AHMAD BILAL

Sweedishchap.weebly.com

IDENTIFICATION OF LOAD FROM SWR

Characteristics of SWR

SWR has two Characters

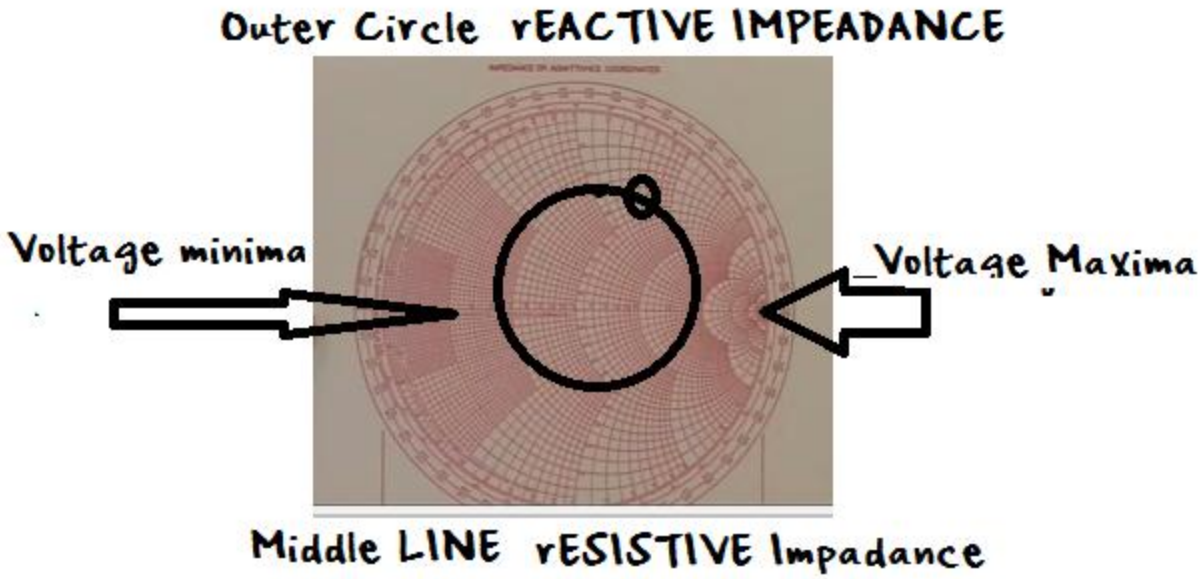
- VSWR
- Location of Max and Minina

So we want to **determine the type of load** from SWR pattern

Smith Chart and VSWR

When we draw VSWR circle , the maxima and minima , while moving from load towards the generator will be encountered as

- First Maxima
- 2nd Minima
-



Inductive Load

For a load which lying in upper half .

First we encounter Voltage maxima and then Voltage minima

Capacitive load

For a load which lying in lower half .

First we encounter Voltage minima and then Voltage maxima

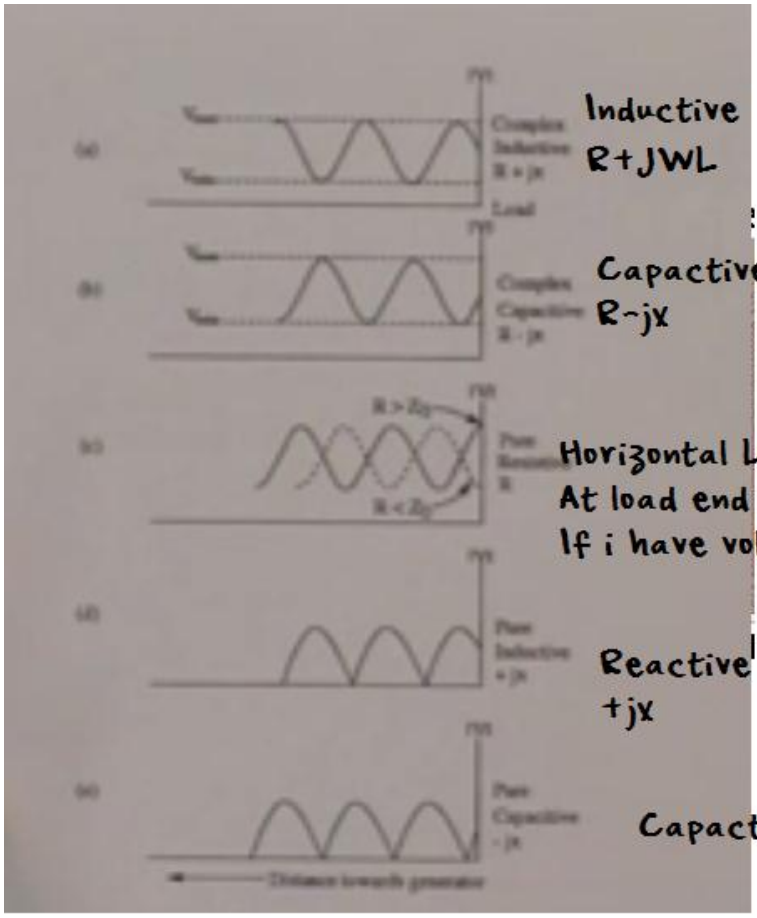
Summary :

