UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Algorithmic Non-cooperative Game Theory

2425-114R-01

Title

Algorithmic Non-cooperative Game Theory

Teacher(s)

Mauro Passacantando

Language

English

Short description

The course aims to provide students with a solid understanding of the theory and algorithms related to solving equilibrium problems in the context of noncooperative game theory.
Program:

- Introduction to noncooperative games: normal form, dominated strategies, best response, Nash equilibrium (NE).
- Finite games: mixed strategies, existence of NE, min-max theorem, Lemke-Howson algorithm.
- Convex games: existence of NE, algorithms based on best response or merit functions, potential games.

Applications to network games.
- Generalized games: existence of NE, reformulations of NE, algorithms. Applications to service provisioning problems in cloud computing systems.
- Bilevel games: equilibrium definitions and related formulations. Applications to infrastructure and service provisioning problems in 5G networks.
- Lab: implementation (with Python/AMPL) of some algorithms illustrated during the course.

CFU / Hours

8 hours (1 CFU) lectures + 12 hours (1 CFU) laboratory

Teaching period

January 2025

Sustainable Development Goals