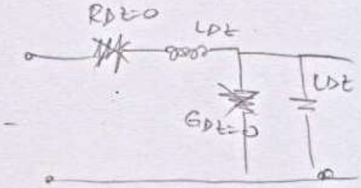
LOSSLES LINE

in many cases, the loss of the line is very small:

$R = G = 0$



$$\gamma = \alpha + j\beta = \sqrt{(R + j\omega L)(G + j\omega C)}$$

$$\boxed{\gamma = \alpha + j\beta = j\omega\sqrt{LC}}$$

$$\boxed{\beta = \omega\sqrt{LC}} \quad (2.12.a)$$

$$\boxed{\alpha = 0} \quad (2.12.b)$$

↳ for a lossless line the attenuation constant is zero.

– The characteristic impedance is $Z_0 = \sqrt{\frac{R + j\omega L}{G + j\omega C}}$

$$\boxed{Z_0 = \sqrt{\frac{L}{C}}} \quad (2.13)$$

→ Real Number.

→ General solution for voltage and current on a lossless line

$$V(z) = V_0^+ e^{-j\beta z} + V_0^- e^{+j\beta z} \quad (2.14a)$$

$$I(z) = \frac{V_0^+}{Z_0} e^{-j\beta z} - \frac{V_0^-}{Z_0} e^{-j\beta z} \quad (2.14b)$$

wavelength : $\boxed{\lambda = \frac{2\pi}{\beta} = \frac{2\pi}{\omega\sqrt{LC}}}$ (2.15)

$$v_p = \frac{\omega}{\beta} = \frac{\omega}{\omega\sqrt{LC}}.$$

$$\boxed{v_p = \frac{1}{\sqrt{LC}}} \quad (2.16)$$