Understanding RF: From Theory to Practice

Errata

1. Fixed phase velocity equation in Chapter 3 stripline example to the speed of light divided by the square root of the effective permittivity. (1/4/25)

$$v_p = \frac{c}{\sqrt{\epsilon_r}}$$

2. Fixed the half wave transformer section in Chapter 2 to reflect half wave math instead of quarter wave (1/6/26).

$$\beta l = \frac{2\pi}{\lambda}\left(\frac{\lambda}{2}\right) = \pi$$

3. Fixed voltage minimum and maximum definitions for VSWR derivation in Chapter 2 (1/6/26)

Voltage maximum where $\cos(2\beta z + \phi) = 1$:

$$|V(z)| = |V_o^+| \sqrt{1 + |\Gamma_L|^2 + 2\ \Gamma_L \cos\ (2\beta z + \phi)}$$
$$|V(z)|_{max} = |V_o^+| \sqrt{1 + |\Gamma_L|^2 + 2\ \Gamma_L}$$
$$|V(z)|_{max} = |V_o^+| \sqrt{(1 + |\Gamma_L|)^2}$$
$$|V(z)|_{max} = |V_o^+| \ (1 + |\Gamma_L|)$$

Voltage minimum where $\cos(2\beta z + \phi) = -1$:

$$|V(z)| = |V_o^+| \sqrt{1 + |\Gamma_L|^2 + 2\ |\Gamma_L| \cos\ (2\beta z + \phi)}$$
$$|V(z)|_{min} = |V_o^+| \sqrt{1 - |\Gamma_L|^2 + 2\ |\Gamma_L|}$$

$$|V(z)|_{min} = |V_o^+| \sqrt{(1 - |\Gamma_L|)^2}$$
$$|V(z)|_{min} = |V_o^+| (1 - |\Gamma_L|)$$

4. Fixed L-Network design equations, added return loss plots, and took out two examples in Chapter 2 (1/10/25)

5. Fixed return loss and insertion loss terminology in Chapter 5 and Chapter 6 to LogMag terminology (1/16/26)

6. Fixed equation flow in 1.1.08 with the proper exponential math in Chapter 1 (1/19/26)

$$E(z) = E_0^+ e^{-jkz} + E_0^- e^{+jkz}$$
$$E(z,t) = \Re\{E(z) e^{j\omega t}\}$$

$$E(z,t) = \Re\{E_0^+ e^{-jkz} e^{j\omega t} + E_0^- e^{+jkz} e^{j\omega t}\}$$
$$E(z,t) = \Re\{E_0^+ e^{j(\omega t - kz)} + E_0^- e^{j(\omega t + kz)}\}$$
$$E(z,t) = E_0^+ \cos(\omega t - kz) + E_0^- \cos(\omega t + kz)$$