

Homework 2

Due Friday 2/1/2013 - at beginning of class

Reading Assignment - Chapter 2.1-2.3

Griffiths Problems, 4th Edition

Each problem should be started on its own piece of paper. Points will be removed from solutions that are difficult to read.

When the problem numbering is different between the 3rd and 4th edition of Griffiths, the third edition number is in parenthesis.

1.44 (Griffiths 3rd Edition problem 1.43)

2.6

2.15

2.17

2.20

2.23

Problem E.2.1 A non-uniform semi-infinite cylindrical volume charge with volume charge density $\Gamma = \gamma\rho^2$ occupies the region $\rho < a$. Compute the electric field inside ($\rho < a$) and the field outside ($\rho > a$) the volume charge, that is compute the field everywhere.

Problem E.2.2 For each of the following fields, determine if the field is a possible electromagnetic field; that is, which of the following fields obey Maxwell's equations.

(a) $\vec{E} = \gamma r^2 \hat{r}$ in spherical coordinates

(b) $\vec{B} = \gamma s^2 \hat{s}$ in cylindrical coordinates

Problem E.2.3 A square of charge with uniform charge density σ lies in the $x - y$ plane, centered at the origin. The square has side of length $2a$. Calculate the field at a point a distance $R > a$ along the y axis.