

## Standing Wave examples- Lossless T.L.

$$Z_0 := 50 \quad \Omega \quad V_g := 10 \quad \text{V} \quad Z_g := 50 \quad \Omega$$

Arbitrary choices

$$\gamma := 0.0 + j \cdot 2.9 \quad 1/\text{m} \quad f := 100 \cdot 10^6 \quad \text{Hz}$$

$$\lambda := \frac{2 \cdot \pi}{\text{Im}(\gamma)} \quad u := \frac{2 \cdot \pi \cdot f}{\text{Im}(\gamma)} \quad u = 2.167 \times 10^8 \quad \text{m/s} \quad \lambda = 2.167 \quad \text{m}$$

$$\Gamma_g := \frac{Z_g - Z_0}{Z_g + Z_0} \quad l := 3.5 \cdot \lambda$$

$$n := 0 .. 350 \quad z_n := \frac{n}{100} \cdot \lambda$$

$$V(z, \Gamma_L) := \frac{1 + \Gamma_L \cdot e^{-2 \cdot \gamma \cdot (l-z)}}{1 - \Gamma_g \cdot \Gamma_L \cdot e^{-2 \cdot \gamma \cdot l}} \cdot \frac{Z_0}{Z_0 + Z_g} \cdot V_g \cdot e^{-\gamma \cdot z}$$

$$I(z, \Gamma_L) := \frac{1 - \Gamma_L \cdot e^{-2 \cdot \gamma \cdot (l-z)}}{1 - \Gamma_g \cdot \Gamma_L \cdot e^{-2 \cdot \gamma \cdot l}} \cdot \frac{1}{Z_0 + Z_g} \cdot V_g \cdot e^{-\gamma \cdot z}$$

**General load**  $Z_L := 30 + j \cdot 50 \quad \Omega$

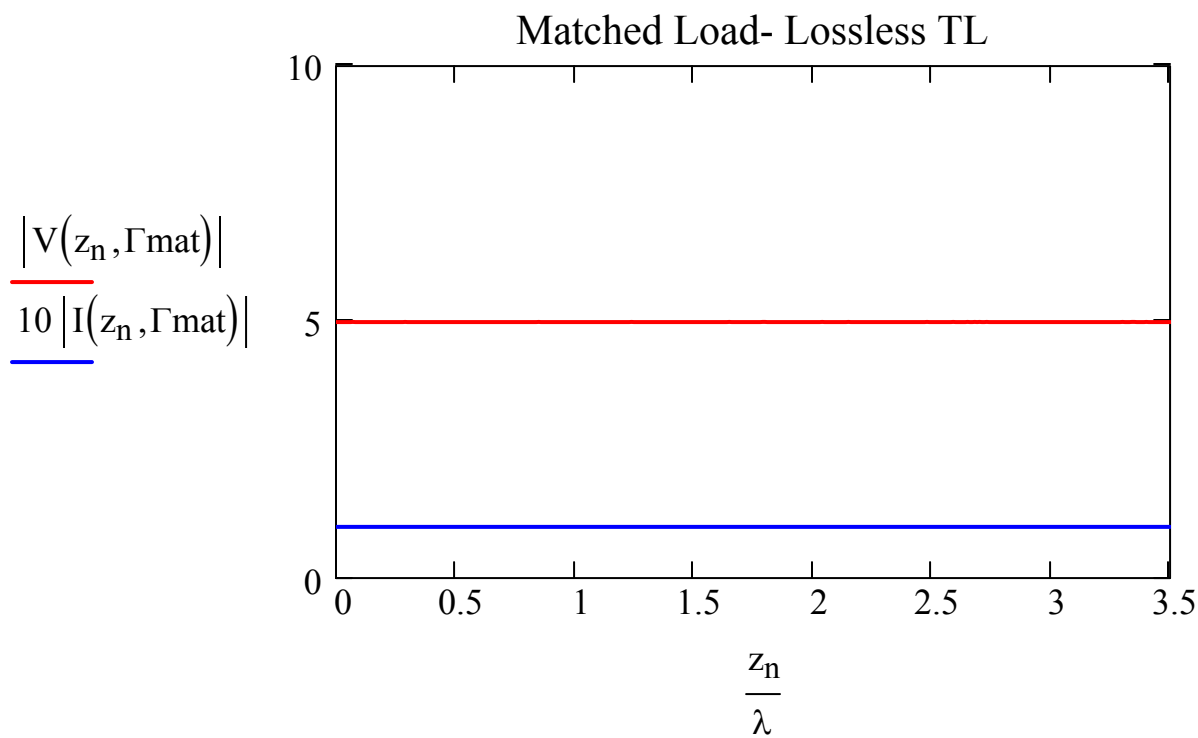
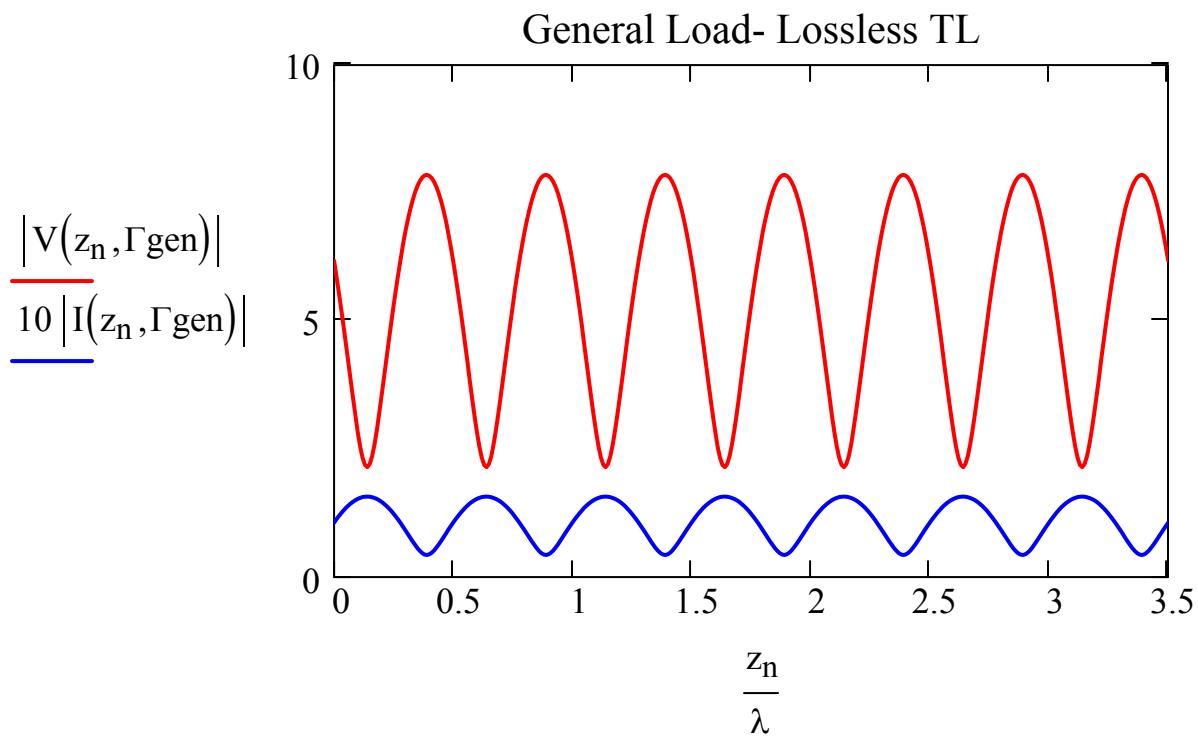
$$\Gamma_{\text{gen}} := \frac{Z_L - Z_0}{Z_L + Z_0} \quad \Gamma_{\text{gen}} = 0.101 + 0.562i \quad |\Gamma_{\text{gen}}| = 0.571$$

