# Equations of CPW used for plotting the graphs.

The characteristic impedance of CPW

$$Z_0 = rac{30\pi^2}{\sqrt{arepsilon_e'}} \Biggl( \ln \Biggl( 2rac{1+\sqrt{k}}{1-\sqrt{x}} \Biggr) \Biggr)^{-1}$$

where k is

$$k = \frac{s}{(s+2w)}$$

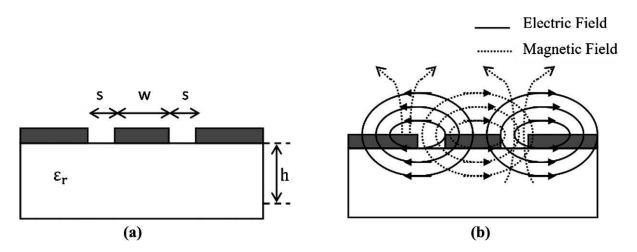
• The Effective permitivity

$$arepsilon_e = rac{(arepsilon_r+1)}{2} \ for \left(rac{h}{w}>>1
ight)$$

$$arepsilon_e' = arepsilon_r \left[ anhigg( 0.775 \, \logigg( rac{h}{w} igg) + 1.75 igg) 
ight] + rac{k}{\left( rac{w}{h} 
ight)} [0.04 \, - \, 0.7 \, k + 0.01 \, (1 - 0.1 arepsilon_r) (0.25 + k)]$$

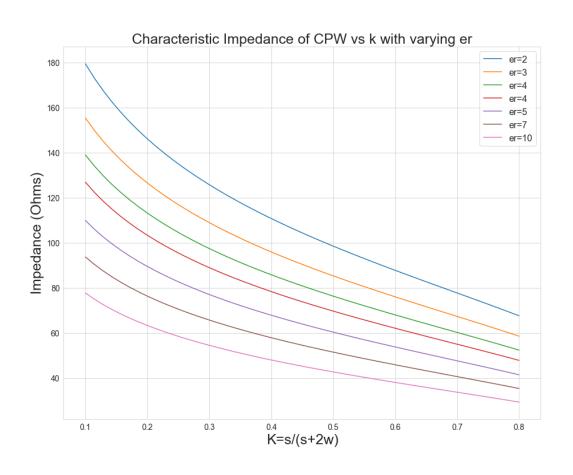
$$rac{Z_0'}{Z_0} = \sqrt{rac{arepsilon_e}{arepsilon_e'}}$$

#### Cross-sectional view of CPW

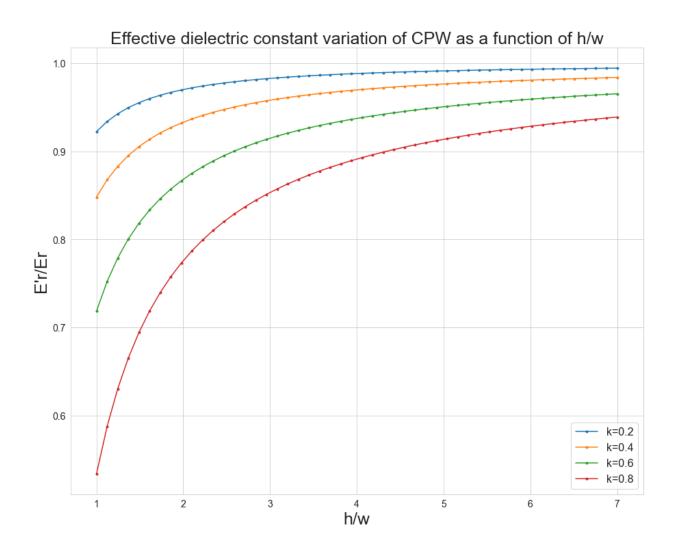


(a) Cross-sectional view of CPW and (b) field configurations

# Characteristic impedance variation of CPW vs k varying dielectric constant



## Effective dielectric constant variation of CPW as function of h/w



## Normalized impedance of CPW variation as function of h/w

