Fall 2021

Economics 712-007
Topics in Repeated Games
Syllabus
June 9, 2021

Class time and place: First session, Tuesdays and Thursdays 10:30AM–12noon. (first lecture 8/21/2021).

Instructor: George J. Mailath, gmailath@econ.upenn.edu;
        office hours: by appointment.

Assessment: The final grade in the course will be determined by class participation and a research proposal. Details of what is expected are given below. Please do discuss your preliminary ideas with me. The research proposal is due 11/15/2021. No extensions will be given.

Recommended text: Mailath and Samuelson (2006).

Outline

The following is a tentative outline of what I intend to cover. The list of papers is suggestive only–not only can I not cover all these papers, but I may replace some by others.

1. Repeated Games with Imperfect Public Monitoring: Structure and the folk theorem.

   Mailath and Samuelson (2006, Chapters 7-9); Abreu, Milgrom, and Pearce (1991).

2. Applications (relational contracting, trading favors, repeated adverse selections, principle agency, stochastic games)

   Bhaskar and Mailath (2019); Fudenberg and Yamamoto (2010); Levin (2003); Mailath and Samuelson (2006, Chapter 11); Morris (2001); Olszewski and Safronov (2018); Samuelson and Stacchetti (2017).

3. Repeated Games with Private Monitoring: Structure.

   Mailath and Samuelson (2006, Chapters 12-13); Bhaskar, Mailath, and Morris (2008); Ely, Hörner, and Olszewski (2005); Hörner and Olszewski (2006, 2009); Mailath and Olszewski (2011); Olszewski (2007).

4. Applications (communication, stochastic games)

Awaya and Krishna (2016, 2019); Compte (2002); Fuchs (2007, 2015); Jullien and Park (2014, 2019); Kandori and Matsushima (1998).

5. Repeated games with anonymous random matching.

Deb (2020); Deb, Sugaya, and Wolitzky (2020); Ghosh and Ray (1996); Sugaya and Wolitzky (2020); Wolitzky (2021).

6. Repeated games in continuous time

Bergin and MacLeod (1993); Bernard and Frei (2016); Fudenberg and Levine (2007, 2009); Sannikov (2007); Sannikov and Skrzypacz (2010, 2007).

Research Proposal

The research proposal should be typed, and look like a paper: It has a title, your name, and date. I recommend using LaTeX (MikTeX is an excellent implementation, and TeXstudio is a good free LaTeX editor for Windows; you can access Overleaf through Penn Libraries, https://guides.library.upenn.edu/LaTeX). Remember to spellcheck your document before submission!

 Please structure your research proposal as follows:

1. Abstract

This is a short summary of around 100 to 250 words.

2. Introduction

The introduction (usually about two pages) gives a nontechnical description of the research question, and how the research project would answer it. The introduction should do so in a way that the reader understands why you think this is an interesting or important question.

3. Related Literature

The most relevant literature should be briefly described, with an emphasis on how it relates to your question. I do not expect (or want) you to do a detailed literature search, but you should do a minimal Google scholar search to make sure you do not miss any "obvious" references. As a rough guideline, the typical related literature section is one to two pages.

It is also good practice to start creating your own `.bib` file for you references. I use bibtex (which is part of LaTeX) with the `natbib` package.

4. Description of Model/Motivating Example

Often when starting research, it is better to begin with a simple example to either illustrate the research question or as a "proof of concept." This section should contain either

(a) a carefull description and analysis of a simple example, with a description of what the general model should look like, or

(b) the general model, with some preliminary results.

The section should conclude with conjectures for the general model.

By its nature, research is a risky enterprise. Even with a good research question, there is no guarantee that the first (or second or third) attempt at attacking the question will succeed. Moreover, we learn from the failures as well as from the successes. If your attempts at formulating an example or model to attack a research question fail, an informative write-up of why the attempts failed, can also constitute a "passing" research proposal for the purposes of this class. As part of such a write-up, if you have an idea of what you would do if you had more time should also be included.

5. Conclusion

This can be short, simply summarizing what you hope to learn from the research project.

6. References

Bibtex will create this for you, as long as you use the `\cite` command in LaTeX, and you have a correctly formatted `.bib` file. Note that the Google scholar bibtex entries often need to be edited.

References

Abreu, Dilip, Paul Milgrom, and David Pearce (1991), "Information and timing in repeated partnerships." *Econometrica*, 59, 1713-1733.

Awaya, Yu and Vijay Krishna (2016), "On communication and collusion." *American Economic Review*, 106, 285–315.

Awaya, Yu and Vijay Krishna (2019), "Communication and cooperation in repeated games." *Theoretical Economics*, 14, 513–553.

Bergin, James and W. Bentley MacLeod (1993), "Continuous time repeated games." *International Economic Review*, 34, 21–37.

