vPython Lab Questions Field of a Uniformly Charged Rod – Physics 152

1. The number of spheres you used to approximate the uniformly charged rod effects the value you get for the $E-$field. At a position $0.75m$ above the center of the rod find and record the magnitude of the $E-$field for N=5, N=15, N=25, N=50. Calculate the analytical result from the formula you found in your homework assignment (call this $||\vec{E_{exact}}||$). What do you notice about the relationship between N and the difference between $||\vec{E_{net}}||$ and $||\vec{E_{exact}}||$? Why would this be the case?

2. You will now use you program to measure the value of $||\vec{E_{net}}||$ as the length of the rod changes. Return to your original observation location $(-1m, 0.4m, 0)$. Measure $||\vec{E_{net}}||$ for $L = 1$, 2, 3, 4, 5, 6, 7, 8, 9, and $10m$. Graph $||\vec{E_{net}}||$ vs L. Does this behave the way you would expect? Explain why or why not.