

S2, 2023

Mathematical Economics

Monday, Friday 10:25-12:10

June 5, 2023

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In this course, we study mathematical tools useful for advanced level economics, including important topics from convex analysis, as well as advanced topics from discrete mathematics such as lattices, supermodularity, and matroids.

Course information will be posted at

<http://www.oyama.e.u-tokyo.ac.jp/mathecon23/>

Textbook

- R. V. Vohra, *Advanced Mathematical Economics*, Routledge, 2004.

Topics

1. Farkas' Lemma (Vohra 2, 3, Applications: 2.5, 2.6, 3.5, 4.7)
2. Separating Hyperplane Theorems (Vohra 3, Applications: 6.4)
3. Structure of Polyhedra (Vohra 3, 4, Applications: 4.6, 4.9)
4. Lattices and Supermodularity (Vohra 7, Applications: 7.2, 7.5, Milgrom and Roberts)
5. Cores of Convex Games (Shapley)
6. Matroids and Polymatroids (Vohra 8, Applications: 8.7)
7. Choquet Integral (if time permits) (Dow and Werlang)

Grading

Final exam

Office hours

Fridays 14:00-15:30, or by appointment

10th floor, 1012

References

- J. Dow and S. Werlang, “Uncertainty Aversion, Risk Aversion, and the Optimal Choice of Portfolio,” *Econometrica* 60, 197-204, 1992.
- P. Milgrom and J. Roberts, “Rationalizability, Learning, and Equilibrium in Games with Strategic Complementarities,” *Econometrica* 58, 1255-1277, 1990.
- L. S. Shapley, “Cores of Convex Games,” *International Journal of Game Theory* 1, 11-26, 1971.

(More to be posted on the course webpage)