Classical Electrodynamics (Physics course 503)

Problem set #4

Due date: 6pm, Mar 27 (Tue), 2018

Submission: HW box in physics building.

***1.*** Grounded conducting sphere is located near by a point charge q. The distance between the sphere and the point charge is y. Show that the total induced charge on the sphere is the same as the image charge. When an electrostatic problem is solved by the method of image, the image charge properly located represents the overall effect of induced charges.

***2.* (a)** Find the electrostatic potential arising from an electric dipole of magnitude p located at distance L from the center of grounded conducting sphere of radius a. Assume that the axis of dipole passes through the center of sphere and the size of dipole is much smaller than distance L.

**(b)** Consider two isolated conducting spheres (radii a) in a uniform electric field oriented so that the line joining their centers, of length L, is parallel to the electric field. When L is large, *qualitatively* describe the fields which result, through order .

***3.*** Jackson 2.2

***4.*** Jackson 2.3