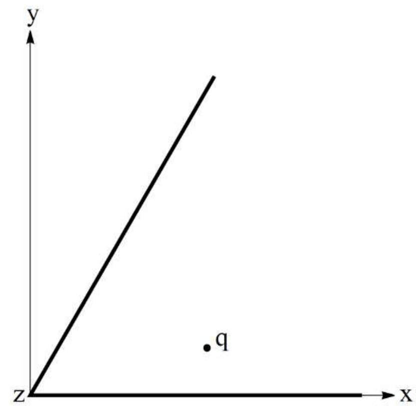
Q1. The figure shows two semi-infinite grounded conducting planes meeting along the z-axis. The angle between them is 60 ° . A positive point charge is located at $(s, \phi, z) = (0.5, 15\,°, 0)$. Use the method of images to find the potential and the field in the region between the two plates where the charge is located.



Q2. Find the surface charge density on the plates.

Q3. Take $q = 4\pi\epsilon_0$ and use Mathematica to

A) Show in the same plot a plot of the point charge, the plates and the contours of the electric potential between the conducting plates in the x-y plane that is z =0 in the range $-0.1 \geq x \geq 1$ and range $-0.1 \geq y \geq 1$. Use the following options in your CountorPlot: ContourShading -> None, ContourLabels -> All, and Contours -> {0, .5, 1, 1.5, 2, 2.5, 3, 3.5, 4}

B) Show in the same plot a plot of the point charge, the plates and the contours of the electric potential between the conducting plates in a plane parallel to the x-y plane at z =1 in the range $-0.1 \geq x \geq 1$ and range $-0.1 \geq y \geq 1$. Use the following options in your CountorPlot: ContourShading -> None, ContourLabels -> All, and Contours -> Table[0.1 i, {i, 0, 0.3, .03}].

C) show in the same plot a plot of the point charge, the plates and the contours of the electric potential and the streamlines of the electric field between the plates in the x-y plane in the range $-0.1 \geq x \geq 1$ and range $-0.1 \geq y \geq 1$. Use the same options of step A.

D) Comment on the direction of the electric field at the conducting plates.