

Math Camp Syllabus

Maxime Cugnon de Sévricourt
& Yağmur Menzilcioğlu

Summer 2022

E-mail: mc2534@georgetown.edu, ym406@georgetown.edu

Dates: August 8 - 19, 2022

Class Hours: 9 am - 12 pm, 1 pm - 4 pm EST

Classroom: Healy 103

Course Description

The purpose of this course is to serve as:

- (i) a gentle introduction to some new technical skills that you will be exposed to in short order in your classes; and
- (ii) a refresher on some elementary mathematical ideas that you will need throughout the first year

Week 1

The first week will expose you to some basic contents of Econometrics and Macroeconomics in the first year. The goal is to fill the gap between undergraduate and Ph.D. levels. Course material will come from various sources:

- Appendices M.J - M.N in *Microeconomic Theory* by Mas-collel, Whinston and Greene;
- Appendix A in *Econometrics* by Bruce Hansen ([available online](#)); and
- Part V in *Mathematics for Economists* by Carl P. Simon and Lawrence Blume;
- Chapter 2 of *Recursive Macroeconomic Theory* by Lars Ljungqvist and Thomas J. Sargent.

Instructor: Yağmur

Topics: Static optimization, matrix algebra, differential equations, stochastic processes and introduction to MATLAB.

Week 2

The second week will focus on reviewing/developing your core mathematical toolkit. This will be heavily based around appendices M.A - M.I in *Microeconomic Theory* by Mas-Collel, Whinston and Greene as well as *Real Analysis with Economic Applications* by Efe Ok

Instructor: Maxime

1. Day 1: *Naïve* Set Theory, binary relations, functions
2. Day 2: Real numbers and Real-valued functions
3. Day 3: Topology
4. Day 4: Convex analysis, separating hyperplane theorem, properties of convex functions, correspondences, Berge's Theorem of the Maximum
5. Day 5: Fixed Point Theorems

We look forward to working with you all! If you have any questions about background or the program, feel free to reach out to us to chat any time! Welcome aboard!