

Lectures 1/2 Tuts

Due Apr 14

Tutorial Problems

- How can you list all files in a directory, with the most recent one displayed last? (5)
- How can you display the first 25 lines of a file? How can you display just lines 16 through 25? (5)
- Sometimes there are multiple man pages with the same name. How can you display them all? (5)
- Make a new text file with your name, email address, what you're working on for your honours project, plus a few things you'd like to learn in the course. Initialize a git repository and commit this file. (5)
- Put your answers to the other tutorial questions into another text file. Add this to the repository also. (5)
- Make a github account and push the repository onto github. Email me your github name so I can have a look at your file/answers. (10)

Tutorial

- Write a python script to make a vector of n evenly spaced numbers between 0 and $\pi/2$. i.e. $x[0]=0, x[-1]=\pi/2$ (5)
- Use this vector to integrate $\cos(x)$ from 0 to $\pi/2$ for a range # of points using the simple method. include 10,30,100,300,1000 points between 0 and $\pi/2$. How does error scale with # of points? (5)
- Python supports array slicing - $x[5:10:2]$ will take points 5,7,9 from x . $x[5::2]$ will take points 5,7,9... from x . How can I take all odd points from an array? How can I take all even points from an array, but skipping the first and last points? (5)
- Write a python function to integrate this vector using Simpson's rule. How does error scale with # of points? How many points did we need to use in part 2 to get same accuracy as 11 points with Simpson's rule? (10)
- Plot the errors as a function of # of points using Simpson's rule and standard sum. You will want to use a log scale here - look at logplot.py in the github distribution (5)

Bonus Points

- the `scipy` module has built in integration functions in `scipy.integrate`. The `quad` routine will do numerical integrals. `quad` will try to put its effort where the function changes quickly.
- Look at `scipy_quad_example.py`, which uses `scipy` to integrate our Gaussian function over two different ranges. The integrals should be (almost) identical - yet they are not. Can you figure out why? (5)
- Can you write another function that will always give the