$$\begin{cases} V(z) = V_{i0}e^{-rz} + V_{r0}e^{rz} \\ I(z) = \frac{V_{i0}}{Z_0}e^{-rz} - \frac{V_{r0}}{Z_0}e^{rz} \end{cases}$$

$$\begin{cases} Z_L I_L = V_L = V_{i0}e^{-rl} + V_{r0}e^{rl} \\ Z_0 \times I_L = \frac{V_{i0}}{\cancel{Z_0}}e^{-rl} - \frac{V_{r0}}{\cancel{Z_0}}e^{rl} \end{cases}$$

$$\begin{cases} V_{i0} = \frac{I_L}{2}(Z_L+Z_0)e^{rl} \\ V_{r0} = \frac{I_L}{2}(Z_L-Z_0)e^{-rl} \end{cases}$$

$$\begin{cases} V(z) = \frac{I_L}{2}(Z_L+Z_0)e^{r(l-z)} + \frac{I_L}{2}(Z_L-Z_0)e^{-r(l-z)} \\ I(z) = \frac{I_L}{2Z_0}(Z_L+Z_0)e^{r(l-z)} - \frac{I_L}{2Z_0}(Z_L-Z_0)e^{-r(l-z)} \end{cases}$$

$$\begin{cases} V(z) = \frac{I_L}{2}(Z_L+Z_0)e^{rz'} \times \left[1 + \frac{Z_L-Z_0}{Z_L+Z_0}e^{-2rz'}\right] \\ \quad = V_{i0}e^{-rz} \times \left[1 + \Gamma_L e^{-2rz'}\right] \\ I(z) = \frac{V_{i0}}{Z_0}e^{-rz} \times \left[1 - \Gamma_L e^{-2rz'}\right] \end{cases}$$

$$|V(z)| = |V_{i0}| \times \left|\left(1 + |\Gamma_L| e^{-j2\beta z'}\right)\right|$$

MAX 發生在 $e^{-j2\beta z'} = 1$

$$2\beta z' = 2\pi \times n$$

$$2 \times \frac{2\pi}{\lambda} \times z' = 2\pi n$$

$$z' = \frac{\lambda}{2} \times n$$

與負載相距 2分之1 波長整數倍的地方

min 發生在 $e^{-j2\beta z'} = -1$

$$2\beta z' = \pi(n \times 2 + 1)$$

$$2 \times \frac{2\pi}{\lambda} \times z' = \pi \times (2n+1)$$

$$z' = \frac{\lambda}{4}(2n+1)$$

距負載 $\frac{1}{4}$波長奇數倍的位置

$$|I(z)| = \left|\frac{V_{i0}}{Z_0}\right| \times \left|1 - \Gamma_L e^{-j2\beta z'}\right|$$

MAX 在 $\boxed{}$

min 在 $\boxed{}$

$R_L > R_0$

也就是

假 Γ_L 式

為正實數

到下半部 僅考慮

lossless tml TML