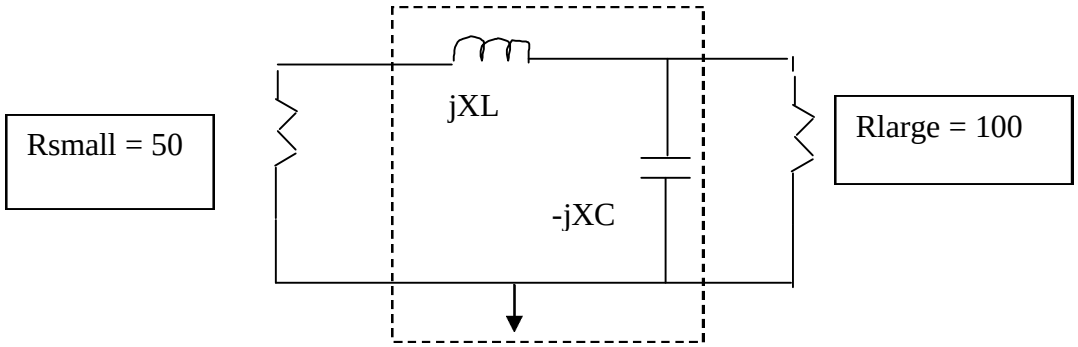
Simple L – Section and Transmission line matching techniques
February 2010

1.0 Match two resistive terminations.

L – Section.

DC preserved: (Low pass section. Also the inductor and capacitor may exchange places for a high pass section. Same calculations apply)



Calculate Qs = Qp = Sqrt[(Rlarge/Rsmall) -1] 1.0
Qs = XL/Rsmall
Qp = Rsmall/Xc

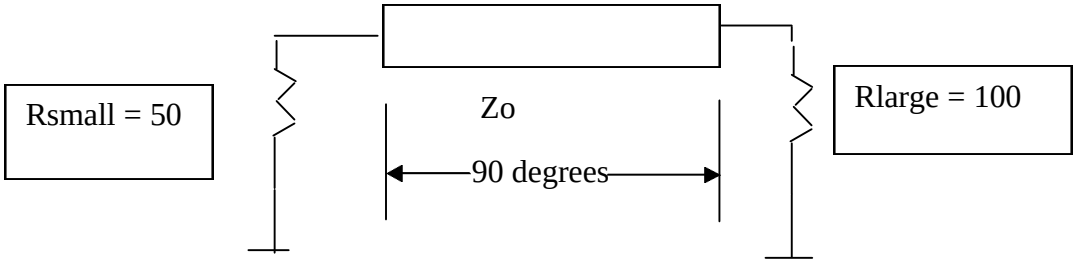
Therefore XL = Qs x Rsmall and XC = Rsmall/Qp 2.0

Knowing the frequency Xl and XC can be calculated and the values of L and C can Be calculated.

Transmission line match:

Easiest matching is between real source and load.

Zo = Sqrt(Rsmall.Rlarge)
Ex: Here Zo=10 Ohms



If source and load is complex then use the following formulas:

$$Zo = Sqrt\{[(Rs^2 + XS^2)RL - (RL^2 - XL^2)RS]/(RS-RL)\} \quad 3.0$$

Electrical length in degrees:

$$Theta = Tan^{-1}\{[Zo(RL - RS)]/(XS*RL - XL*RS)\} \quad 4.0$$

Definition of electrical length:

Theta =[(length of line/ wavelength on the media (guide wavelength)]* 360. 5.0

Note: S and L stand for source and load whether uppercase or lowercase.