

Econ 3321/5321 Programming and Computation with R

Contact

Instructor: Min Seong Kim
Lecture: Mon, Fri 8:40-9:55am, OAK 308
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Course Description

This is an introduction to R programming for data analysis. Computation using a programming language is an essential part of data analysis. Competent economists with quantitative expertise must not just be able to run existing programs but also be able to read, modify and write codes, so that they can assemble computational tools needed to solve various economic problems.

No programming knowledge is assumed for this class, but some knowledge in statistics/econometrics and linear algebra may be assumed. Students will learn the basics of R programming – objects, data structures, logical design, functions, etc. They will also learn how to conduct matrix algebra, data visualization, optimization, and econometric analysis using the R programming language.

Course Mechanics

In each class, I will have a short lecture that covers a single topic. The rest of the class is will be a lab session, in which students will work through a set of practice exercises using various economic data. These are to be completed and submitted. There will also be a midterm and final project.

Course Outline

1. Operation in R: Arithmetic operation, relational operation, logical operation
2. Variable assignment: Numeric, Character, Logical
3. Data structures: Vector, Matrix, Factor, Data frame, List
4. Data Input
5. Date data
6. Conditional statement: if, else if, else
7. Loop: while, for (Application: Bootstrap)
8. Functions: How to use a built-in function, and how to write a function
9. Apply family (useful function)
10. Matrix Algebra (Application: PageRank algorithm)
11. Visualization
12. Linear regression analysis
13. Optimization
14. Principal Component Analysis

Schedule Change

We will move the lecture on April 7 (Fri) to April 5 (Wed).

Data Sets

- You can find many interesting datasets from (www.kaggle.com)
- College Data (<http://www-bcf.usc.edu/~gareth/ISL/data.html>)
- Exchange Rate Data (<https://fred.stlouisfed.org/series/DEXUSEU>)
- Housing Market data (<https://www.kaggle.com/harlfoxem/housesalesprediction>)
- Wage Data (<https://www.kaggle.com/thec03u5/fifa-18-demo-player-dataset>)

Course Evaluation

- 20%: Participation
- 20%: Assignments
- 30%: Midterm
- 30%: Final Project and Presentation

You are encouraged to discuss and work together, but **all work you submit must be your own.**

Email Policy

I will try to response to an email within one day (24 hours). If a question cannot briefly be answered with a reply email, I will indicate that you need to see me during the OHs.

Classroom Policy

- Please do not use the computer for other purposes than lab exercises.
- Please do not use any other electronic devices in class.
- Please do not work on other subjects in class.
- Please do not make unnecessary noises.
- If you have to leave class early or join late, please do so quietly.