Logan Maier
Activity 9_10

Optimization 101

3. 3.986 sec for pow(x,2) and .355 seconds for changing to explicitly x*x. x*x is far more efficient

4. After implementing the squareit function we see a slight time increase from the x*x, to a time of .624 seconds which is still many times faster than using the pow function. The over head is the difference between he time taken between the x*x method and the squareit function, which is around .25 seconds. I believe the overhead is not worth it when calculating millions of calculations, but in smaller computations it is worthwhile.

5. I found that sqr(z) was the fastest. It was almost the same as x*x, with relatively no difference between the two.

6. The inline method time was similar to the squareit method, but it was still slower than the previous sqr(z) method and the x*x method. I would chose to to use the sqr(z) method since the overhead is almost nonexistent, and it improves the readability.

7. Optimization complete:

Method	**Time**
pow	3.2E-5 sec
x*x	2 E -6 sec
squareit	2 E -6 sec
sqr	2 E -6 sec
square	2 E -6 sec

After completing the optimized runs, pow is still the slowest, but all forms decreased time required exponentially. With every other method having roughly the same time, I would use the square method as its readability is the best in my eyes.

GSL Interpolation

1. No questions.
2. Done
3. Plot included
4. Yes
5. Plot included. Cubic reacts best near the peaks and globally overall. Linear reacts well globally, but isnt good at the peaks. Poly reacts well at the peaks, but is no good globally.

Mystery

1. Jeremy Bowers

Python Scripts

1. Yes
2. Yes
3. No Questions

Cubic

1. Done
2. Done
3. Knowing that if the equation of a line is a constant, then the derivative is zero. So this makes it easy to iterate over a specific range to find an h value that accurately converges on a dx value this good. Doing this method resulted in a dx value that is accurate to one in 10^6 between 1 and 4, the value was .03867.
4. Using the same approach as previously, I know change the search criteria to search for a value that has an error value within 10^-4.