

ISyE 8803E

Game Theory

Spring 2008

Administrative Info

Instructor: Anton J. Kleywegt
Office: Groseclose 409
Office hours: after class
e-mail: Anton.Kleywegt@isye.gatech.edu
WWW URL: http://www.isye.gatech.edu/faculty/Anton_Kleywegt
Phone: 894-4323
Fax: 894-0390

Class Times: To Be Decided At Organizational Meeting on Wednesday, January 9, 6:00pm, in IC207

Description:

The course covers foundational material in both non-cooperative and cooperative game theory. The major objective of the class will be to develop a better understanding of the basic theoretical results in game theory and their proofs. Significant time will be spent on the mathematical material, beyond the prerequisite knowledge for the class, that underly the proofs of important results. Thus we will not spend much time on applications, although we may devote a little time on some applications such as economic models, auction theory, or biological models, depending on the interests of class participants. We will also briefly explore some of the more modern topics in game theory, such as dynamical models of learning in games.

Objectives of the course are

- to develop a familiarity with basic results in game theory;
- to develop a familiarity with mathematical tools and proof techniques used in game theory;
- to understand the assumptions and the limitations of results in game theory, and the questions that result from those;
- to develop the ability to read papers involving game theory, and to understand the technical parts of the papers.

Prerequisites:

Previous exposure to real analysis will be important (concepts such as supremum, infimum, convergence, continuity, contraction mapping). The extensions of some results use measure theory. Familiarity with convex sets and convex functions will be important.

Textbook:

Myerson, R.B., "Game Theory: Analysis of Conflict", Harvard University Press, 2002.

References:

Aliprantis, C. D. and Chakrabarti, S. K., *Games and Decision Making*, Oxford University Press, New York, 2000.

Border, K. C., *Fixed Point Theorems with Applications to Economics and Game Theory*, Cambridge University Press, Cambridge, 1985.

Dixit, A. and Skeath, S., *Games of Strategy*, W.W. Norton & Company, New York, 1999.

Filar, J. A. and Vrieze, K., *Competitive Markov Decision Processes*, Springer-Verlag, New York, 1996.

Friedman, J. W., *Game Theory with Applications to Economics*, Oxford University Press, New York, 1986.

Friedman, J. W., *Oligopoly and the Theory of Games*, North-Holland, Amsterdam, 1977.

Fudenberg, D. and Levine, D. K., *The Theory of Learning in Games*, MIT Press, Cambridge, MA, 1998.

Fudenberg, D. and Tirole, J., *Game Theory*, MIT Press, Cambridge, MA, 1991.

Garcia, C. B. and Zangwill, W. I., *Pathways to Solutions, Fixed Points, and Equilibria*, Prentice-Hall, 1981.

Gibbons, R., *Game Theory for Applied Economists*, Princeton University Press, Princeton, 1992.

Jones, A. J., *Game Theory: Mathematical Models of Conflict*, Chichester, England, 2000.

Kreps, D. M., *Game Theory and Economic Modelling*, Oxford University Press, Oxford, 1990.

Luce, R. D. and Raiffa, H., *Games and Decisions*, Dover Publications, New York, 1957.

Mas-Colell, A. and Whinston, M. D. and Green, J. R., *Microeconomic Theory*, Oxford University Press, New York, 1995.

Owen, G., *Game Theory*, Academic Press, San Diego, 1995.

Rapoport, A., *N-Person Game Theory*, University of Michigan Press, Ann Arbor, 1970.

Shubik, M., *Game Theory in the Social Sciences: Concepts and Solutions*, MIT Press, Cambridge, MA, 1982.

Von Neumann, J. and Morgenstern, O., *Theory of Games and Economic Behavior*, Princeton University Press, Princeton, 1980.

Vorobyev, N. N., *Game Theory: Lectures for Economists and Systems Scientists*, Springer-Verlag, New York, 1977.

Grading:

Grades will be based on homework assignments.

Homework:

Homework will be assigned approximately once every two weeks. You should start working on each homework early, that way you will have time to ask questions in class before the homework is due. Late homework will be accepted only in case of unavoidable occurrences, such as illness or death in the family. You are encouraged to discuss homework and learn from each other, but each person must submit his/her own work, unless the homework specifically indicates that you should work in groups. Any queries on homework grades must be submitted in writing to the instructor, together with the homework in question.

Academic Honor Code:

It is your responsibility to familiarize yourself with the Georgia Tech Honor Code. Specifically, you must do your own work in all homeworks and exams; when homework is specifically assigned as group homework you may and should work with the other members of your group.