Advanced Game Theory

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Course information:
Course Number: POLSCI.890-1.01.Sp14
Time: Th 10:05 AM–12:35 PM
Place: Biological Sciences 063
Course website: Sakai

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Course Description

This is the second semester in the game theory sequence. The prerequisites are the first semester in deductive/analytical approaches and the department's math camp, or the equivalent of both. However, there will be a review of the material from the first semester of game theory, so don't worry if your game theory is rusty. The first few weeks also review/introduce many mathematical tools. And, of course, I will be happy to answer questions in class or help out of class.

The course has two primary aims. The first is a better understanding of the technical modeling literature. By the end of the course you should not only be able to read and understand most of it, but also have a good idea as to why authors made the choices they did, and what they gained or lost by making them. The second is an enhanced ability to write models of your own. Throughout the course you will be exposed to an array of different theoretical modeling choices, from signaling and bargaining games to agency problems to (if time permits) behavioral models and computational methods, both to familiarize you with them and to indicate which may be of best use in a given context. Along the way we will also discuss how to present formal models, which can be as important as the modeling decisions themselves.

Course Format

I believe the best way to learn modeling is by doing, and the class structure reflects this. I have partitioned the course into eight sections, some of which have subtopics. After each of the first six sections there will be a problem set, which will be due at the beginning of class two weeks after we complete the section. These problem sets will require a significant input of time, and represent the most important mechanism for developing mastery of the material. You will be provided with detailed solutions to the problem sets in the class in which they are due, and will be expected to carefully read through these and come to the following class with any questions.

As a supplement to the required text I will post lecture notes to Sakai. I expect you to have made an attempt to read both text and notes before class. This will help you ask questions in class that will be of most use to you, and I encourage frequent interruptions in that regard. It is easy to fall behind, and no question which helps prevent this is a bad one. I also recommend going over the text or the notes again after class, to cement your understanding. This syllabus lists as well recommended readings for class topics; these are published works relevant to the topic and often referenced in the text. I strongly suggest that you at least read through model set-ups and justifications in the recommended readings.

At the conclusion of the class you will write a model of your own designed to address a question of substantive interest to you. The purpose of this model is not to produce an immediately publishable work of formal theory. It is instead to take some early steps in formalizing your thoughts, understand what this entails, and help you to discern your future interests in this area.

Readings

The required textbook for the course is McCarty, Nolan and Adam Meirowitz. 2007. *Political Game Theory: An Introduction*. New York: Cambridge University Press (**MM**). I will also post to Sakai related notes prior to most classes, usually several weeks beforehand. You are responsible for reading both text and notes carefully and coming to class with questions. I will provide additional notes detailing the examples we will go over in class after we go over them. Recommended papers are mostly available in the usual places.

Course Requirements

- Participation (10%): I expect active participation in the form of questions during class.
- Problem Sets (60%): This is by far the most important part of the course. You are welcome to work together on these, but each person must write up the solutions on his or her own, either by hand (assuming your handwriting is legible) or by computer (preferably in LaTeX). You are strongly encouraged to make sure that you understand each thing you write down, and I encourage you to come talk to me if this is proving difficult. This is for your benefit, not mine; you will get much more out of the class this way. I will pass out a solution key to each problem set after it is turned in. I will give generous credit for making the attempt at a difficult problem even if the solution is not found, so don't worry if your answers are not flawless.
- Original Modeling Paper (30%): You are to produce by the last class a paper comprising an original model and its solution. This paper must contain a formal presentation of the model, substantive justifications for all modeling assumptions and parameters, a brief (no more than one paragraph) introduction detailing the question the model is intended to address, a brief (no more than three pages) discussion of insights derived from the model, and an appendix with a formal solution of the model. The model may be on any topic, as long as it uses methods discussed in class. It must be typewritten (again, preferably in LaTeX). Length will vary based on the complexity of the model. You may combine this paper with one you will be using for another purpose; however, my expectations as to polish will rise in this case. Prior discussion with me about both the substance of and the methods employed in the paper is strongly encouraged. As with the problem sets, I will be generous in giving credit for attempting something difficult even if the outcome isn't perfect, so please feel free to stretch yourselves.

