Welcome to CogSci 109

Modeling and Data Analysis

Instructional Team

- Instructor
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- TA's
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About our expectations of you

- This course does not assume that you lived every day programming since you took CogSci 18
- Assuming that you took the intro to programming or are taking concurrently, and so have some sense of what programming is, but do not necessarily remember all details
- We will review and define mathematical and programming concepts as we go
- It will require an open mind on your part and effort

Why this course is important for everybody

- No matter what you do in life, being able to take in information, organize it,do something with it, and then communicate with others is key
- These specific techniques are very basic to scientific research
- It is a language to speak and understand

Four main parts to course

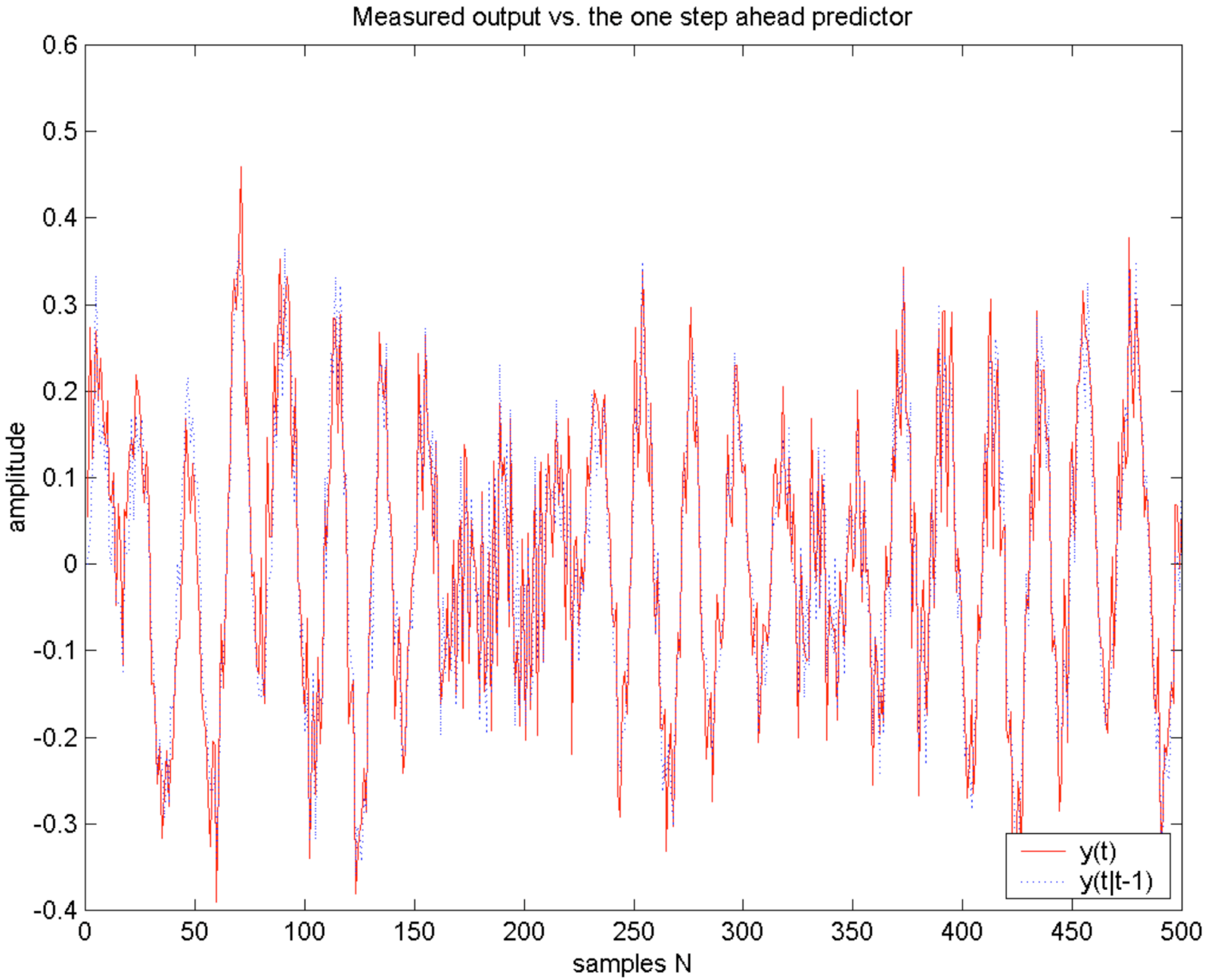
1. Data manipulation and processing
2. Extracting basic information from data and visualizing that info
3. Modeling the data and evaluating those models, data fits
4. presenting and communicating results

