EMag I. Prof. Xingwei Wang

Homework #5

Due day: Oct. 15(Mon) before class.

Problem 2.53 A lossless 50-Ω transmission line is terminated in a load with $Z_L = (50 + j25)\ \Omega$. Use the Smith chart to find the following:

(a) The reflection coefficient Γ.

(b) The standing-wave ratio.

(c) The input impedance at 0.35λ from the load.

(d) The input admittance at 0.35λ from the load.

(e) The shortest line length for which the input impedance is purely resistive.

(f) The position of the first voltage maximum from the load.

Problem 2.66 A 200-Ω transmission line is to be matched to a computer terminal with $Z_L = (50 - j25)\ \Omega$ by inserting an appropriate reactance in parallel with the line. If $f = 800$ MHz and $\varepsilon_r = 4$, determine the location nearest to the load at which inserting:

(a) A capacitor can achieve the required matching, and the value of the capacitor.

(b) An inductor can achieve the required matching, and the value of the inductor.

Problem 2.68 A 50-Ω lossless line is to be matched to an antenna with $Z_L = (75 - j20)\ \Omega$ using a shorted stub. Use the Smith chart to determine the stub length and distance between the antenna and stub.