

55. (a) Using Eq. 33-61, the impedance is

$$Z = \sqrt{(12.0\,\Omega)^2 + (1.30\,\Omega - 0)^2} = 12.1\,\Omega .$$

- (b) We use the result of problem 54:

$$P_{\text{avg}} = \frac{\mathcal{E}_{\text{rms}}^2 R}{Z^2} = \frac{(120\,\text{V})^2 (12.0\,\Omega)}{(12.1\,\Omega)^2} = 1.18 \times 10^3\,\text{W} .$$