S1, 2018

Mathematics II

Monday, Friday 10:25-12:10

April 6, 2018

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The aim of this course is to provide students with basic tools in Analysis that are needed in advanced level micro and macro economics. The course covers the main part of the Mathematical Appendices in Kreps.

Course information will be posted at

http://www.oyama.e.u-tokyo.ac.jp/mathii18/

Topics

1. Real numbers (Debreu 1.5)
2. Some simple real analysis (Kreps A.2; Debreu 1.6, 1.7; MWG M.F)
3. Correspondences (Kreps A.4; Debreu 1.8; MWG M.H)
4. Convex sets and (quasi-)concave functions (Kreps A.3; Debreu 1.9; MWG M.C)
5. Differentiation (Kreps A.7; MWG M.A, M.B, M.E)
6. Negative (semi-)definite matrices (MWG M.D)
7. Separating hyperplane theorems (Kreps A.3; Debreu 1.9; MWG M.G, M.M)
8. Optimization (Kreps A.5; MWG M.J, M.K)
9. Envelope theorem (Oyama and Takenawa; MGW M.L)
10. Fixed-point theory (Kreps A.8 Debreu 1.10; MWG M.I)
11. Dynamic programming (Kreps A.6; Stokey-Lucas 4; Puterman 5, 6; MWG M.N)

Textbook

- D. M. Kreps, *Microeconomic Foundations I*, Princeton University Press, 2012.

References

- G. Debreu, *Theory of Value*, Yale University Press, 1959.
- A. Mas-Colell, M.D. Whinston, and J.R. Green, *Microeconomic Theory*, Oxford University Press, 1995.
- D. Oyama and T. Takenawa, "On the (Non-)Differentiability of the Optimal Value Function When the Optimal Solution Is Unique," forthcoming in *Journal of Mathematical Economics*.
- M.L. Puterman, *Markov Decision Processes: Discrete Stochastic Dynamic Programming*, Wiley-Interscience, 2005.
- N.L. Stokey and R.E. Lucas, *Recursive Methods in Economic Dynamics*, Harvard University Press, 1989.

Grading

Final exam

Office hours

Fridays 14:00-15:30, or by appointment
10th floor, 1012