



24.781 COMPUTATIONAL ELECTROMAGNETICS

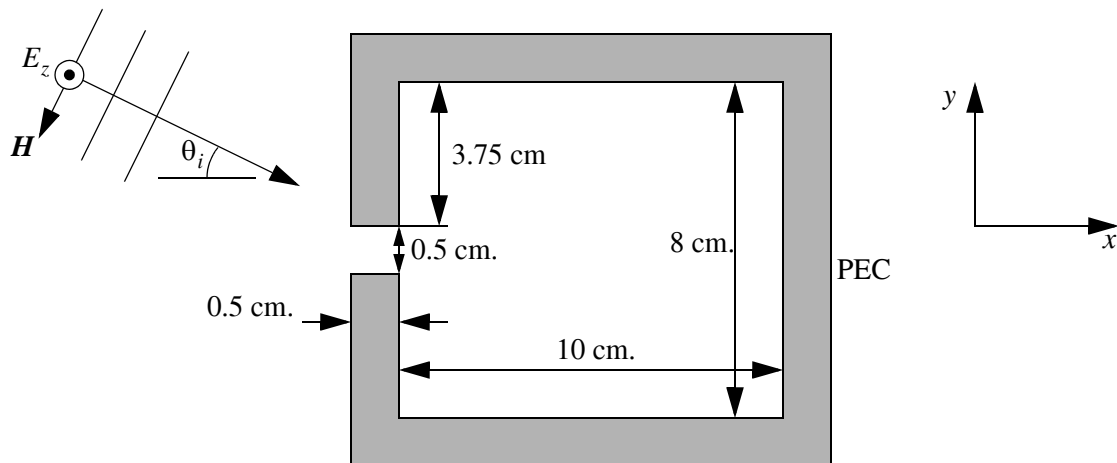
ASSIGNMENT 2 Part B

Time Domain Electromagnetics in 2-D by Finite Difference Methods

October 8, 2003

Due Date: Wednesday, October 22, 2003

Write a 2-D FDTD program to solve the shielding problem shown in the figure.



The incident plane-wave is polarized as transverse-magnetic to the  $z$ -direction (i.e., only an  $E_z$  component of the electric field exists and there is no  $H_z$  component of the magnetic field). Use the scattered-field formulation of FDTD and plot the shielding effectiveness as a function of frequency for 100 MHz to 6 GHz. The shielding effectiveness is defined as:

$$SE = -20 \log \left( \frac{\max E_z \text{ inside shield}}{\text{value of } E_z \text{ without shield}} \right)$$

Do this for various angles of incidence from  $\theta_i = 0$  to  $\theta_i = \pi$ . Use any absorbing boundary conditions you like to terminate the grid.