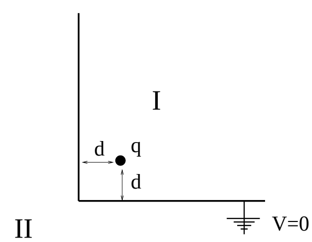
PHYS 621 – HOMEWORK # 3 – DUE FRIDAY, 9/18/2009

Problem 1. A grounded conductor has the shape of an infinite plane except for a hemispherical bulge of radius a. A charge q is placed above the center of the bulge, at a distance d from the plane (or $d - a$ from the top of the bulge). (a) Find the potential in the region above the conductor. (b) Find the total induced charge on the conductor. (c) Find the Dirichlet Green's function.

Problem 2. A charge q is placed near the inner corner of a grounded semi-infinite L-shaped conductor (see figure). Find the potential in region I. (b) Find the Dirichlet Green's function. (c) Find the potential in region II if the conductor is given a constant potential V.



Problem 3. (a) With the image method, compute the potential generated by a charge q which is located between two grounded infinite parallel-plate conductors as in figure below. (b) Write the Dirichlet Green's function. (c) Compute the induced surface charge distribution on the plates.