Tentative Schedule:

Section 1: Review of Intro Game Theory and 1-D Calculus

Reading: None, but it might be helpful to read over your notes from Intro Game Theory and math camp prior to class.

Section 2: Individual and Group Choice

Topic: Choice, Uncertainty, and Mathematical Underpinnings.

Required reading: **MM** Ch 2,3

Recommended readings:

Austen-Smith, David and Jeffrey S. Banks. 2000. *Positive Political Theory I: Collective Preference*. Ann Arbor: University of Michigan Press, Ch 1.

Bazerman, Max H. 2008. *Judgment in Managerial Decision Making*. New York: John Wiley and Sons, Ch 3.

Topic: Social Choice Theory and Methods of Proof

Required reading: **MM** Ch 4

Recommended readings:

Austen-Smith, David and Jeffrey S. Banks. 2000. *Positive Political Theory I: Collective Preference*. Ann Arbor: University of Michigan Press, Ch 2.

Sen, Amartya. 1970. "The Impossibility of a Paretian Liberal," *Journal of Political Economy* 78: 152–157.

McKelvey, Richard D. 1976. "Intransitives in Multidimensional Voting Models and Some Implications for Agenda Control." *Journal of Economic Theory* 12: 472–482.

Section 3: Normal and Extensive Form Games

Topic: Normal Form Games and Comparative Statics

Required reading: **MM** Ch 5

Recommended readings:

Ashworth, Scott and Ethan Bueno de Mesquita. 2006. "Monotone Comparative Statics in Models of Politics." *American Journal of Political Science* 50(1): 214–231.

Calvert, Randall L. 1985. "Robustness of the Multidimensional Voting Model: Candidate Motivations, Uncertainty, and Convergence." *American Journal of Political Science* 29:69–95.

Osborne, Martin. 1995. "Spatial Models of Political Competition Under Plurality Rule: A survey of Some Explanations of the Number of Candidates and the Positions They Take." *Canadian Journal of Economics* 27: 261–301.

Topic: Bayesian Games

Required reading: **MM** Ch 6

Recommended reading:

Austen-Smith, David and Jeffrey S. Banks. 1996. "Information Aggregation, Rationality, and the Condorcet Jury Theorems." *American Political Science Review* 90: 34–45.

Topic: Extensive Form Games

Required reading: **MM** 7

Recommended readings:

Palfrey, Thomas R. 1984. "Spatial Equilibrium with Entry." *Review of Economic Studies* 51: 139–156.

Romer, Thomas and Howard Rosenthal. 1978. "Political Resource Allocation, Controlled Agenda, and the Status Quo." *Public Choice* 33(1): 27–44.

Section 4: Dynamic Games of Incomplete Information

Required reading: **MM** Ch 8 (Through section 5)

Recommended reading:

Austen-Smith, David, and John R. Wright. 1992. "Competitive Lobbying for a Legislator's Vote." *Social Choice and Welfare* 9: 229–257.

Epstein, David, and Peter Zemsky. 1995. "Money Talks: Deterring Quality Challengers in Congressional Elections." *American Political Science Review* 89(2): 295–308.

Farrell, Joseph. 1987. "Cheap Talk, Coordination, and Entry". *Rand Journal of Economics* 18: 34–39.

Gilligan, Thomas and Keith Krehbiel. 1987. "Collective Decision-Making and Standing Committees: an Informational Rationale for Restrictive Amendment Procedures." *Journal of Law, Economics, and Organization* 3(2): 287–335.

Spence, Michael. 1973. "Job Market Signaling." *The Quarterly Journal of Economics* 87(3): 355–374.

Section 5: Refinements and Repeated Games

Topic: Equilibrium Refinements and Herding Models

Required reading: **MM** Ch 8 (Through end)

Recommended reading:

Jeffrey S. Banks and Joel Sobel. 1987. "Equilibrium Selection in Signaling Games." *Econometrica* 55(3): 647–661.

