HW#5

8-18. The standing-wave ratio on a lossless 300-(Ω) transmission line terminated in an unknown load impedance is 2.0, and the nearest voltage minimum is at a distance 0.3λ from the load. Determine (a) the reflection coefficient Γ of the load, and (b) the unknown load impedance Z_L.

8-20. The characteristic impedance of a given lossless transmission line is 75 (Ω). Use a Smith chart to find the input impedance at 200 (MHz) of such a line that is: (a) 1 (m) long and open-circuited, and (b) 0.8 (m) long and short-circuited. Then (c) determine the corresponding input admittances for the lines in parts (a) and (b).

8-21. A load impedance $30 + j10\ (\Omega)$ is connected to a lossless transmission line of length 0.101λ and characteristic impedance 50(Ω). Use a Smith chart to find (a) the standing-wave ratio, (b) the voltage reflection coefficient, (c) the input impedance, (d) the input admittance, and (e) the location of the voltage minimum on the line.

8-24. A dipole antenna having an input impedance of 73-(Ω) is fed by a 200-(MHz) source through a 300-(Ω) two-wire transmission line. Design a quarter-wave two-wire air line with a 2-(cm) spacing to match the antenna to the 300-(Ω) line.

8-27. Measurements on a lossless transmission line of characteristic resistance 75-(Ω) show a standing-wave ratio of 2.4 and the first two voltage minima nearest to the load at 0.335(m) and 1.235(m). Use a Smith chart to: (a) determine the load impedance Z_L, and (b) find the location nearest to the load and the length of a short-circuited stub required to match Z_L to the line.