



Problems Set #4

"Graphical Solution for Transmission Line Problems"

P4.1 In figure p4.1, let the $Z_L=40-j10 \Omega$, $Z_o=50 \Omega$, $f=800\text{MHz}$, and $v=c$.

(a) Find the shortest length d_1 of a short-circuited stub, and the shortest match on the main line to the left to the stub.

(b) Repeat for an open-circuited stub

P4.2 The lossless line shown in figure p4.2 is operating with $\lambda=100 \text{ cm}$. If $d_1=10 \text{ cm}$.

And the distance $d=25 \text{ cm}$. the line is matched to the left of the stub. Find the load impedance.

P4.3 50Ω transmission line is connected to a load impedance $Z_L=60+j 80 \Omega$. A double stub Tuner spaced $\lambda/8$ a part is used to match the load to the line as shown in figure p4.3. Find the required length L_a , L_b .

Homework Assignment:

H4.1 A load $Z_L=25+j 75 \Omega$ is located at $z=0$ on the lossless two-wire line for which $Z_o=50\Omega$ And $v=c$. (a) If $f=300 \text{ MHz}$, find the shortest distance d at which the input admittance has a real part equal to $1/Z_o$ and a negative imaginary part. (b) what value of capacitance C should be connected across the line at that point to provide unity standing wave ratio on the remaining portion of the line

H4.2 The two-wire lines shown in figure H4.2 are lossless and have $Z_o=200 \Omega$. Find d and the shortest possible value for d_1 to provide a matched load if $\lambda=100 \text{ cm}$.

