ELEC 306
Problem Set 5
Due: October 3, 2014

Homework Problems.
Work the following problems in Sadiku:

H5.1 6.14

H5.2 6.33

H5.3 6.60

H5.4 14.4

Real Problems.

R5.1 Computation Problem. Write a program to solve Laplace's equation using finite differences for the confguration shown in Figure 6.10 in Sadiku. You may utilize either the iterative or band matrix method. Use grid sizes of 17x17 and 65x65 nodes. For the solution on the larger grid, plot the equipotential and electric field lines, using at least 10 and no more than 40 lines for each.

Compare your results with the analytic solution given in Example 6.5. Discuss the accuracy and convergence of your solution.

R5.2 Computation Problem. Adapt your program from the previous problem to the configuration shown below. This is the cross-section of a square coaxial transmission line where the shaded portions represent the conductors. You should use a grid size appropriate to the geometry of the problem. Instead of plotting the field and equipotential lines, compute the capacitance per unit length assuming a dielectric with ϵ_r=2.0.