Lec-17

Wednesday, February 26, 2020 8:43 AM

Estimating V^+

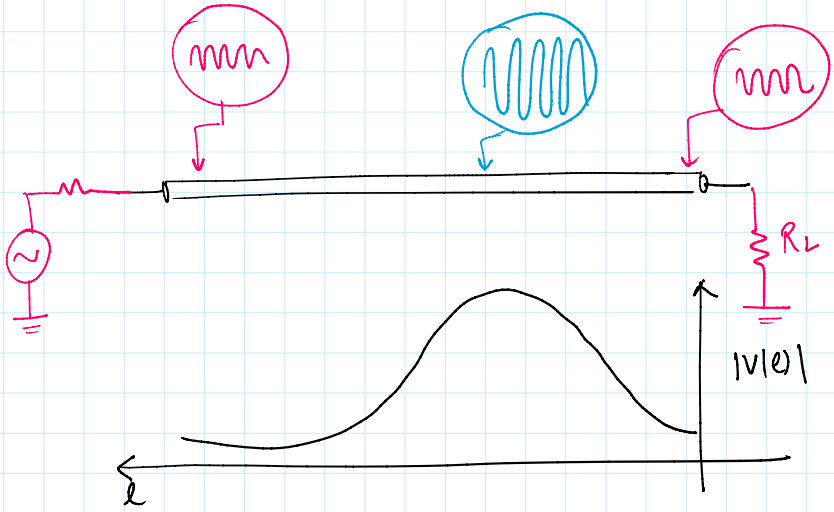
$$V_{max} = V^+ (1 + |\Gamma_L|) \quad -(1)$$

$$V_{min} = V^+ (1 - |\Gamma_L|) \quad -(2)$$

(1) + (2)

$$V_{max} + V_{min} = 2V^+$$

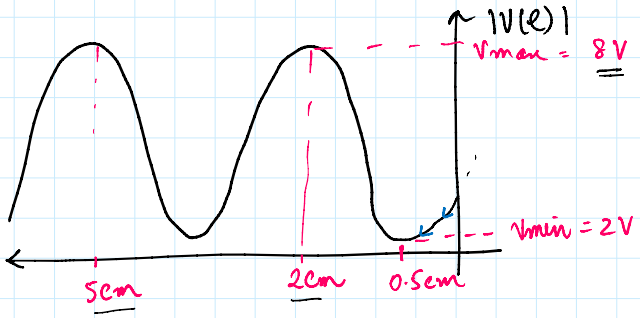
$$V^+ = \frac{V_{max} + V_{min}}{2}$$



Example 1:

$Z_0 = 50\,\Omega$

Z_L = Unknown



a) $VSWR = 4 = \frac{V_{max}}{V_{min}}$

b) Wavelength on this Transmission line = 6cm

$$\frac{\lambda}{2} = 5cm - 2cm = 3cm.$$

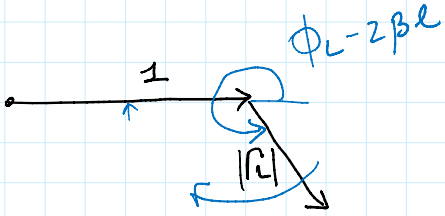
c) $V^+ = ?$ $\qquad \frac{V_{max} + V_{min}}{2} = 5V$

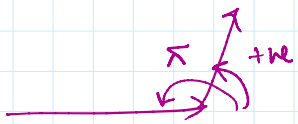
d) $|\Gamma_L|$ magnitude $= ? \qquad = 0.6$

$$VSWR = \frac{1 + |\Gamma_L|}{1 - |\Gamma_L|}$$

$$\frac{VSWR - 1}{VSWR + 1} = |\Gamma_L|$$

e) Angle of Γ_L ; $\phi_L = ?$





$$\rightarrow \quad \phi_L - 2\beta l = \pi \quad \Big|_{l = 0.5cm}$$

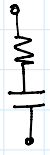
$$\phi_L - 2\frac{2\pi}{\lambda} \cdot l = \pi$$

$$\phi_L = \frac{\cancel{4}\pi}{\cancel{36}} \cdot \frac{1}{\cancel{2}} + \pi$$

$$\phi_L = \pi + \frac{\pi}{3}$$

$$\phi_L = 240^\circ \longrightarrow -120^\circ$$

f) $Z_L =$



g) $I_{max} = \frac{8V}{50} = 160mA$

$I_{min} = \frac{2}{50} = 40mA$

VSWR game played on Kahoot with more examples