Chapter 11, Solution 2.

Given the circuit in Fig. 11.35, find the average power supplied or absorbed by each element.

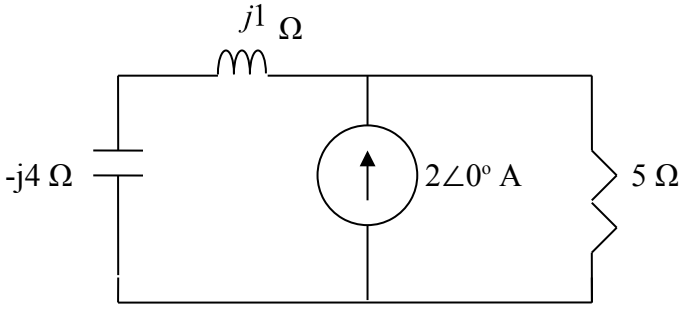
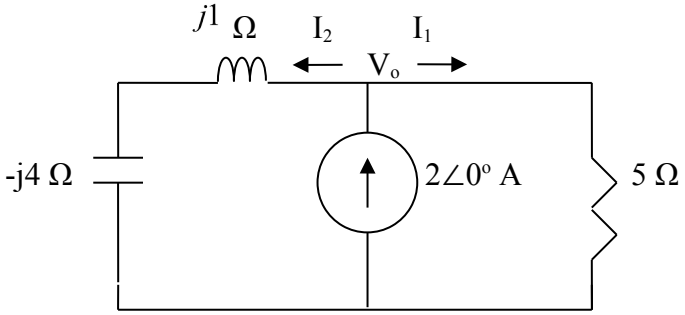


Figure 11.35
For Prob. 11.2.

Solution

Using current division,



$$I_1 = \frac{j1 - j4}{5 + j1 - j4}(2) = \frac{-j6}{5 - j3}$$

$$I_2 = \frac{5}{5 + j1 - j4}(2) = \frac{10}{5 - j3}$$

For the inductor and capacitor, the average power is zero. For the resistor,

$$P = \frac{1}{2}|I_1|^2 R = \frac{1}{2}(1.029)^2(5) = 2.647 \text{ W}$$

$$V_o = 5I_1 = -2.6471 - j4.4118$$

$$S = \frac{1}{2}V_o I^* = \frac{1}{2}(-2.6471 - j4.4118)x2 = -2.6471 - j4.4118$$

Hence the average power supplied by the current source is **2.647 W**.