Physics 325 — Scientific Computing — Fall 2016 — Lab 08

October 14, 2016

Exercise 1. Laplace Equation

Solve the Laplace Equation in two dimensions for a region defined by $0 \leq$ x ≤ 1 and $0 \leq$ y≤ 1. Let the boundaries be given by $\phi(x, 1) = \phi(1, y) = 10.0$, $\phi(x, 0) = \phi(0, y) = 0.0$. Use at least 100 points per dimension. Plot and save a contour plot for the region containing at least 10 labeled contour levels. You may have to investigate the options to matplotlib.pyplot.contour. (10 points)

Exercise 2. Interpolation

Suppose that someone was interesting in finding the value of the potential at any y value for x=0.5 (centered vertical line) for the potential you calculated in Exercise 1. Use the Python scipy.interpolate.interp1d function to create a function that will provide the desired potential value and test on a non-grid point. **(10 points)**