

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 .

Solution:

$$|\Gamma| = \frac{S-1}{S+1} = \frac{3-1}{3+1} = 0.5.$$

For a purely resistive load, $\theta_r = 0$ or π . For $\theta_r = 0$,

$$Z_L = Z_0 \left[\frac{1+\Gamma}{1-\Gamma} \right] = 50 \left[\frac{1+0.5}{1-0.5} \right] = 150\ \Omega.$$

For $\theta_r = \pi$, $\Gamma = -0.5$ and

$$Z_L = 50 \left[\frac{1-0.5}{1+0.5} \right] = 15\ \Omega.$$
