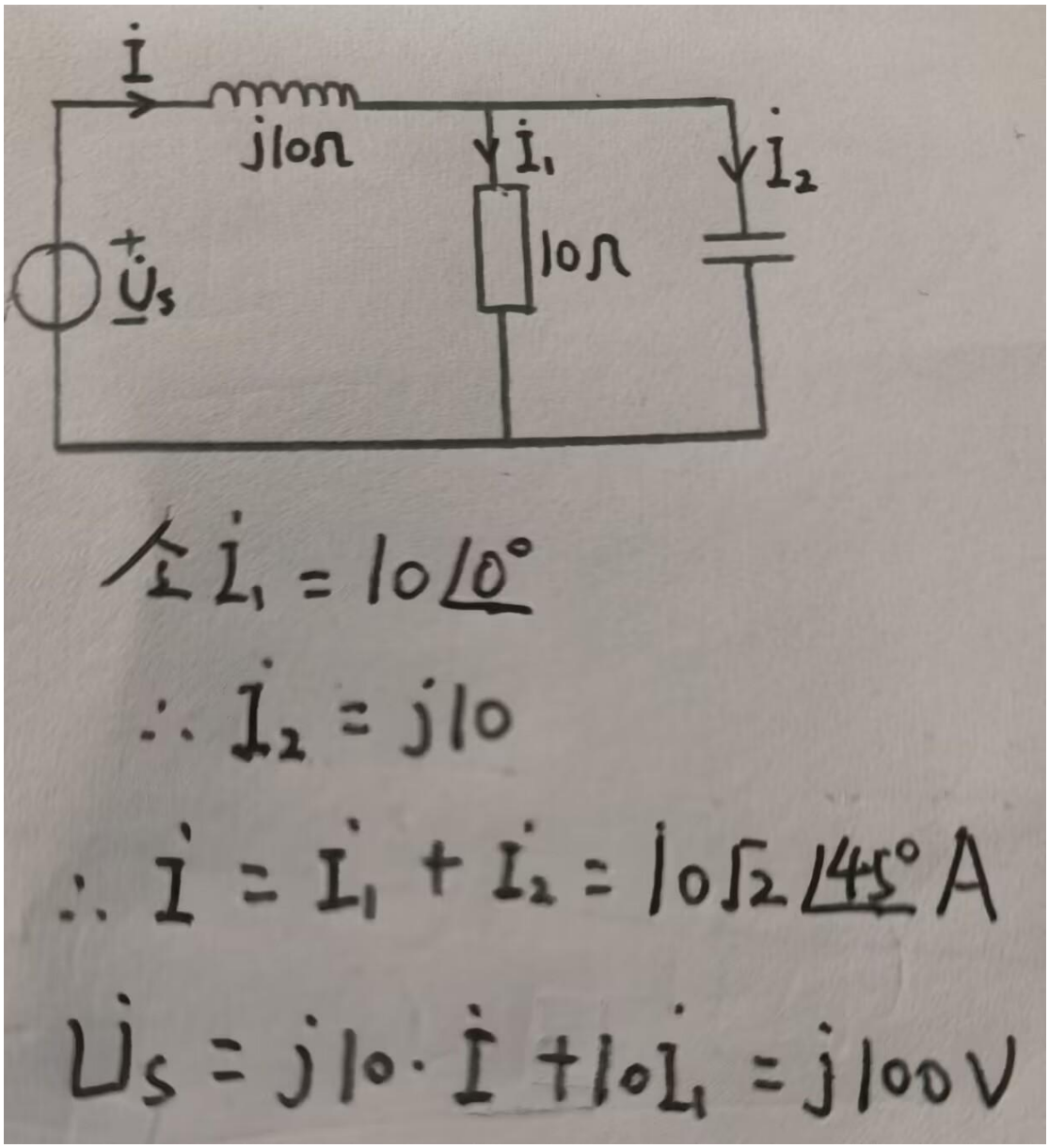
电路作业（七）

8-10



$\because \dot{I}_1 = 10\angle 0°$

$\therefore \dot{I}_2 = j10$

$\therefore \dot{I} = \dot{I}_1 + \dot{I}_2 = 10\sqrt{2}\angle 45° A$

$\dot{U}_S = j10 \cdot \dot{I} + 10\dot{I}_1 = j100 V$

8-14

解：$\dot{U}_S = \frac{100}{\sqrt{2}} \angle 0° \text{ V}$

$j\omega L = j25\ \Omega$

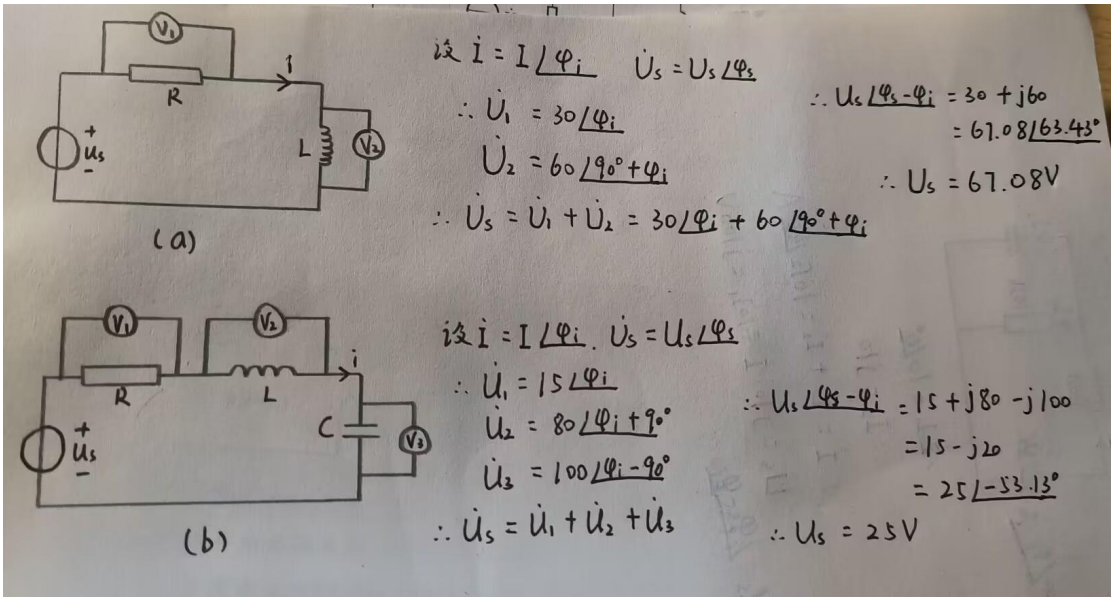
$\dot{U}_L = \frac{j25}{R+j25} \cdot \dot{U}_S$

$\therefore R = 66.14\ \Omega$

$\dot{I} = \frac{\dot{U}_S}{R+j25} = 1\angle -20.7° \text{ A}$

$\therefore i = \sqrt{2}\cos(10^3 t - 20.7°) \text{ A}$

8-15



设 $\dot{I} = I\angle\varphi_i$　$\dot{U}_S = U_S\angle\varphi_S$

$\therefore \dot{U}_1 = 30\angle\varphi_i$

$\dot{U}_2 = 60\angle 90° + \varphi_i$

$\therefore \dot{U}_S = \dot{U}_1 + \dot{U}_2 = 30\angle\varphi_i + 60\angle 90° + \varphi_i$

$\therefore U_S\angle\varphi_S - \varphi_i = 30 + j60$

