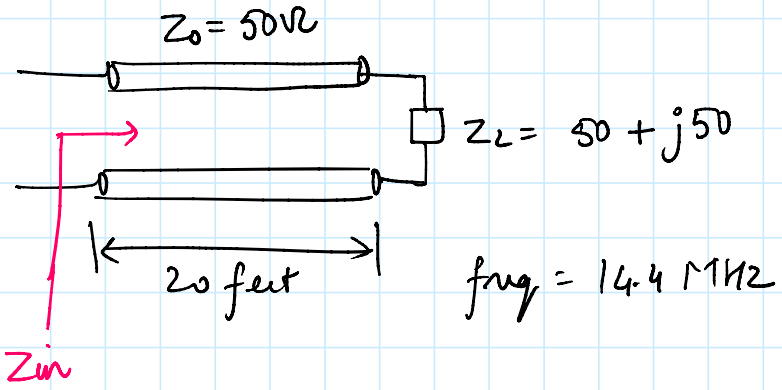
Lec-23

Friday, March 13, 2020 8:32 AM

Example-4:



Step 1: $\bar{Z}_L = 1 + j1$; Mark on the Smith chart.

Step 2: Length in meters : $20\,ft \times 0.3048 \frac{m}{ft} = 6.096\,m$

Step 3: Calculate $\lambda = \frac{c}{f} = \frac{3 \times 10^8}{14.4 \times 10^6} = 21.276\,m$

Step 4: Calculate the length of the transmission line in λ

$$\text{length}\,(\text{in}\,\lambda) = \frac{6.096}{21.276} = 0.28\lambda$$

Step 5: Find the starting λ position the outer dial $= 0.16\lambda$

Step 6: Go clockwise by 0.28λ ; Final position $= 0.44\lambda$

Step 7: Draw straight line from 0.44λ to center & draw VSWR circle.

Step 8: Intersection point of VSWR circle & the 0.44λ line is $\bar{Z}_{in} = 0.42 - j0.34$

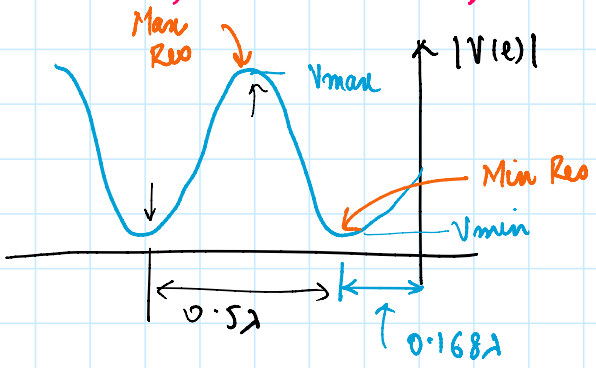
Step 9: $Z_{in} = (0.42 - j0.34) \times 50 = 21 - j17\,\Omega$

Example 5: Find load impedance from VSWR

$Z_0 = 50\,\Omega$

VSWR = 3.6

Distance of the first voltage minima from the load = 0.168λ



$\frac{V_{max}}{V_{min}} = 3.6$

Step 1: Draw the VSWR circle

Step 2: Draw a line @ 0.168λ on the inner dial.

Step 3: $\bar{Z}_L = 0.95 - j1.3$

$Z_L = 47.5 - j65\ \Omega$