

**ECE 5317/6351**  
**Microwave Engineering**  
**Fall 2019**  
**Homework #7**

Text: *Microwave Engineering* by David M. Pozar, 4th edition, Wiley, 2011.

Problems: 5.13, 5.16, 5.19 7.6, 7.29.

**Extra Problem 1**

Derive formulas for the shunt reactance  $X_1$  and the series reactance  $X_2$  in the series-shunt ell matching network (for low to high impedance transformation). (Your derivation should parallel somewhat the derivation in the class notes given for the shunt-series ell, used for low to high impedance transformation).

**Extra Problem 2**

Find the capacitance and inductance values for a shunt-series ell matching network that will transform a 100 [ $\Omega$ ] load to a 50 [ $\Omega$ ] input impedance at 100 [MHz]. Use a shunt capacitor and a series inductor.

**Notes:**

- 1) In Prob. 5.13, use TXLINE to get the dimensions for the layout.
- 2) In Prob. 5.16, you do not have to make the plots. Use TXLINE to get the layout in part (b).
- 4) In Prob. 5.19, you do not have to make the plot. When it says to use the “approximate theory developed in the text”, this mean to use the method that was done in Notes 19 (not using the Table for the Chebyshev design).
- 5) In Prob. 7.6, you only need to do the design; you do not have to calculate the  $S$  parameters.
- 6) In Prob. 7.29, the output signals are the signals on ports 2 and 3.