
Fundamentals of Electromagnetic Fields and Waves: I

Fall 2006, EE 30348, Electrical Engineering, University of Notre Dame

Assignment 11

Due dates:

Problems 1 & 2: Thursday, November 30th.

Rest of the problems: Tuesday, December 5th.

Please attach this sheet on top of your solutions. Sketch figures wherever necessary.

1) Finite difference solution to Laplace's Equation I:

Solve the example problem 4.14 (page 305) from Iskander using the Finite difference method, but with a 10×20 mesh size. Also, re-solve it for the 4×8 and the 2×4 mesh sizes as shown in the example. Plot the potential variation inside the rectangle (i.e., make a surface-plot of $\Phi(x, y)$ vs (x, y) inside the rectangle) for each of the three mesh sizes. Use any mathematical software you prefer (Matlab/Mathematica/ your own code) for your matrix inversion.

2) Finite difference solution to Laplace's Equation II:

Iskander: Problem 4.14 (Page 362). Choose the mesh size judiciously. Plot the potential variation over the region for which you solve Laplace's equation.

3) Magnetostatics I:

Iskander: Problem 4.24, Problem 4.25, Problem 4.26, Problem 4.27, Problem 4.28.

4) Magnetostatics II:

Iskander: Problem 4.29, Problem 4.30, Problem 4.31, Problem 4.32.

No more assignments! Good luck for your finals!