CS-454 **Convex optimization and applications**

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Cursus	Sem.	Type
Computational science and Engineering	MA2	Opt.
Computer science	MA2	Opt.
SC master EPFL	MA2, MA4	Opt.
Systems Engineering minor	E	Opt.

Language of teaching	English
Credits	4
Session	Summer
Semester	Spring
Exam	During the semester
Workload	120h
Weeks	14
Hours	**3 weekly**
Courses	1 weekly
Exercises	2 weekly
Number of positions	

Summary

Optimization is not only a major segment of applied mathematics, it is also a critical problem in many engineering and economic fields. In any situation where resources are limited, decision makers try to solve problems they face in the best possible manner. The course provides theory and practice.

Content

The class will cover topics such as:
Convex sets and functions
Recognizing convex optimization problems
Optimality Conditions and Duality
Linear Programming (geometry of linear programming, applications in network optimization, the simplex method)
Least squares and quadratic programs
Semidefinite programming
Interior point methods

Keywords

Convex Optimisation

Learning Prerequisites

Required courses

A good background in linear algebra. Mastering MATLAB is a plus!

Recommended courses

Basic Linear Algebra

Learning Outcomes

By the end of the course, the student must be able to:

- Solve Convex optimization problems

Teaching methods

Ex-cathedra lectures and exercise sessions(in English).

Assessment methods

Midterm (25%) and final exam (50%). Small personal project (25%). Exams are open-text and on paper (no use of computers)

Resources

Bibliography

Book : Convex Optimization by Stephen Boyd and Lieven Vandenberghe

Ressources en bibliothèque

- Convex Optimization / Boyd