PHSX315

Spring 2022 Preliminary Syllabus

The core part of the course will address the following topics using interesting physics and astronomy problems, with an emphasis on getting you up and running as an applied computational scientist using python.

The order is not well defined. The plan is to first develop your overall competence in computational methods associated with items 1-5 before going into detail on a particular topic. Essential tools to start with are git (version control) and LaTeX (scientific writing).

1. Random Numbers and Monte Carlo Methods
2. Numerical Integration
3. Root-finding
4. Ordinary Differential Equations:
   Initial Value Problems (eg. equation of motion)
5. Data Analysis Techniques
   a. Parameter Estimation
   b. Hypothesis/Model Testing