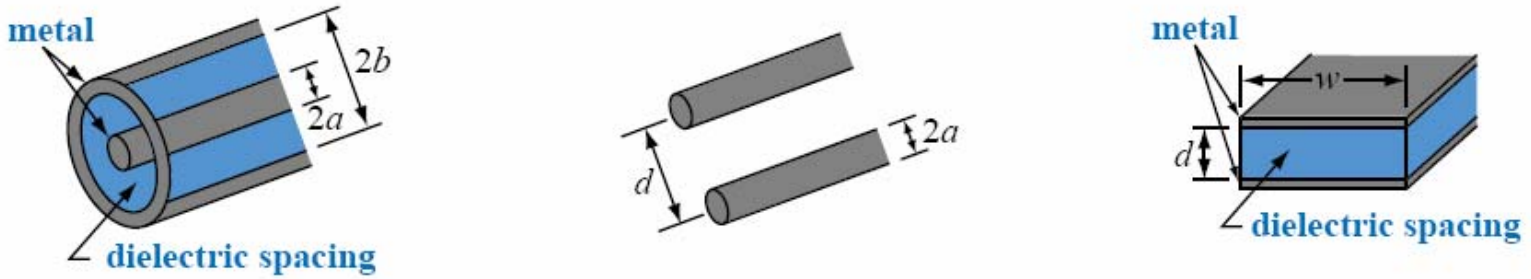
Transmission Lines: Per Unit Length Parameters

Parameter	Coaxial Cable	Two Wire Line	Parallel Plate Stripline	Units
r	$\frac{R_s}{2\pi}\left(\frac{1}{a}+\frac{1}{b}\right)$	$\frac{R_s}{\pi a}$	$\frac{2R_s}{w}$	Ω/m
l	$\frac{\mu}{2\pi}\ln\frac{b}{a}$	$\frac{\mu}{\pi}\ln\left[\frac{d}{2a}+\sqrt{\left(\frac{d}{2a}\right)^2-1}\right]$ $\approx \frac{\mu}{\pi}\ln\left[\frac{d}{a}\right]$ for $d >> 2a$	$\frac{\mu d}{w}$	H/m
g	$\frac{2\pi\sigma}{\ln\frac{b}{a}}$	$\frac{\pi\sigma}{\ln\left[\frac{d}{2a}+\sqrt{\left(\frac{d}{2a}\right)^2-1}\right]}$ $\approx \frac{\pi\sigma}{\ln\left[\frac{d}{a}\right]}$ for $d >> 2a$	$\frac{\sigma w}{d}$	S/m
c	$\frac{2\pi\varepsilon}{\ln\frac{b}{a}}$	$\frac{\pi\varepsilon}{\ln\left[\frac{d}{2a}+\sqrt{\left(\frac{d}{2a}\right)^2-1}\right]}$ $\approx \frac{\pi\varepsilon}{\ln\left[\frac{d}{a}\right]}$ for $d >> 2a$	$\frac{\varepsilon w}{d}$	F/m
ε, μ, σ are for the insulating material between the conductors, $R_s = \sqrt{\frac{\pi f \mu_c}{\sigma_c}}$ where $\frac{2R_s}{w}$ μ_c, σ_c are for the conductors				



(a) Coaxial line (b) Two-wire line (c) Parallel-plate line

Reference: Ulaby – *Fundamentals of Applied Electromagnetics*