

Lecture 1. Warming up

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Knowing each other

- Tell the class something about yourselves.

Class objectives

1. To review the fundamental mathematics for graduate level courses in (applied) economics.
 - You should be alarmed if you do not understand these;
 - You cannot escape these while you are in the graduate schools;
 - If you understand all of these, you should be in good shapes;
 - This is not a comprehensive list.
2. To guide you through the beginning stages of learning computer programming.
 - You do not have to come if you are already an expert;
 - You need to be self-motivated.

Why does the class matter?

Because quantitative skills matter, and

- It is one of the few courses focusing on mathematics;
- It is the **ONLY** course that teaches computer programming.

Some motivation questions

1. What would farmers do when fertilizer becomes cheaper?
2. How do price risks affect the import allocation? (Muhammad, 2012)
3. How to map a theoretical economic model to data? (see an example by Villoria and Hertel, 2011)
4. How to estimate empirical models or test on the theoretical models?
6. You cannot answer the above questions without knowing enough about maths or computer programming.

The cohort - based on the survey

1. PhDs and Master's are about half-and-half;
2. Most students own intermediate level knowledge of calculus;
3. Half did not take any class in linear algebra;
4. One-third used R before and two-thirds used STATA before.

The course design

1. Math materials covered are up to the master's level, but more weights are placed on the entry levels;
2. Some PhD levels of materials would be covered (labelled with “*”);
3. Every piece of math covered here is relevant;
4. There are 7 sessions for calculus and 3 sessions for linear algebra;
5. There are 9 sessions for computer programming, equally distributed among R, STATA and SAS;
6. I use R to explain math problems when necessary.

Why R?

1. R is a free dynamic programming language;
2. R is built for statistical computing. R and Python have become the most popular softwares for data analysis;
3. R is a powerful tool for data wrangling and data visualization;
4. STATA and SAS are also good to know.

Class rules

1. Attendance is not required;
2. Yet, registration is required;
3. No home assignment or exam;
4. Question are very welcomed;
5. Avoid eating please.

A few things to note

1. Prepare the softwares in the following two weeks;
2. Keep track with my GitHub website for updates of class materials:
<https://github.com/cbw1243/KSUMathReview>
3. Watch out for the Kaggle competition:
<https://www.kaggle.com/competitions>
4. Talk to me if you are confused at any point;
5. We go through the basic calculus in the next class.

End.