$= 67.08\angle 63.43°$

$\therefore U_S = 67.08V$

设 $\dot{I} = I\angle\varphi_i$. $\dot{U}_S = U_S\angle\varphi_S$

$\therefore \dot{U}_1 = 15\angle\varphi_i$

$\dot{U}_2 = 80\angle\varphi_i + 90°$

$\dot{U}_3 = 100\angle\varphi_i - 90°$

$\therefore \dot{U}_S = \dot{U}_1 + \dot{U}_2 + \dot{U}_3$

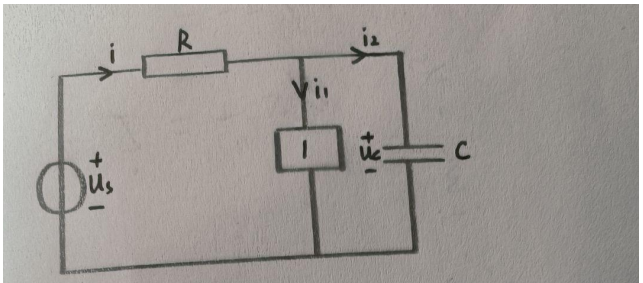
$\therefore U_S\angle\varphi_S - \varphi_i = 15 + j80 - j100$

$= 15 - j20$

$= 25\angle -53.13°$

$\therefore U_S = 25V$

8-20



(1) $i_2 = C\cdot\frac{du_C}{dt} = 4\sqrt{2}\cos 10^6 t\ V$

$\dot{U}_S = 25\angle -126.87°\ V$. $\dot{U}_C = 20\angle -90°\ V$

$\dot{I} = \frac{\dot{U}_S - \dot{U}_C}{R} = -5A$

$i = -5\sqrt{2}\cos 10^6 t\ A$

$\therefore i_1 = i - i_2 = -9\sqrt{2}\cos 10^6 t\ A$

(2) $\dot{I}_1 = -9A = 9\angle 180°\ A$

$\therefore \Delta\varphi = -90° - 180° = -270°$

$\therefore \Delta\varphi = 90°$

电压超前电流90°

∴ 支路1可能是电感