Syllubus (Tentative)

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Office Hour: By Appointment

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1 Overview:

This summer course is designed to prepare first year graduate students for applying Matlab to economic research. By the end of the three-week long course, students are expected to gain adequate programming experience and comfort of solving complicated models in Matlab without being fret about it.

2 Prerequisite:

No prior knowledge about the Matlab is required. Although some knowledge of general programming is preferred. However, as with most courses in programming, I will not be able to cover all the gory details in the lectures, and the students should take initiatives in searching for solution for problems encountered. I do encourage student to obtain an account of Duke Slurm cluster service from IT soon after the course starts, and I will show how to use it towards the end of the course.

For Mac OS users, please install the Xcode software from Appstore. For Windows users, install new version of Visual Studio with SDK (preferred), or SDK 7.1 with .netframe 4.0.

3 Grading:

The grading will be based on 2 minor (20% each) and 1 major (60%) group assignments. Those assignments are simplified from real economic problems. For first two assignments, you are supposed to hand in the final result. You are supposed to hand in, as a group, three items: the pseudo-code, the (readily executable) code, and printout of the result. The final assignment is due by 11:59pm on the last day of the class. I will post my approach to the problem after each problem set is due. Students are encouraged to collaborate and cross-check each other's work, and I will not make any effort to eliminate free-riding. But remember, coding is about practice, and if you don't put in effort yourselves, you won't be able to do it right in a timely manner when needs arise.

4 Class Schedule[1]:

- Class 1: Fundamental knowledge about coding in Matlab

    - Cover the basic concept of Matlab, functions, scripts.
    - Goal: Students are able to toy with Matlab and create simply functions and programs
    - Assignment1: basic linear estimation using bootstraps

- Class 2: I/O

    - Cover data input/output.
    - Goal: Students are able to export result from Matlab programs.
    - Assignment 2: Creating Tables as seen in economic papers.

- Class 3: Graphics

    - Cover commonly used type of graphs.

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[1]I am indebted to previous instructors for this course, Joe Mazur, Tyler Ransom, and Olga Kozlova, for their generosity of sharing past course materials, from which I drew many insightful contents.

- Goal: Students are expected to be able to generate complicated graph with proper labels, and legends, etc..
- Assignment 1 due

- Class 4: Debugging and code optimization.

  - Cover the common practice of debugging, and good practice to keep track of execution of code.
  - Goal: Students are expected to improve efficiency in coding through effective debugging practice.

- Class 5: Modeling Economy

  - Cover Advanced coding methods in Matlab to cope with coding intensive economic models.
  - Goal: Students are expected to be able to handle complicated economic model
  - Assignment 3(a): Create a auction market.
  - Assignment 2 due

- Class 6: Modeling Economy (Q&A)

- Class 7: Non-linear Econometric Estimators:

  - Cover basic optimization tools in Matlab and apply them to solving economic problems
  - Goal: Student are able to use build-in optimization toolkits with ease.
  - Assignment 3(b): Applied the model derived in the previous assignment to obtain point estimate using GMM estimation.

- Class 8: Time-consuming Optimization/Bootstrap Inference

  - Cover Advanced optimization toolkits and bootstrapping techniques in Matlab

- Goal: Students are able to utilize university resources and advanced optimization toolboxes to solve time-consuming econometric models.

- Assignment 3(c): derive confidence interval to the point estimate derived earlier.