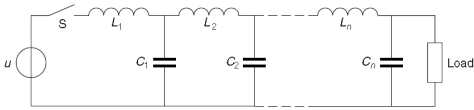


Attenuation and Distortion of Traveling Waves

Note Title

3/10/2014

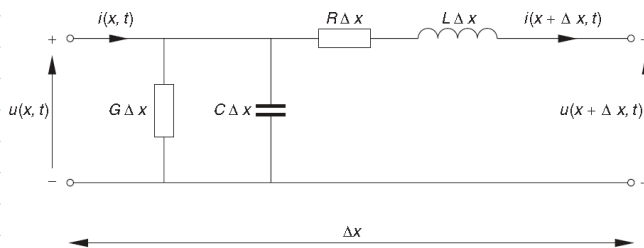
* Lossless Lines:



* Neglected items:

- The series resistance of the conductors
- The skin-effect for higher frequencies
- The losses in the dielectric medium between the conductors in a high-voltage cable
- The leakage currents across string insulators
- The influence of the ground resistance
- The corona losses and so on

* Included Losses:



$$\text{Characteristic impedance} : Z_0 = \sqrt{\frac{R + Ls}{G + Cs}}$$

* Attenuation: The wave peak is reduced exponentially.

$$V = V_0 e^{-\frac{G}{C}t}$$

and

$$I = I_0 e^{-\frac{R}{L}t}$$

* Distortion: when $\frac{R}{L} \neq \frac{G}{C}$, the shape of the wave changes.

① The steepness of the wave front will decrease.

② The wave will be elongated at the center and the tail.

