

Preliminary syllabus for the course

"The Evolution of Games and Social Contacts: Preferences, Norms and Interactions"

We will analyze game theory from the perspective of adaptive and interacting agents – first introducing evolutionary games on simple standard form games, and then analyzing multi-player games on networks that define social contacts. Selection and mutations will play a crucial role for the emergence of equilibria.

We will stress the importance of the the structure of interactions, which shapes the selections of equilibria, so that preferences and norms are the result of local coordination.

At the same time, social networks affect the diffusion and the learning processes of agents – so that preferences and norms can also be seen as the result of those communication processes.

Finally we will discuss how agents may adapt their connections depending on those incentives: so that preferences and norms will shape the interactions.

Proposal for the division of the course

Monday morning

- basic notions of game theory (players, strategies, best reply) [Boncinelli]
- evolutionary stability (ESS and related concepts) [Boncinelli]
- evolutionary dynamics (replicator dynamics and Lotka-Volterra equations) [Boncinelli]
- learning (reinforcement learning, imitation, best reply) [Boncinelli]

Monday afternoon

- first assignment

Tuesday morning

- stochastic stability: introduction, uniform error model, radius-coradius theorems, log linear response model [Boncinelli]
- norms (i.e., coordination on one equilibrium) [Boncinelli]
- efficiency vs risk-dominance [Boncinelli]
- evolution of preferences [Boncinelli]

Tuesday afternoon

- second assignment
- seminar: Ennio Bilancini

Wednesday morning

- cooperation [Boncinelli]
- notions on social networks [Pin]
- diffusion in networks (SIS model) [Pin]

Wednesday afternoon

- numerical investigations (prerequisite: basic knowledge of Matlab/Octave)
- third assignment

Thursday morning

- learning in networks (Bayesian vs. naïve) [Pin]
- network games [Pin]
- best-shot network games [Pin]

Thursday afternoon

- fourth assignment
- seminar: Simon Weidenholzer

Friday morning

- evolutionary stability for network games [Pin]
- endogenous contacts & endogenous networks [Pin]
- residential segregation [Pin]
- ...

Friday afternoon

- fifth assignment

Textbooks

- L. Samuelson (1998), "Evolutionary games and equilibrium selection". Mit Press.
- P. H. Young (2001) "Individual Strategy and Social Structure: An evolutionary theory of institutions". Princeton University Press, 2001.
- M. O. Jackson (2008), "Social and Economic Networks". Princeton University Press.

