Linear Optimization, 8.0 credits

Linjär optimering, 8.0 hp

Third-cycle education course

MAI0130

Department of Mathematics

Valid from: First half-year 2023

Approved by
Head of Department

Approved

Registration number

Entry requirements

Undergraduate courses in mathematics and optimization or operations research.

Learning outcomes

The course gives an introduction to the field of linear optimization, including basic modeling, theory and solution methods. It is intended for students in scientific disciplines where linear optimization can serve as tool in research and development, such as management science, logistics management, engineering design, computer science, and electrical engineering. It is also intended as a first course in linear optimization for students in mathematical sciences.

Contents

- Linear equations, inequalities, linear programming: a brief historical overview.
- Formulation techniques involving transformations of variables.
- Intelligent modeling essential to get good results.
- Polyhedral geometry.
- Duality theory and optimality conditions for linear programs.
- Revised simplex variants of the primal and dual simplex methods and sensitivity analysis.
- The decomposition principle.
- Complexity of the simplex algorithm and polynomial-time algorithms.
- The transportation and assignment problems.

Educational methods

Seminars where the participants present the course topics and solutions to selected exercises from the course literature.

Examination

Active participation with presentations of course topics and solutions to exercises.

Grading

One-grade scale

Course literature

Optimization for Decision Making: Linear and Quadratic Models, K.G. Murty, Springer, 2010, and ***Linear Programming and Network Flows***, M.S. Bazaraa, J.J. Jarvis and H.D. Sherali, Wiley, 2013 (4th edition).