

Strategic Choices: Games and Team Optimization

Duration: 20 hours

Teachers:

Lucia Pusillo – DIMA, University of Genova - pusillo@dima.unige.it

Marcello Sanguineti - DIBRIS, University of Genova - marcello.sanguineti@unige.it

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Abstract

Game and Team Theory study strategic interactions among two or more agents, which have to take decisions in order to optimize their objectives. They have various links to disciplines such as Economics, Engineering, Computer Science, Political and Social Sciences, Biology, and Medicine. These links provide incentives for interdisciplinary research and make the role of Game and Team Theory invaluable in a variety of applications. The main goal of this course consists in providing students with the basic mathematical tools to deal with interactive problems and illustrating them via case-studies

Program

- Non cooperative games
- Strategic games and extended-form games
- Incomplete-information games
- Well-posedness problems for Nash equilibria
- Repeated games
- Evolutionary stable strategies
- Multiobjective games and solution concepts
- Cooperative TU-games
- Solutions for cooperative games
- Partial cooperative games and applications to environment models
- Some applications to medicine problems via Game Theory.
- Team optimization with stochastic information structure.
- Examples of applications of team optimization in contexts such as:
 - o nonverbal communication & social interactions;
 - o optimal production;
 - o telecommunication networks.

References

- Course notes/slides.
- L. Pusillo. "Evolutionary Stable Strategies and Well Posedness Property", Appl. Math. Sciences, vol. 7, 8 p.363-376, 2013.
- L. Pusillo, S. Tijs. "E-equilibria for Multicriteria Games ". In: R. Cressman and P. Cardaliaguet. The Annals of the International Society of Dynamic Games (ISDG). vol. 12, pp. 217-228, Birkhauser, 2012.
- A.Dontchev, T. Zolezzi. "Well-Posed Optimization Problems". Lecture Notes in Mathematics, vol. 1543 Springer, 1993.
- D. Fudenberg, J. Tirole. "Game Theory", MIT Press, 1991
- H. Peters. "Game Theory- A Multileveled Approach". Springer, 2008.
- G. Gnecco, M. Sanguineti. "Team Optimization Problems with Lipschitz Continuous Strategies", Optimization Letters, vol. 5, pp. 333-346, 2011.
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- G. Gnecco, M. Sanguineti, G. Gaggero. "Suboptimal Solutions to Team Optimization Problems with Stochastic Information Structure". SIAM Journal on Optimization, vol. 22, pp. 212-243, 2012.