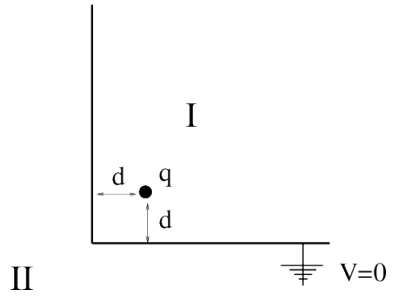
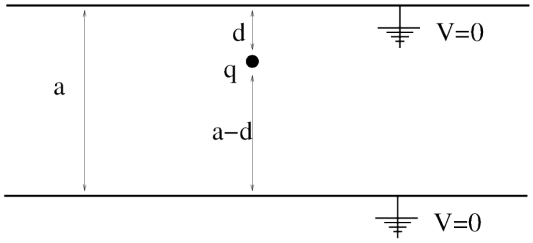
**PHYS 721 – HOMEWORK # 3 – DUE TUESDAY, SEPTEMBER 25, 2018**

**Problem 1.** 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 2.** (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.




**Problem 3.** Show that the (three-dimensional) Green function for Dirichlet boundary conditions on a square two-dimensional region $0 \le x \le 1$, $0 \le y \le 1$ can be written

$$G(\mathbf{x}, \mathbf{x}') = 2 \sum_{n=1}^{\infty} g_n(y, y') \sin(n\pi x) \sin(n\pi x') \,,$$

where the functions $g_n$ satisfy

$$\left( \frac{\partial^2}{\partial y'^2} - n^2 \pi^2 \right) g_n(y, y') = -4\pi \delta(y - y') \,,$$

and $g_n(y, 0) = 0$, $g_n(y, 1) = 0$.