

Math Review Part II

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Class Hours: M-F 9.30am-12pm

Class Room: Maloney Hall, Room 313

Course Description

This is the second part of the mini math review session. The session will give you a flavor of real analysis and cover other topics useful for the first year micro sequence like quasi-concavity and quasi-convexity of functions, correspondences and some basics of optimization.

Requirements

There is no formal requirement for the math camp, however I encourage you to go over the lecture slides for each topic before the class and also give an honest shot at solving the problem sets before looking at the solutions. Seeking help from your classmates and engaging with each other with respect to the material as well as problem sets is also highly encouraged.

Syllabus

1. Real Analysis

- Sets, Relations and Functions
- Metric Spaces
- Basic Topology
- Sequences and Convergence
- Compactness
- Continuity and Weierstrass Theorem

2. Convexity

- Convex Sets
- Separating Hyperplane Theorem

- Concave and Convex Function
- Quasiconcave and Quasiconvex Function

3. Correspondences

- Concept of Correspondences
- Upper and Lower Hemi-Continuity
- Closed Graph Property
- Fixed Point Theorems
- Berge's Theorem of Maximum

4. Static Optimization

- Unconstrained Optimization
- Constrained Optimization
 - Equality Constraints: Lagrange Method
 - Inequality Constraints: Kuhn-Tucker Theorem*
- Envelope Theorem*

Topics marked * will be very briefly touched upon as they will be covered in depth in the first-year math sequence.

References

I will be teaching using lecture slides that I have compiled using lecture notes available elsewhere and the following books as references:

1. Carl P. Simon and Lawrence Blume, Mathematics for Economists, Norton 1994
2. Alpha C. Chiang, Fundamental Methods of Mathematical Economics, McGraw Hill, 1983
3. Walter Rudin, Principles of Mathematical Analysis, McGraw Hill
4. A. MasColel, M.D. Whinston, and J.R. Green, Microeconomic Theory (math appendix)
5. Knut Sydsaeter, Peter Hammond, Atle Seierstad and Arne Strom, Further Mathematics for Economic Analysis, Second Edition

I have made an attempt to ensure that the lecture notes along with the class should be self-sufficient but you might want to supplement it with one of the above books for deeper understanding of certain topics. I won't recommend buying any of these books since they are available at the BC library and can also be found digitally unless you like hoarding math books. In any case, you can always request to refer to my copies of the books. For basic understanding of most topics, Simon and Blume is a good reference as well as a starting point for someone who might be feeling overwhelmed. If you are someone who enjoys mathematics, I recommend flipping through Rudin for Analysis. Math appendix of MWG covers the material succinctly and should be preferred for quickly reviewing material that you have seen before.