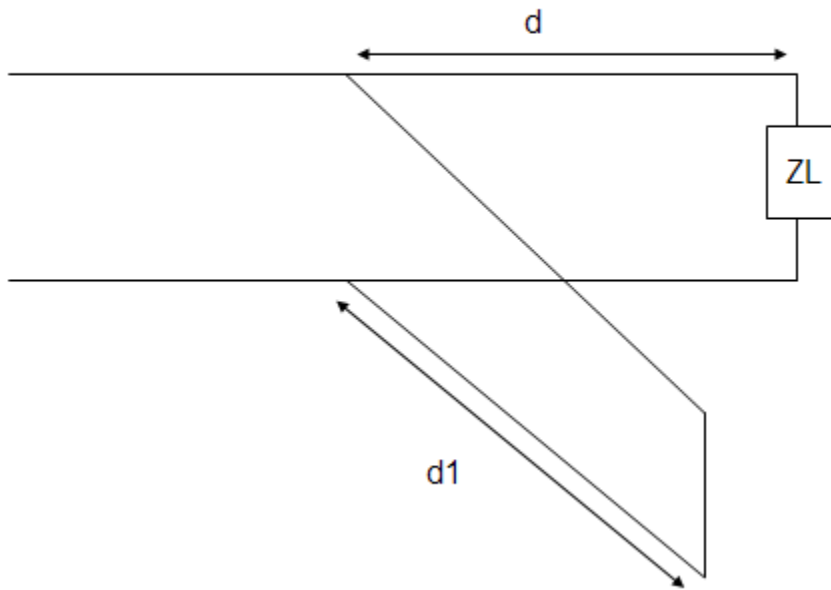


Figure p4.1

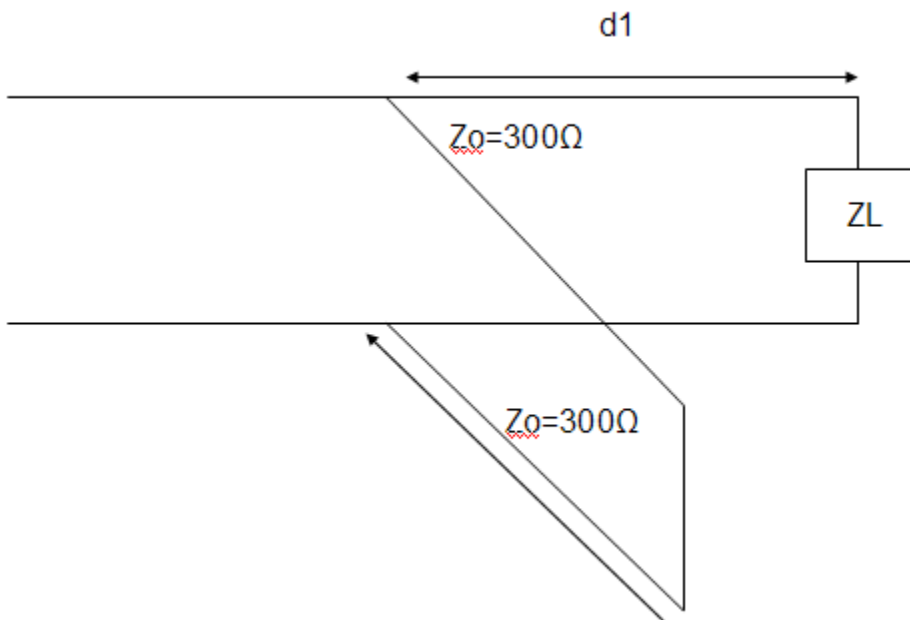


Figure p4.2

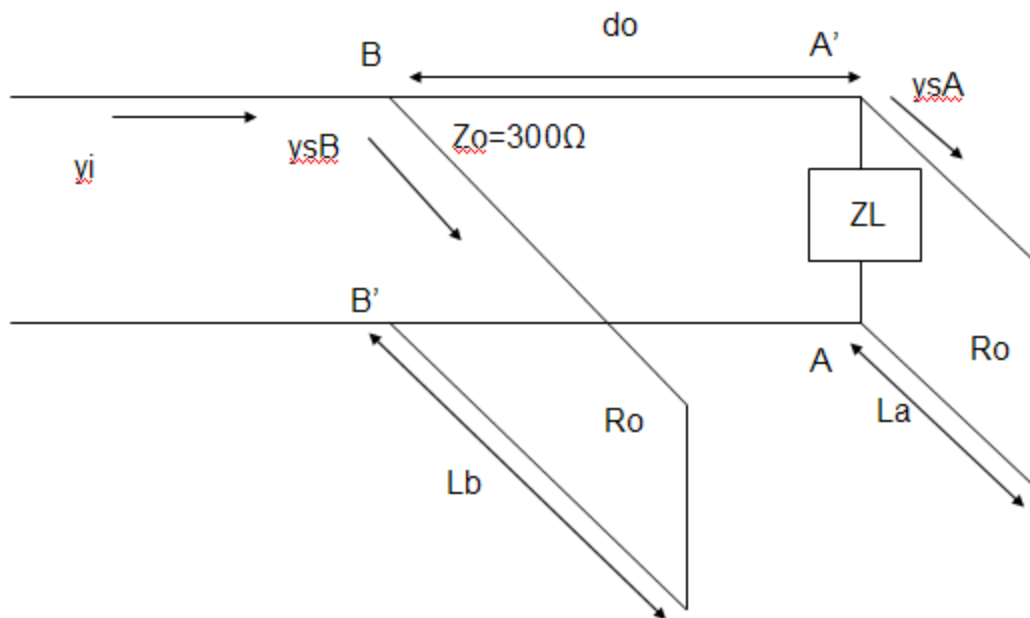


Figure p4.3

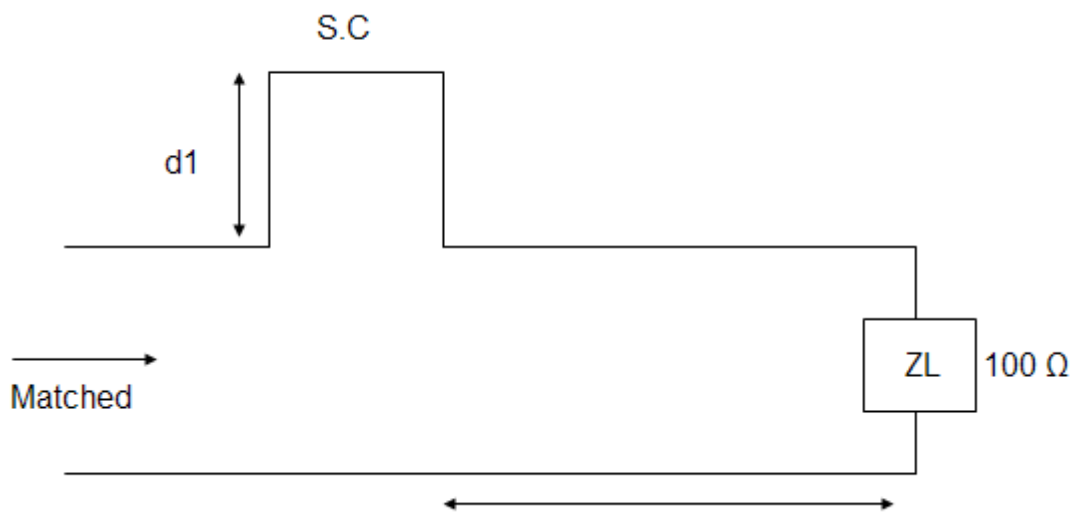


Figure H4.2