$$S_{\text{gen}} := \frac{1 + |\Gamma_{\text{gen}}|}{1 - |\Gamma_{\text{gen}}|} \quad S_{\text{gen}} = 3.66$$

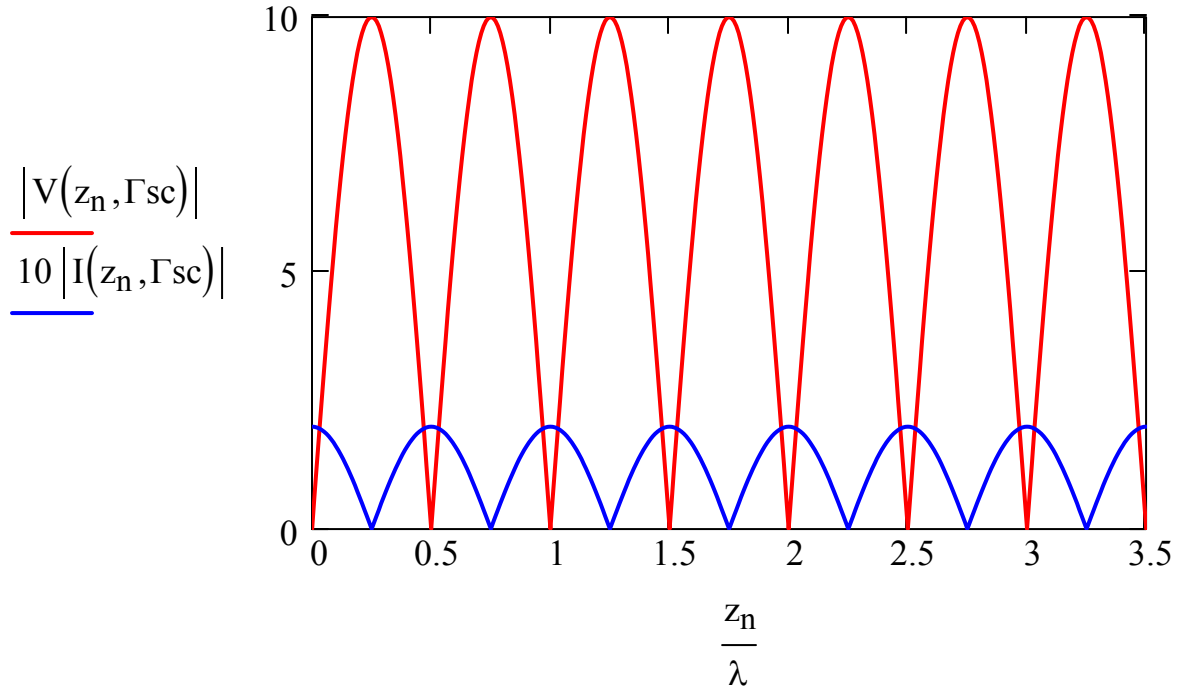
**Short Circuit**  $\Gamma_{\text{sc}} := -1$

**Open Circuit**  $\Gamma_{\text{oc}} := 1$

**Matched Load**  $\Gamma_{\text{mat}} := 0$



Short Circuit Load- Lossless TL



Open Circuit Load- Lossless TL