Inductive Load

While moving towards generator if we first encounter voltage maxima and then voltage minima

Capacitive load

SWR and Load TYPE



Applications of transmission Line in High frequency Circuits

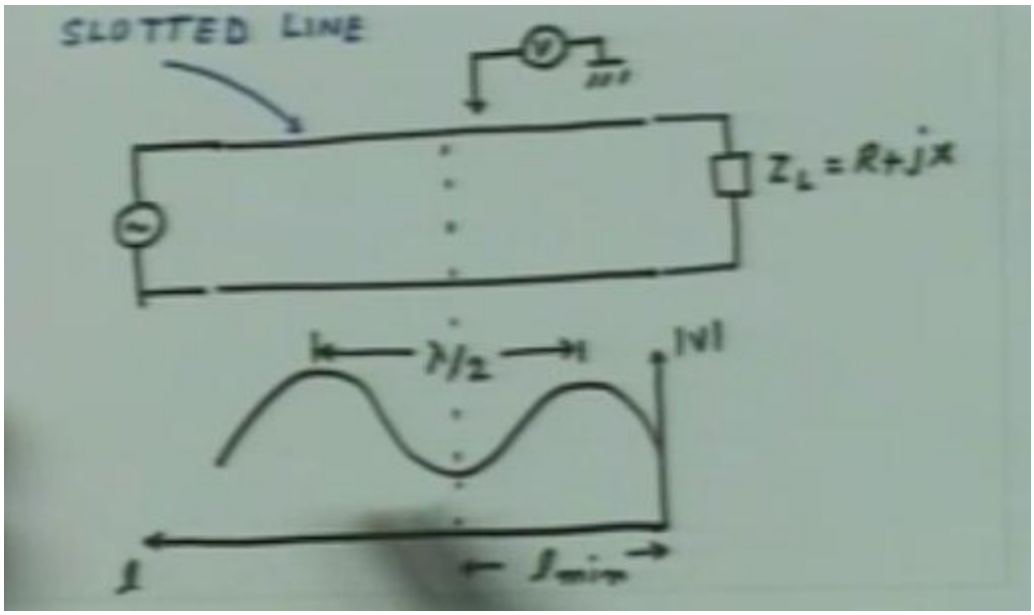
- Proposed for transferring power from one point to another

Application 1 : Measurement of unknown impedance

- Slotted Line -
- A voltage probe slide along transmission line to give us magnitude variation of voltage

For measurement of unknown impedance we connect probe ad unknown impedance .

- We will get a SWR



Distance b/w two voltage maxima and minima is **lambda / 2**

So my measuring the distance b/q to maxima or minima we can estimate the value of wavelength , from there we can get value of B

