Notes for Lab 2

Additional information for Lab 2.

Pre-Lab Assignment

- make sure you can access the Matlab software by logging in to `https://appsanywhere.bcit.ca`.

- write an m-file called `Efield.m` defining a function that returns a matrix containing the value of the E-field computed using the second formula in the lab notes. It should not plot the values, just return the values of the E-field.

  The first set of comments in your Matlab m-files should be a continous block of comments immediately following the function line so that the comment block is printed when you type the Matlab command `help Efield`. This comment block should contain:

  – the function prototype (the same as the function line without the word 'function')

  – a description of each argument and return variable in the function prototype along with the dimensions for any non-scalar variables and the allowed values for any argument with a restricted domain

  – the name of the file, your name and the date

  – a brief comment for each major section of the file explaining the purpose of that section of code. It should be possible to figure out what your code does (but not how it does it) just by reading your comments.

  Each section of your code should include comments summarizing what that section of code is doing. See the m-files distributed by Mathworks for examples.

- put a copy of the file in a folder you can access and bring a printout of the `Efield.m` file with you to the lab to hand in.

- read the documentation for the meshgrid, surf and hist Matlab functions. What is returned by `meshgrid([1:N],[1:N])`?

- for the carrier frequency given in the lab notes, what are the values of the wavelength λ and wave number k_0?

Lab Procedure

The Matlab code for the simulation should be put into a file (for example, `lab2.m`). As you proceed through the lab procedure continue adding to and refining your code. The best way to keep track of changes is with revision control software but for now you can either comment out old sections of your code or make backup copies of your m-files, possibly using different names.

Lab Report

Submit printouts of the following:

1. two program listings: a copy of the final version of your lab script, and the final version of the `Efield.m` file.

2. two figures: the final surface plot of the E-field generated by the combination of the 10 plane waves and a histogram of the envelope values.