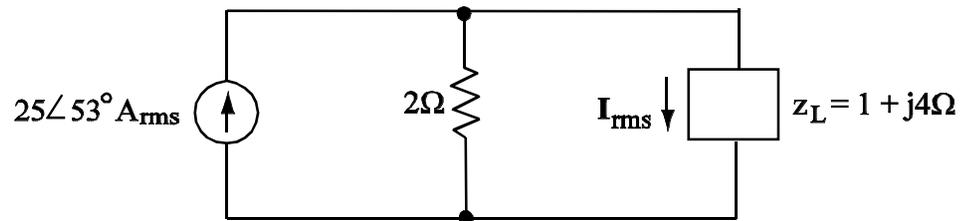


1. (30 points)



- Calculate the value of rms current,  $I_{\text{rms}}$ , flowing through  $z_L$ .
- Calculate the complex power,  $S$ , for  $z_L$ . Include appropriate units.

ans: a)  $I_{\text{rms}} = 10 A_{\text{rms}}$ b)  $S = 100 + j400 \text{ VA}$ 

sol'n: (a) The circuit is a current divider:

$$I_{\text{rms}} = 25\angle 53^\circ A_{\text{rms}} \cdot \frac{2\Omega}{2\Omega + 1 + j4\Omega}$$

$$I_{\text{rms}} = 25\angle 53^\circ A_{\text{rms}} \cdot \frac{2\Omega}{3 + j4\Omega}$$

$$I_{\text{rms}} = 25\angle 53^\circ A_{\text{rms}} \cdot \frac{2\Omega}{5\angle 53^\circ \Omega}$$

$$I_{\text{rms}} = \frac{25 \cdot 2}{5} \angle (53^\circ - 53^\circ) \frac{A_{\text{rms}} \Omega}{\Omega}$$

$$I_{\text{rms}} = 10\angle 0^\circ A_{\text{rms}}$$

sol'n: (b)  $S = |I_{\text{rms}}|^2 z_L = |10A|^2 (1 + j4\Omega)$ 

$$S = 100(1 + j4) \text{ VA}$$

$$S = 100 + j400 \text{ VA}$$