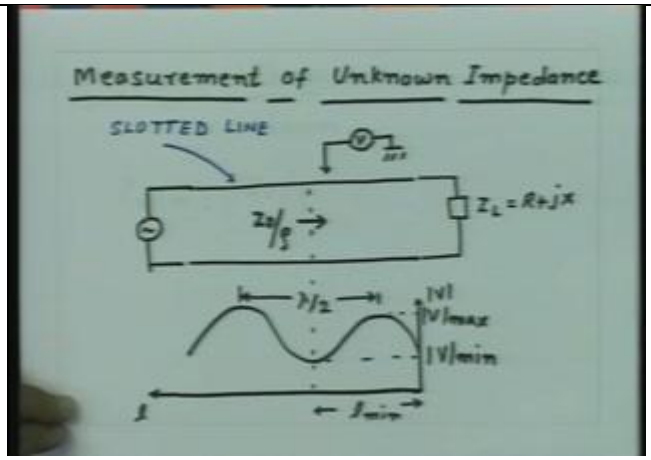
So to summarize

1. Find VSWR
2. Identify voltage maxima or minima
3. Find value of lambda / 2
4. Find Beta

So now calculate

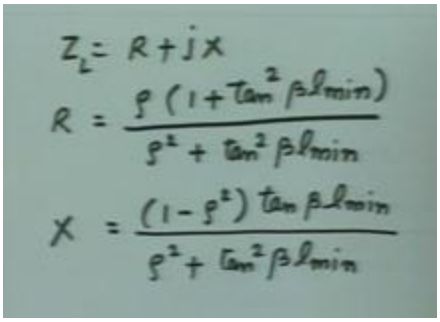
1. VSWR = Vmax/Vmin
2. At Vmin , **impedance will be minimum** . or Rin will be be minimum
   Rmin=Zo/VSWR

3. .



4. $Z_L = Z_o\{\underline{R_{min}\cos(-\beta l_{min}) + jZ_o \sin(-\beta l_{min})}\}$
$Z_o\cos\underline{(-\beta l_{min}) + jR_{min}\sin(-\beta l_{min})}$

5. Separating **Real and imaginary values**



6. In real life , while we connect unknown impedance to transmission line , there are some other factors involved in the procedure like connectors , so L min calculation is not **precise in all cases**
7. First replace the load with short circuit. Obtain VSWR
8. Obtain VSWR with Load
9. Compare and calculate

Application II Circuit Element

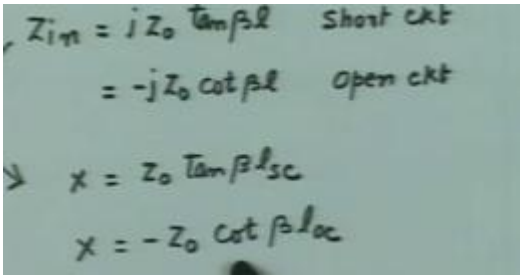
Inductance and Capacitance Effects

1. When we increase frequency , distributed elements tart showing their effects

2. Let s say we have inductance at A very high frequency
3. However we do not **consider the capacitance b/w two turn of inductance**
4. As **freq increases** the **effect increases**
5. Means **after few Mhz** , inductance will be acting like a more **dominant capacitance .**
6. Similarly same **goes with capacitor**

7. As **frequency increase wave length decrease**. Lumped elements are hard to realize on circuits. So we replace circuit elements from transmission lines

Smith Chart and Inductance element

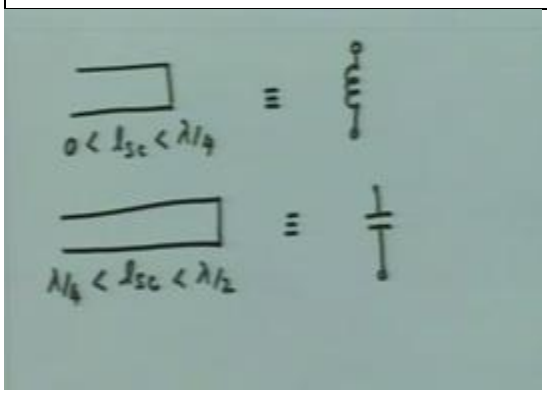
8. By changing the length impedance changes.
9. Right most point represent open circuit, and left most represent short circuit. So just by chaining the length we can get different inductance
10. **Defining length**
11. 

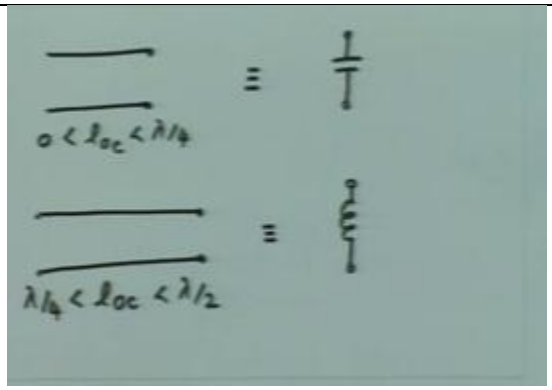
12. **The both function can have values from infinity to +infinity, so we can have any value**
13. **Example of open circuit and close circuit : PCB and Parallel line**
14.

Finding length of transmission line for required reactance on smith chart

1. Lets say we want to find a reactance which on outer most circle
2. .move anticlockwise
3. Point is n upper half so inductive

4. Reach till closed or open circuit point





Application III Circuit Element