Report 1 - Getting Started

Leen Alrawas

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Abstract

This report contains a brief background and personal goals. It also contains the results of the first problem set along with my GitHub account information.

1 Background & Personal Goals

For this course, I am looking forward to learning more efficient ways to implement codes and gaining a broad idea about the use of computing in different applications of Physics. I will also use this course as a chance to practice Python as I did not rely on it during my previous studies. I participated in several projects in computational mathematics and physics. In particular, a 1-year research project that consisted of finding and coding new more efficient numeric algorithms for Fresnel Integrals. The work involved double and quadruple precision, finding parameters of Chebyshev polynomial approximations, dealing with lengthy multi-dimensional arrays, optimizations, benchmarking, dealing with round-off errors, etc. The work was mainly done in Fortran-90. Other projects involved simulations, Agent-Based Modeling, the Monte Carlo method, parallel processing, tabu search, the genetic algorithm, and extrapolation/interpolation in the fields of epidemiology and computational nuclear physics. The used platforms and languages included C++, Matlab, Wolfram Mathematica, R, and GAMA Platform.

After the current degree (in the case of surviving the PhD), I am planning to continue in academia and pursue a postdoc position either in theoretical or computational Astrophysics. I also would love to learn the basics of machine learning as it is a popular tool in the field.

2 GitHub Information

Account Name: Leen-Alrawas
`https://github.com/Leen-Alrawas/phys-ga2000/tree/main/ps-1`

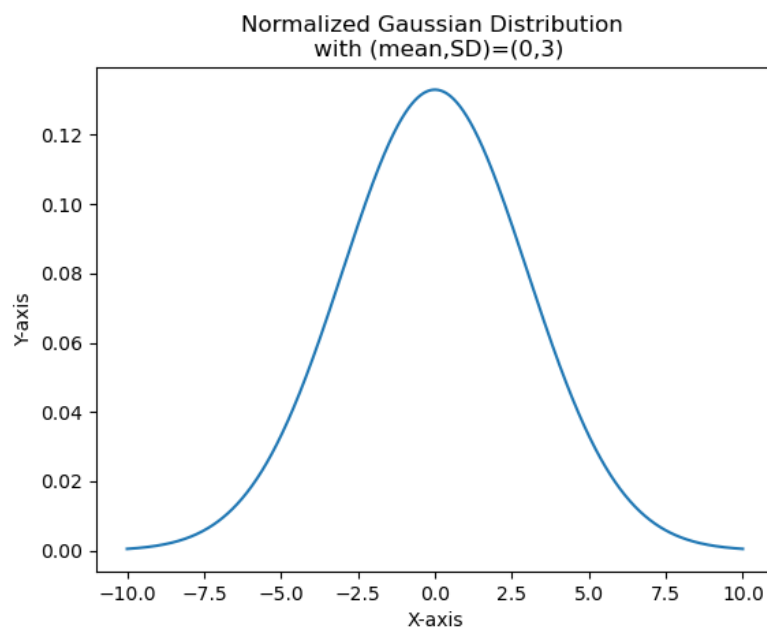## 3 The First Code: Gaussian Distribution

Figure 1: This normalized Gaussian distribution for a dataset with $\mu = 0$ and $\sigma = 3$.