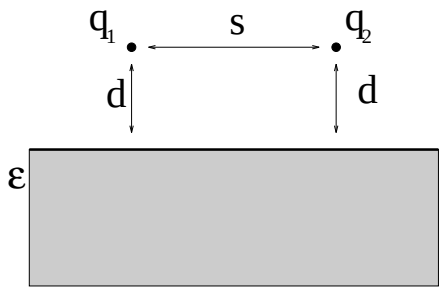
32. What is the surface polarization charge density on a sphere of dielectric constant ϵ and radius a placed in a uniform electric field $E_o\hat{z}$?

33. Make an accurate plot by computer of the electric and displacement fields both inside and outside the sphere in the previous problem. It should look better than the sketch on the bottom of page 17-12 in the notes.

    Warning! This problem looks easy but is very subtle – be extremely careful in your solution. The whole point is to test your understanding of what contributes to the energy and what does not. I suggest explaining your reasoning in detail in case an algebraic error prevents you from obtaining the correct answer.

34. Two point charges q_1 and q_2, separated by a distance s, are each located a distance d from a semi-infinite slab of conductor that fills the entire lower half space. Calculate the energy of the system excluding the infinite self-energies of the point charges.