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# Fundamentals of Electromagnetic Fields and Waves: I

Fall 2007, EE 30348, Electrical Engineering, University of Notre Dame

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## Assignment 10

Due dates:

**Problems 1 & 2: Tuesday, December 11th.**

**Problems 3 & 4: Thursday, December 13th.**

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  $10 \times 20$  mesh size. Also, re-solve it for the  $4 \times 8$  and the  $2 \times 4$  mesh sizes as shown in the example. Plot the potential variation inside the rectangle (i.e., make a 2D-plot of  $\Phi(x, y)$  vs  $(x, y)$  inside the rectangle as I showed in the class) 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.

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No more assignments! Good luck for your finals!