Problem Set #2

1. Modify the MATLAB code "femtot.m" from Note #1 to incorporate variable cell sizes, using the expressions you derived in Problem Set #1, problem 3. Once you get this working (try different meshes created by the "mesh1.m" program), execute the code using the input meshes "inputfil_1.txt" and "inputfil_2.txt" which represent 2 different meshes for dielectric slabs of thickness 0.4 wavelengths and relative permittivity $\varepsilon_r = 5$. Turn in a program listing and the results you obtain for reflection and transmission coefficients for the two test cases.

2. In Note #3, a representation for the potential function $\Phi(x,y)$ was given in terms of linear "pyramid" basis functions in Equation (10). Substitute this expansion into the energy functional (as in equation 42) and use the result to generate a system of equations by setting the derivative of the functional with respect to each of the unknown coefficients $\{\phi_n\}$ to zero. How does this system differ from the system obtained in equation (14) of Note #3?