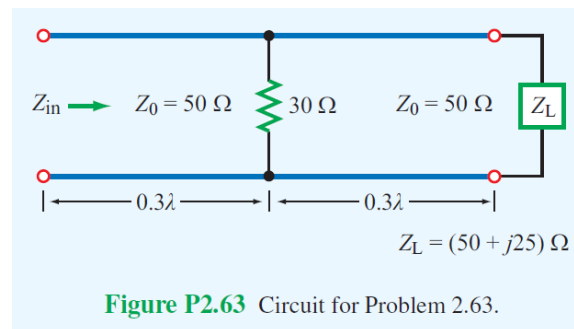


EE3109 Applied Electromagnetics
2022/23 Semester B
Week 9: Tutorial Questions

1. Using a slotted line, the voltage on a lossless transmission line was found to have a maximum magnitude of 1.5 V and a minimum magnitude of 0.5 V. Find the magnitude of the load's reflection coefficient.
2. A lossless transmission line of electrical length $l = 0.35\lambda$ and characteristic impedance $Z_0 = 100 \Omega$ is terminated in a load impedance $Z_L = 60 + j30 \Omega$. Find Γ , S and Z_{in} .
3. At an operating frequency of 300 MHz, a lossless 50Ω air-spaced transmission line 2.5 m in length is terminated with an impedance $Z_L = 40 + j20 \Omega$. Find the input impedance.
4. Show that at the position where the magnitude of the voltage on the line is a maximum, the input impedance is purely real.
5. A 300Ω lossless air transmission line is connected to a complex load composed of a resistor $R = 600 \Omega$ in series with an inductor $L = 0.02$ mH. At 5 MHz, determine: (a) Γ_L , (b) S , (c) location of voltage maximum nearest to the load, and (d) location of current maximum nearest to the load.
6. A 50Ω lossless transmission line is connected to a load composed of a 75Ω resistor in series with a capacitor of unknown capacitance. If at 10 MHz the voltage standing wave ratio on the line was measured to be 3, determine the capacitance C .
7. (Adapted from Ulaby 2.63) A 50Ω lossless line 0.6λ long is terminated in a load with $Z_L = (50 + j25) \Omega$. At 0.3λ from the load, a resistor with resistance $R = 30 \Omega$ is connected as shown in Fig. P2.63.
 - (a) Find Z_{in} .
 - (b) If a voltage source with generator resistance 75Ω feeds 1 W of power into this circuit, what is the generator voltage?
 - (c) What percentage of the input power is dissipated by the load?



Source for questions: Ulaby Ch2 Q18,28-30,20-21.