Phys 3330 Electricity & Magnetism II
Spring 2019
Assignment #3 - due Wednesday February 13th 2019

Laplace's Equation in two variables

1. Starting with the rectangular 2D box we looked at in class, modify the solution for the following cases. For each download the Maple sheet that I posted on the website and change it to make of plot of your solution. Please email me the Maple sheet, although you can turn in the written solution by hand.
   a. A rectangular box, with three sides (x=0, y=0, y=b) set to zero potential, but with the fourth side (x=a) set to a potential equal to $V(y) = 4V_o\left[\frac{y^2}{b^2} - \frac{y}{b}\right]$.
   b. A rectangular box, with three sides (x=0, y=0, y=b) set to zero potential, but with the fourth side split into two equal sections, with the one section (y>½b) also having zero potential, but the the other section (y<½b) having a constant potential V_o.
   c. A rectangular box, with three sides (x=0, y=0, y=b) set to zero potential, but with the fourth side split into three equal sections, with the outermost two also having zero potential, but the middle section having a constant potential V_o.

      For all three questions write a Maple worksheet to plot the potential.

2. Repeat for a rectangular box, with only two sides set to zero potential. The side x = a has a constant potential V_1 and the side y = b has a constant potential V_2. (Note, if you think about the Principle of Superposition you can write down the solution to this problem without any actual calculation.)

   Make a plot of the potential inside the box.