Bernard, Benjamin and Christoph Frei (2016), "The folk theorem with imperfect public information in continuous time." *Theoretical Economics*, 11, 411–453.

Bhaskar, V. and George J. Mailath (2019), "The curse of long horizons." *Journal of Mathematical Economics*, 82, 74–89.

Bhaskar, V., George J. Mailath, and Stephen Morris (2008), "Purification in the infinitely-repeated prisoners' dilemma." *Review of Economic Dynamics*, 11, 515–528.

Compte, Olivier (2002), "On sustaining cooperation without public observations." *Journal of Economic Theory*, 102, 106–150.

Deb, Joyee (2020), "Cooperation and community responsibility." *Journal of Political Economy*, 128, 1976–2009.

Deb, Joyee, Takuo Sugaya, and Alexander Wolitzky (2020), "The folk theorem in repeated games with anonymous random matching." *Econometrica*, 88, 917–964.

Ely, Jeffrey C., Johannes Hörner, and Wojciech Olszewski (2005), "Belief-free equilibria in repeated games." *Econometrica*, 73, 377–416.

Fuchs, William (2007), "Contracting with repeated moral hazard and private evaluations." *American Economic Review*, 97, 1432–1448.

Fuchs, William (2015), "Subjective evaluations: Discretionary bonuses and feedback credibility." *American Economic Journal: Microeconomics*, 7, 99–108.

Fudenberg, Drew and David K. Levine (2007), "Continuous time limits of repeated games with imperfect public monitoring." *Review of Economic Dynamics*, 10, 173–192.

Fudenberg, Drew and David K. Levine (2009), "Repeated games with frequent signals." *Quarterly Journal of Economics*, 124, 233–265.

Fudenberg, Drew and Yuichi Yamamoto (2010), "Repeated games where the payoffs and monitoring structure are unknown." *Econometrica*, 78, 1673–1710.

Ghosh, Parikshit and Debraj Ray (1996), "Cooperation in community interaction without information flows." *Review of Economic Studies*, 63, 491–519.

Hörner, Johannes and Wojciech Olszewski (2006), "The folk theorem for games with private almost-perfect monitoring." *Econometrica*, 74, 1499–1544.

Hörner, Johannes and Wojciech Olszewski (2009), "How robust is the folk theorem?" *Quarterly Journal of Economics*, 124, 1773–1814.

Jullien, Bruno and In-Uck Park (2014), "New, like new, or very good? Reputation and credibility." *Review of Economic Studies*, 81, 1543–1574.

Jullien, Bruno and In-Uck Park (2019), "Communication, feedbacks and repeated moral hazard with short-lived buyers." Working Paper 19-1027, Toulouse School of Economics, URL https://www.tse-fr.eu/sites/default/files/TSE/documents/doc/wp/2019/wp_tse_1027.pdf. July 2019, revised April 2020.

Kandori, Michihiro and Hitoshi Matsushima (1998), "Private observation, communication and collusion." *Econometrica*, 66, 627–652.

Levin, Jonathan (2003), "Relational incentive contracts." *American Economic Review*, 93, 835–857.

Mailath, George J. and Wojciech Olszewski (2011), "Folk theorems with bounded recall under (almost) perfect monitoring." *Games and Economic Behavior*, 71, 174–192.

Mailath, George J. and Larry Samuelson (2006), *Repeated Games and Reputations: Long-Run Relationships.* Oxford University Press, New York, NY.

Morris, Stephen (2001), "Political correctness." *Journal of Political Economy*, 109, 231–265.

Olszewski, Wojciech (2007), "A simple exposition of belief-free equilibria in repeated games." *Economics Bulletin*, 58, 1–16.

Olszewski, Wojciech and Mikhail Safronov (2018), "Efficient cooperation by exchanging favors." *Theoretical Economics*, 13, 1191–1231.

Samuelson, Larry and Ennio Stacchetti (2017), "Even up: Maintaining relationships." *Journal of Economic Theory*, 169, 170–217.

Sannikov, Yuliy (2007), "Games with imperfectly observable actions in continuous time." *Econometrica*, 75, 1285–1329.

Sannikov, Yuliy and Andrzej Skrzypacz (2007), "Impossibility of collusion under imperfect monitoring with flexible production." *American Economic Review*, 97, 1794–1823.

Sannikov, Yuliy and Andrzej Skrzypacz (2010), "The role of information in repeated games with frequent actions." *Econometrica*, 78, 847–882.

Sugaya, Takuo and Alexander Wolitzky (2020), "A few bad apples spoil the barrel: An anti-folk theorem for anonymous repeated games with incomplete information." *American Economic Review*, 110, 3817–35.

Wolitzky, Alex (2021), "Cooperation in large societies.", URL http://economics.mit.edu/files/21356. Survey prepared for World Congress of the Econometric Society 2020.