Week 1

PHY 110C

Introduction to Data Analysis for Physics

Overview

- What this course is
- Syllabus
- Online Textbook
- Intro to *Mathematica*

What this course is

- Student-led workshop
- Pass/fail
- Prep for Modern Lab PHY 353L
- Prep for research
- Prep for career
- Intro to Data Analysis for Physics
  - *Mathematica*
  - *LaTeX*
  - Error analysis, model fitting, etc.

Syllabus

- Handout in classs
- http://www.cs.utexas.edu/~evanott/PHY110C_Textbook/static/data_analysis/syllabus.html

Online Textbook

- http://www.cs.utexas.edu/~evanott/PHY110C_Textbook/static/data_analysis

Introduction to Mathematica

- From the reading for Week 1
- Access in PMCL or PC through Physics department

Basic Constructs

- Variables
  - x=5
- Order matters
  - 5=x (wrong)
  - x=5; x^2; x=2
- Building on output
  - %^2; %% + 5
- Other constructs
  - (*comments*)
  - “strings” <> ToString[5]

Lists

- Storing more than one value in a single place
- Useful for plotting, getting all data together

```
data = {1,4,9,16}
data[[1]] (*1*)
data[[1;;2]] (*{1,4}*)
data[[{1,3}]] (*{1,9}*)
Norm[data] (*18.8149*)
data[[2]]=3 (*sets second element to 3*)
```

Functions

- Useful for not copying a formula many times
- Single variable, or multivariate

```
f[x_] := x^2
g[x_] := Sin[Sqrt[x-7]]
h[x_] := D[Sin[t^2], t]/.{t->x}
```

Example: Calculus

- Differentiation: D[f[t], t] or D[f[t], {t, order}]
- Integration: Integrate[f[t], t] or Integrate[f[t], {t, a, b}]

Try d(ln t)/dt, int(sin^2(t)dt)

Assignment 1

http://www.cs.utexas.edu/~evanott/PHY110C_Textbook/static/data_analysis/_downloads/assignment1.pdf