**Project 1**

**Guidelines: Please type all the solutions! For the Smith Chart use Tools/ Typewriter to inset symbols or text. Email and UPLOAD your project 1 on your ePortfolio. In addition to this poject you also need to upload Project 2 and the reflections on the seminars/workshops/field trips, and email them to me.**

**Team 1:**  Mamadou Bah, Arie Meiman, Daniel Edwards and Tyrell Miles

1. A 690λ- long lossless Z0=75Ω T-line is terminated in in a load ZL=15+j67 Ω. Calculate and use the Smith Chart to find:
2. ΓL; b)VSWR; c)Zin
3. The input impedance for a 100Ω lossless T-line of length 1.162λ is measured as 12+j42 Ω. Determine the load impedance.

Normalized input impedance🡪

Normalized load impedance🡪

Final Answer🡪

1. a) Design an open ended shunt-stub matching network to match a load ZL =70+j110 Ω to a 50 Ω impedance T-line. Chose the solution that minimizes the length of the through line.

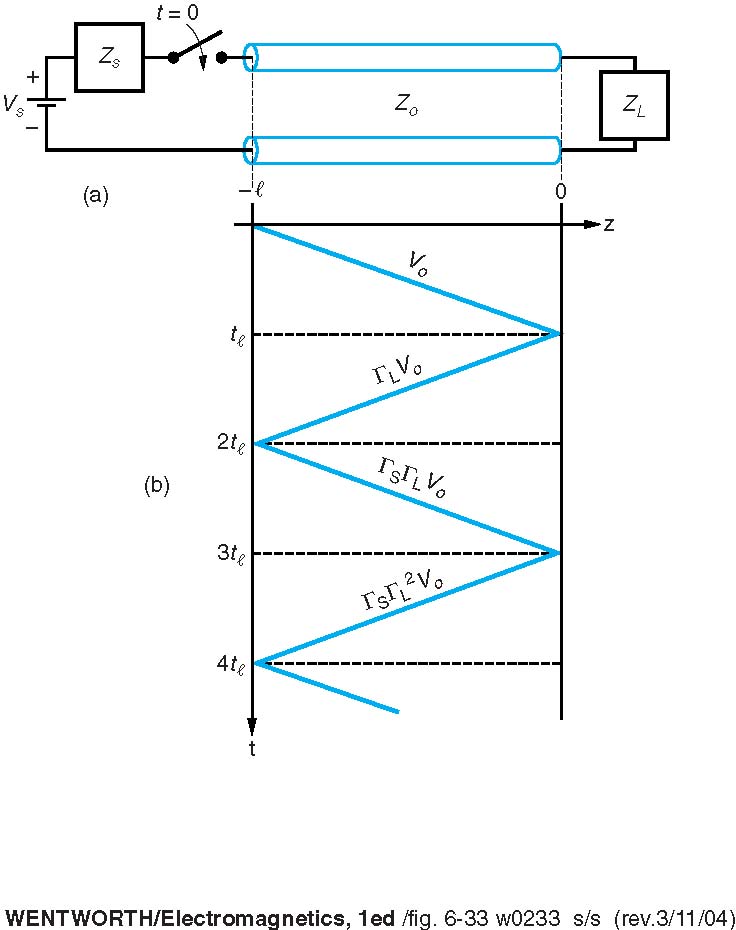
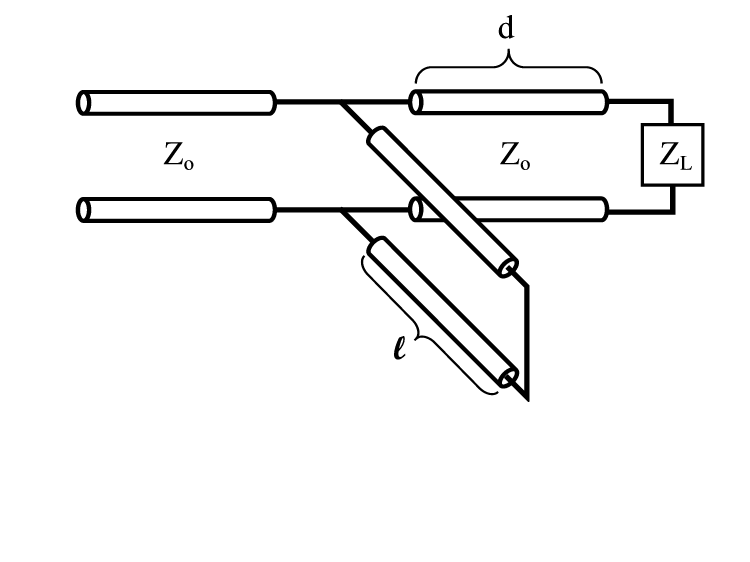
Admittance: 0.32+j0.2

1+j1.3

1-j1.4

Length: 0.324λ

Distance:0.324\*2=0.648 meters

1. Now suppose the load turns out to be ZL =40+j100 Ω. Determine the reflection coefficient seen looking into the matching network.
2. A load impedance ZL=25+j90 Ω is to be matched to a 50 Ω line using a shorted shunt stub tuner. Find the solution that minimizes the length of the shorted stub

Normalized load impedance:

Admittance: YL=0.1+j0.5

1+jb=1+j2.6

1-jb=-j2.6

Wavelength from load: 5-0.422=0.078

Load λ + (1+jb) λ: 0.078 +0.172=0.25

Distance 1: 0.25\*2=0.5m

Distance 2: 0.25-0.192=0.058

Minimized length: 0.058\*2=0.116 m

Answer=0.116 meters

1. A 50 Ω line is terminated in a pair of parallel load impedances of 50+j100 Ω and 50 –j100 Ω. Determine the total load admittance and impedance seen by the line.
2. Consider the figure with the following values VS=10V, RS=30Ω, R0=50Ω, up=0.666c, RL=150Ω, and l=10cm. Plot out to 2ns
3. the voltage at the source end,

V+ =V- \*Γ

v+ = 3.125\*-0.25= 1.5625

v+ =-0.25\*0.7825=0.1953125

v+ =0.25\*0.09765625=0.0244140625

v+ =0.25\*0.01220703125=0.0030517578125

1. b) the voltage at the middle,

volts

1. the voltage at the load end of the T-line.

V-=V+ \*Γ

v- = (0.5)\*6.25=3.125 volts

v- =0.5\*1.5625=.7825

v- = 0.5\*0.1953125=0.09765625

v- =0.5\*0.0244140625=0.01220703125