NEW ECONOMIC SCHOOL
Master of Arts in Economics

Game Theory

Module 3, 2023/2024

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Course information

Course Website: at my.nes.ru

Instructor's Office Hours: TBA

Class Time: M Th 17:15-18:45

Room Number: online 247

TAs: Alexander Tonis, Sergei Ignatov

Course description

Game theory offers formal treatment of multi-agent interactions of interdependent agents. We will discuss specific elements of the formal theory, involving mostly non-cooperative games, including: games in the strategic and the extensive form, solution concepts, epistemic conditions needed to predict outcomes of games, equilibrium refinements, dynamic models of equilibrium selection, and folk theorems of indefinitely repeated games. We will discuss results in experimental economics that test some of the assumptions of classical game theory. Throughout the course we will examine applications of the formal concepts of game theory to problems in economics, biology, political science, etc.

Course requirements, grading, and attendance policies

There will be:

• 4+ homeworks, combined worth 40% of the grade;

• and a closed-book final exam worth 60% of the grade.

Often, you will be asked to read certain materials before lectures.

Course contents

A brief outline of topics:

1. Games in normal (strategic) form and solution concepts, dominant strategies, Nash equilibrium, existence of a Nash Equilibrium
2. Games in extensive form, game trees, sub-game perfect Nash equilibria, backward induction
3. Games with Incomplete information, Bayesian-Nash Equilibria
4. Sequential games with Incomplete information, sequential equilibrium, perfect Bayesian equilibrium, equilibrium selection
5. Repeated games and folk theorems
6. Bargaining problem, Nash bargaining
7. Cooperative games, Shapley Value, Core
8. Learning in games.

Course materials

Required textbooks and materials

- Game Theory, D. Fudenberg and J. Tirole, MIT Press, 1991.

- An Introduction to Game Theory, M. J. Osborne, Oxford UP, 2003.

- A course in Game Theory, M. J. Osborne and A. Rubinstein, MIT Press, 1994.

Additional materials

- Algorithmic Game Theory, N. Nisan et al. (eds), Cambridge UP, 2007

Academic integrity policy

Cheating, plagiarism, and any other violations of academic ethics at NES are not tolerated.

Sample tasks for course evaluation

(1) Devise and write down in extensive form some game of imperfect information such that for each of the *Nash Equilibria* (it may be unique, if you so choose) of the game there exists an outcome equivalent *Weak Sequential Equilibrium*. Demonstrate that by solving for both types of equilibrium.

(2) What is/are the *Weak Sequential Equilibrium/a* of the game depicted in Figure 1? For each *Weak Sequential Equilibrium* you identify determine whether its is *Sub-game Perfect*.

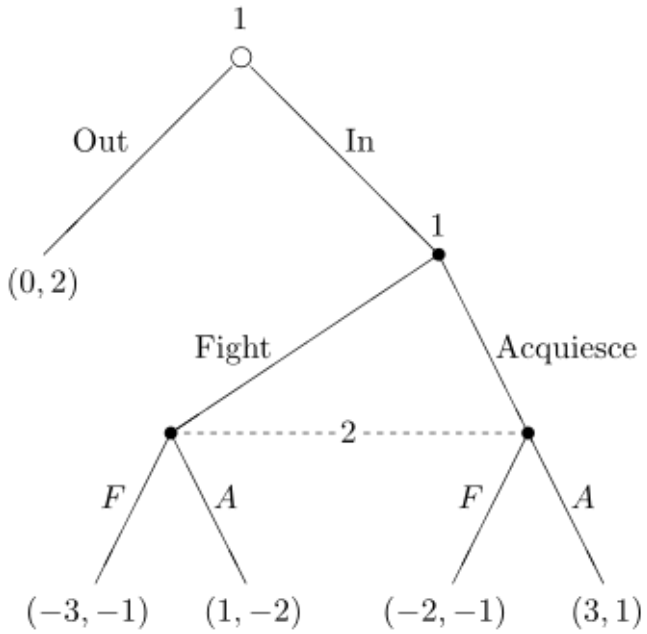

FIGURE 1. Exercise 2

(3) What is/are the *Weak Sequential Equilibrium/a* of the game depicted in Figure 2? Note that 'Nature' plays first and selects either A or B with equal probability.