

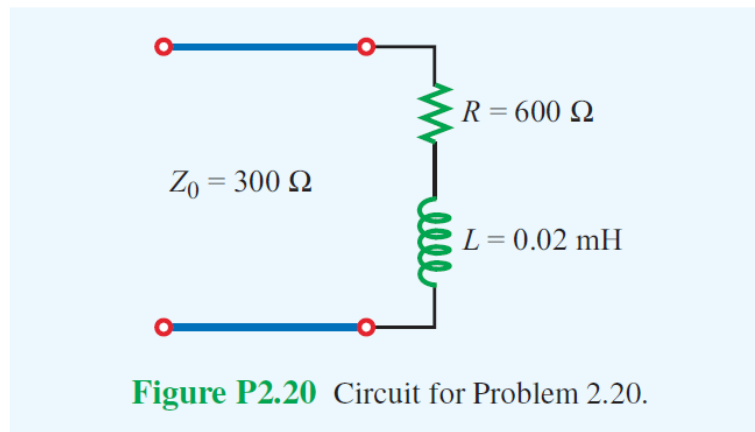
2.1 A transmission line of length l connects a load to a sinusoidal voltage source with an oscillation frequency f . Assuming the velocity of wave propagation on the line is c , for which of the following situations is it reasonable to ignore the presence of the transmission line in the solution of the circuit:

- (a) $l = 20$ cm, $f = 20$ kHz,
- (b) $l = 50$ km, $f = 60$ Hz,
- (c) $l = 20$ cm, $f = 600$ MHz,
- (d) $l = 1$ mm, $f = 100$ GHz.

2.19 A $50\text{-}\Omega$ lossless transmission line is terminated in a load with impedance $Z_L = (30 - j50)\ \Omega$. The wavelength is 8 cm. Find:

- (a) the reflection coefficient at the load,
- (b) the standing-wave ratio on the line,
- (c) the position of the voltage maximum nearest the load,
- (d) the position of the current maximum nearest the load.

2.20 A $300\text{-}\Omega$ lossless air transmission line is connected to a complex load composed of a resistor in series with an inductor, as shown in Fig. P2.20. At 5 MHz, determine: (a) Γ , (b) S , (c) location of voltage maximum nearest to the load, and (d) location of current maximum nearest to the load.



2.24 A $50\text{-}\Omega$ lossless line terminated in a purely resistive load has a voltage standing-wave ratio of 3 . Find all possible values of Z_L .