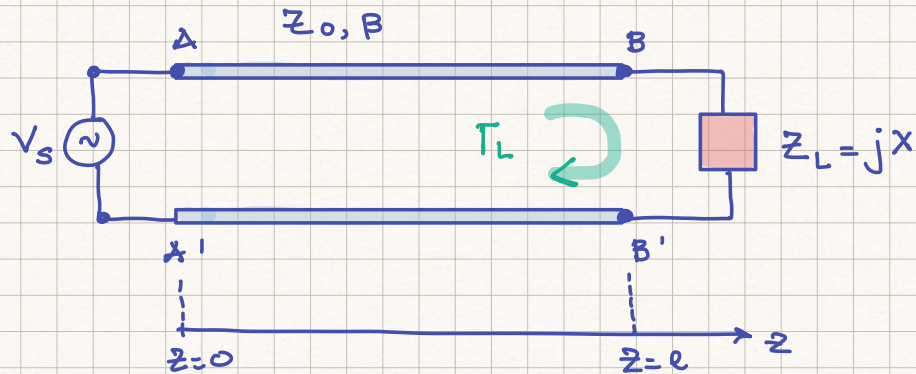


## LINES TERMINATED IN REACTIVE LOADS



$$\Gamma_L = \frac{Z_L - Z_0}{Z_L + Z_0} = \frac{jX - Z_0}{jX + Z_0}$$

$$\Gamma_L = \underbrace{\left| \frac{jX - Z_0}{jX + Z_0} \right|}_{=1} e^{j\phi_L}$$

$$\phi_L = \phi_1 - \phi_2 \quad \text{where}$$

$$\phi_1 = -\tan^{-1} \frac{X}{Z_0} = -\phi_2$$

$$\text{or } \Gamma_L = e^{-2j\phi_2}$$

$$\text{or } \phi_L = -2\phi_2 = 2\tan^{-1} \frac{X}{Z_0}$$

$$\frac{X}{Z_0} \begin{cases} \text{positive if } Z_L = j\omega L \\ \text{negative if } Z_L = -j/\omega C \end{cases}$$

$$\text{if } \phi_L = 90^\circ = \frac{\pi}{2} \Rightarrow$$

$$\tan^{-1} \frac{X}{Z_0} = \frac{\pi}{4} \Rightarrow X = \text{inductive}$$

