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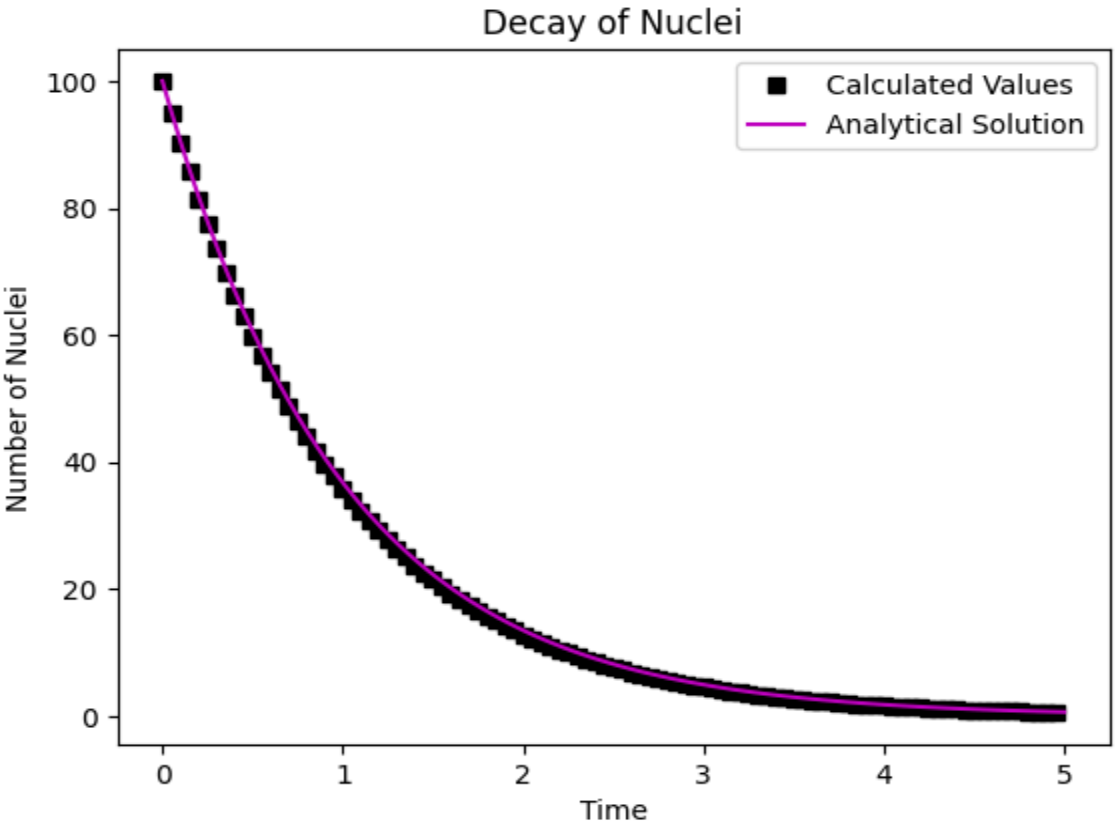
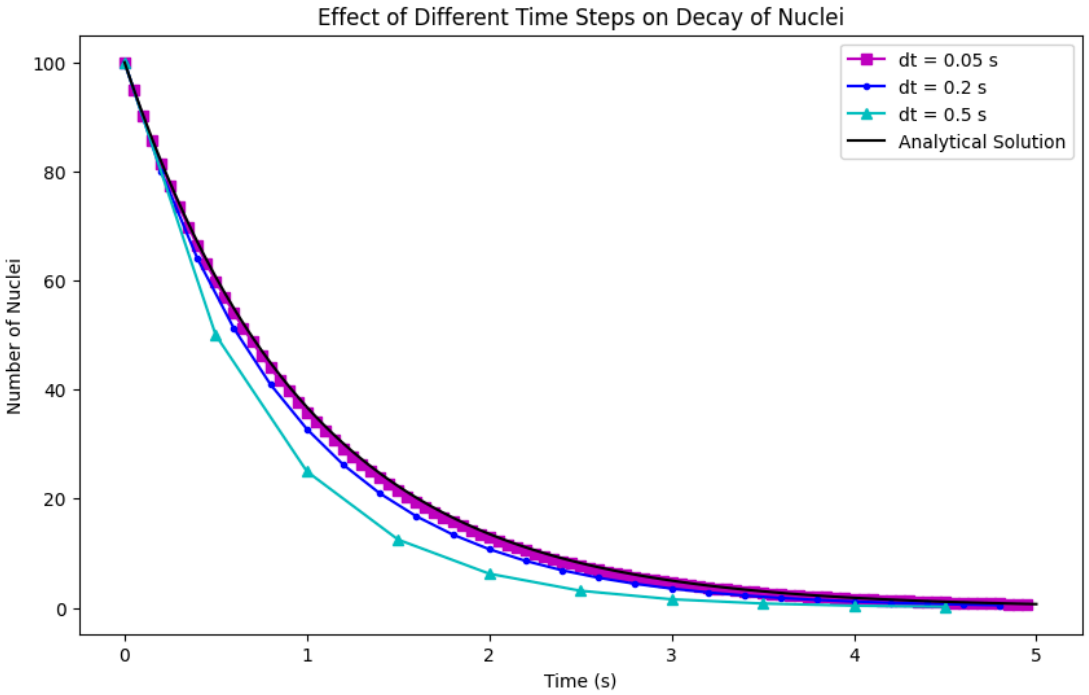
Computational Physics
Chapter 1

- Introduces Nuclear Decay and how to compute it numerically.
    - The differential equation that describes nuclear decay can be solved numerically, however, it can be solved faster using computational methods.
- We solved this problem in the lab by defining functions to compute certain values to find the number of surviving nuclei changes with time.
    - We used an Ordinary Differential Equation to solve this problem and the Euler Method.
- Our function looped over the arrays we created to create our data set.
- When plotting this, we compared the computational values with the analytic



solution that we had worked out. This was plotted and our image looked like:

- We then made sure our output looked reasonable, and if it made sense.
- We continued to test our radioactive decay problem by changing our timesteps, and estimating Nu at different times. We obtained the following graph:



- The solid line is the real solution, and the calculated points become closer and closer together as our timesteps are reduced. This is because there is a larger pool of data, leading to greater accuracy.
- Chapter 1 also discusses the guidelines and philosophy of programming.
- The program structure should be first and used as the outline.
- Descriptive names are very important so that we know what is being used.
- Comment statements should be included as well so that we know what we are doing and why.
- Clarity is very important, everyone should be able to understand your code.