Feddersen, Timothy J. and Wolfgang Pesendorfer. 1996. "The Swing Voter's Curse." *The American Economic Review* 86(3): 408–424.

David M. Kreps and Robert Wilson. 1982. "Sequential Equilibria." *Econometrica* 50(4): 863–894.

Lohmann, Susanne. 1993. "A Signaling Model of Informative and Manipulative Political Action." *American Political Science Review* 87(2): 319–333.

Topic: Repeated Games

Required reading: **MM** Ch 9

Recommended reading:

Axelrod, Robert. 1981. "The Emergence of Cooperation among Egoists." *American Political Science Review* 75(2): 306–318.

Bendor, Jonathan and Piotr Swistak. 1997. "The Evolutionary Stability of Cooperation." *American Political Science Review* 91: 290–307.

Fearon, James D. and David D. Laitin. 1996. "Explaining Interethnic Cooperation." *American Political Science Review* 90(4): 715–735.

Milgrom, Paul, Douglass North, and Barry Weingast. 1990. "The Role of Institutions in the Revival of Trade: The Medieval Law Merchant, Private Judges, and the Champagne Fairs." *Economics and Politics* 2:1–23.

Section 6: Bargaining

Required reading: **MM** Ch 10

Recommended reading:

Banks, Jeffrey S. 1990. "Equilibrium Behavior in Bargaining Games." *American Journal of Political Science* 34(3): 599–614.

Baron, David P. and John A. Ferejohn. 1989. "Bargaining in Legislatures." *American Political Science Review* 89: 1181–1206.

Diermeier, Daniel and Timothy J. Feddersen. 1998. "Cohesion in Legislatures and the Vote of Confidence Procedure." *American Political Science Review* 92(3): 611–621.

Fearon, James D. 1994. "Domestic Political Audiences and the Escalation of International Disputes." *American Political Science Review* 88(3): 577–592.

Fearon, James D. 1995. "Rationalist Explanations for War." *International Organization* 49(3): 379-414.

Nash, John F. Jr., 1950. "The Bargaining Problem." *Econometrica* 18: 155–162.

Rubinstein, Ariel. 1982. "Perfect Equilibrium in a Bargaining Model." *Econometrica* 50: 97–109.

Section 7: Mechanism Design and Agency Theory

Required reading: **MM** Ch 11

Recommended reading:

Bendor, Jonathan and Adam Meirowitz. 2004. "Spatial Models of Delegation." *American Political Science Review* 98(2): 293–310.

Epstein, David and Sharyn O'Halloran. 1994. "Administrative Procedures, Information, and Agency Discretion." *American Journal of Political Science* 38(3): 697–722.

Ferejohn, John. 1986. "Incumbent performance and electoral control." *Public Choice* 50: 5–25.

Shapiro, Jacob N. and David A. Siegel. 2007. "Underfunding in Terrorist Organizations." *International Studies Quarterly* 51: 405–429.

Section 8: Modeling Grab Bag: Behavioral Models, Computational Methods, Quantal Response Equilibrium, and Global Games

Required reading:

Bendor, Jonathan, Daniel Diermeier, and Michael Ting. 2003. "A Behavioral Model of Turnout." *American Political Science Review* 97(2): 261–280.

McKelvey, Richard D. and Thomas R. Palfrey. 1995. "Quantal Response Equilibria in Normal Form Games." *Games and Economic Behavior* 10: 6–38.

McKelvey, Richard D. and Thomas R. Palfrey. 1998. "Quantal Response Equilibria in Extensive Form Games." *Experimental Economics* 1: 9-41.

Morris, Stephen and Hyun Song Shin. 2001. "Global Games: Theory and Applications." Cowles Foundation Discussion Paper No. 1275R.

Siegel, David A. 2009. "Social Networks and Collective Action." *American Journal of Political Science* 53(1): 122–138.