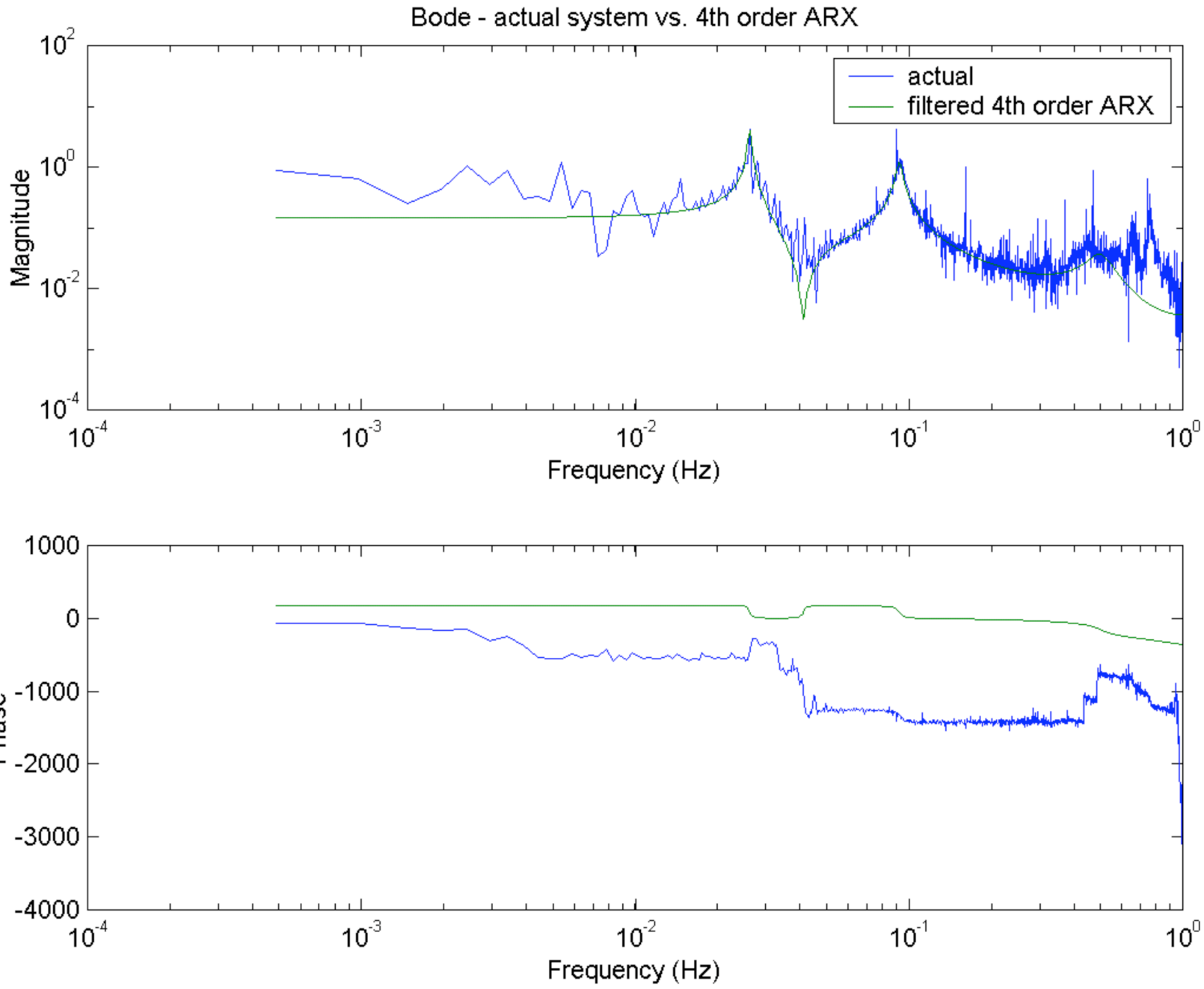
What you will be able to do by the end of this course

- Use Matlab and other tools
- Manipulate data
  - **Load**
  - **Sort**
  - **Filter**
  - **Rearrange/size, etc**

What you will be able to do (continued)

- Extract basic information from that data
  - **Standard statistics (mean, median, mode, standard deviation, correlation)**
  - **Basic Hypothesis testing**
- Visualize the data from multiple perspectives
  - **2D plots**
  - **3D plots**
  - **Charts**
  - **Color plots/contour plots**


Measured output vs. the one step ahead predictor
amplitude
samples N
y(t)
y(t|t-1)
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
0
50
100
150
200
250
300
350
400
450
500


Bode - actual system vs. 4th order ARX
actual
filtered 4th order ARX
Magnitude
Frequency (Hz)
Phase
Frequency (Hz)

What you will be able to do (continued)

- Create models from the data which approximate the behavior of the system
- Communicate results effectively
- Communicate with others
- Read and understand the literature, speak/understand the language
- Know how to look for more information
  - **Expand your knowledge**
  - **Where to go from here**
  - **Pitfalls to avoid**

Logistics of the course

- Course page
  - **http://maelabs.ucsd.edu/alex/pages/cogsci109**
- Grading (Fill the bucket ~ 1000pts)
  - **1 Midterm 20%**
  - **~7 Homeworks 50%**
    - Each week, due Wednesdays, turn in to WebCT
  - **1 Final 30%**
  - **Possibly a group project (depends on time)**
  - **Bonus (TBA) - many opportunities to do well**

Logistics (Continued)

- Labs
  - **Discussions once a week (required attendance at the one you signed up for)**
  - **Review material from the week, hands on experience, Q&A, homework help**
- Office hours locations and dates/times TBA
  - **3 per TA and by appointment**
  - **5 for instructor and by appointment**
  - **Variety of times/days so everyone can go to at least some**
  - **We're here for you! We want to help!**

We want you to work together!

But…

- Please don't cheat!
- That said, we need to define what's ok, what's not
  - **On homeworks** - ***you are welcome to discuss material, homeworks and so on, but you must write your own code and write-ups (no copy and pasting)***
  - **On tests** - ***no collaboration, no information from external sources that are unapproved (no electronic internet or other devices), no discussion with anyone but TA's or instructor. They may give hints but not answers***
- Standard UCSD academic honesty policies also apply

A final word…

- We are all here to do our best to help you learn and succeed
- We all want this to be a positive experience for you that you can continue to gain from over the years to come

Matlab Demos and Introduction