

Professor Weibull's lectures

The traditional interpretation of game theory assumes that the game in question is played exactly once by perfectly rational players who know the game, whose knowledge of the game and of each others' rationality is mutual or even common knowledge, and who hold interpersonally consistent expectations. As an alternative, evolutionary interpretations have been developed where the game is instead recurrently played by boundedly rational individuals who are randomly drawn from large populations. These individuals need not know much about the game - in particular, no knowledge of others' preferences is assumed - but adjust their strategy choice in the light of their own or others experience from play. Equilibrium may then arise in the long run, as a dynamically or stochastically stable state at the population level. In many games the evolutionary predictions are not equilibria but instead certain attractor sets. Robust predictions are therefore instead set-valued. These lectures are aimed at explaining some of the key concepts and results in the evolutionary paradigm, and to relate those to concepts in the rationalistic paradigm. The last session will be devoted to recent work on social norms.

Preliminary outline of the lectures

Session 1 (Thursday morning): Rationalistic and evolutionary paradigms in game theory [van Damme and Weibull (1995), Kandori (1996), Mailath (1998)]. Normal form games: dominance, best replies, Nash equilibrium components, behavior correspondences, inclusive subsets of strategies [Pearce (1984), Kohlberg and Mertens (1986), Basu and Weibull (1991), Weibull (1995), Ritzberger and Weibull (1995), Demichelis and Ritzberger (2004)].

Session 2 (Thursday afternoon): Evolutionary stability and its relations to rationalistic solution concepts. [Maynard Smith and Price (1973), van Damme (1987), Weibull (1995)].

Session 3 (Friday morning): The replicator dynamic, boundedly rational social learning, imitation and noisy best replies, induced stochastic population processes, deterministic approximation, the evolution of social conventions [Kandori, Mailath and Rob (1993), Young (1993), Weibull (1995), Benaim and Weibull (2003)]. Comparing evolutionary and rationalistic predictions: rationality, knowledge, equilibrium, and robust set-valued predictions [Hurkens (1995), Weibull (1995), Ritzberger-Weibull (1995), Hofbauer-Weibull (1996), Sanchirico (1996), Young (1998)]

Session 4 (Friday afternoon): Modelling social norms [Lindbeck, Nyberg and Weibull (1999), Charness and Rabin (2002)]

References

Participants are expected to have read references 4 and 11, and the introductory sections in references 3, 7, 12 and 16 before the lectures. Participants are recommended to have access to references 15 and 17 during the lectures.

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6. Hofbauer J. and J. Weibull (1996): "Evolutionary selection against dominated strategies", *Journal of Economic Theory* 71, 558-573.
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9. Kandori M. (1996): "Evolutionary game theory in economics", in D. Kreps and K. Wallis, *Advances in Economics and Econometrics: Theory and Applications*. Econometric Society World Congress 7, Vol. I, Cambridge University Press, Cambridge UK.
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12. Pearce D. (1984): "Rationalizable strategic behavior and the problem of perfection", *Econometrica* 52, 1029-1050.
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14. Sanchirico C. (1996): "A probabilistic model of learning in games", *Econometrica* 64, 1375-1394.
15. Weibull J (1995): *Evolutionary Game Theory*, MIT Press.
16. Young P. (1993): "The evolution of conventions", *Econometrica* 61, 57-84.
17. Young P. (1998): *Individual Strategy and Social Structure*. Princeton University Press (Princeton).