

Assignment 6
PHGN361

Homework due Feb. 23

1. Before the Friday (Feb. 18) class go to the following link <http://web.ift.uib.no/AMOS/MOV/HO/>. Play and have fun with the applet.
2. Go back to your relaxation solution to the inner square at potential 100 V and the outer at $V = 0$ (item 2 in assignment 4). Assume some length (your choice) associated with the distance between cells. Generate approximate numerical values for the surface charge on the inner conductor.
3. Explain in words how you would use the relaxation method to find the electric field between two charged inner conducting squares (rather than just the one in assignment 4) using the relaxation method. Such a solution could be used to determine the validity of the field lines in the following applet <http://www.cegep-ste-foy.qc.ca/freesite/fileadmin/users/29/NYB/Theorie/contactdiff.swf>.
4. Explain how you would calculate the work required to assemble the charge distribution in the the first problem which involved using the relaxation method.
5. Explain in words how you would solve problem 3.18. Your explanation should not include more than 6 equations. I don't want the answer but rather a discussion of how you start from separation of variables, get a solution which doesn't fit the boundary conditions, then how you would resolve this issue, and how you use the orthogonality of the separation of variables solutions to construct the solutions both inside and outside. Finally, knowing the solution for the potential everywhere how would you find the charge density on the surface of the sphere using Gauss's law.
6. 3.19(PMC), 3.31, 3.32.