ME-429

Game theory for multiagent decision-making

Kamgarpour Maryam

Cursus	Sem.	Type
Computational science and Engineering	MA2, MA4	Opt.
Computational science and engineering minor	E	Opt.
Mechanical engineering minor	E	Opt.
Mechanical engineering	MA2, MA4	Opt.
Microtechnics	MA2, MA4	Opt.
Robotics	MA2, MA4	Opt.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	During the semester
Workload	120h
Weeks	14
Hours	**4 weekly**
Courses	2 weekly
Exercises	1 weekly
Project	1 weekly
Number of positions	

Summary

Students will be able to formulate a multi-agent decision-making problem in static and dynamic environments as a game and apply relevant mathematical theories and algorithms to analyze the interaction of the agents and predict the outcome of the decision-making problems.

Content

Elements of a non-cooperative game: Nash equilibrium, pure and mixed strategies, minimax theorem and saddle point equilibrium for zero-sum games, potential games, sequential games, feedback games, Bayesian games, auctions. Computing equilibria: convex games, best-response dynamics, gradient descent dynamics, learning equilibria, no-regret dynamics. Efficiency of equilibria and mechanism design.

Keywords

game theory, multi-agent decision-making, Nash equilibrium, independent learning.

Learning Prerequisites

Required courses

The course is mathematical and assumes maturity in mathematical logic and experience with writing proofs, algebra, analysis, probability and optimization.

Teaching methods

Lectures on blackboard and on slides. Exercise hours with problem sets. Group project.

Expected student activities

in-class lecture notes, and slides. the notes will be available on moodle after each class

Assessment methods

There will be a class project and two quizzes

Resources

Moodle Link

- https://go.epfl.ch/ME-429