

Physics 503: Scientific Computing

Homework #2

Topic: Plotting with pyplot

NOTE: Turn in appropriate figure graphic files as well as your code.

Assignment

1. If you did not get HW1 completely working, get all parts of that done. Add a timing profile using the 'time' module. Try it with some large data sets ($>10^6$)
2. Write programs to:
 - o Plot 2 different functions in a 2x1 subplot. You choose the functions, but don't use the ones done in class. Make sure the plots each have titles and labeled axes and specify different colors and markers (or line types) for each plot.
 - o Add a second Figure which is a polar plot of two different ellipses with different eccentricities and include a legend (you will need to fiddle with this to get a good position).
 - o Plot a vector (quiver) plot showing the electric field of a dipole. Use color coding to indicate the magnitude of the E field:

$$E_x = k \frac{q_1(x - x_1)}{[(x - x_1)^2 + (y - y_1)^2]^{3/2}} \text{ and}$$

$$E_y = k \frac{q_1(y - y_1)}{[(x - x_1)^2 + (y - y_1)^2]^{3/2}}$$

let $k=1$ and charges equal 1 and -1. (x_1, y_1) is the position of the charge q_1 .
(Feel free to plot a different vector field if you like.)