

Optimization and Sampling

Course Workload		Assessment form (examination/ graded test/ ungraded test)
ECTS	Hours	
3	108	Exam

The course is aimed at studying basic approaches to optimizing functions of many variables both in the discrete case and in real space.

Course structure:

1. Introduction to optimization. Continuous optimization.

- 1.1. Introduction to optimization
- 1.2. Necessary and sufficient conditions for optimality
- 1.3. Lagrange multipliers method
- 1.4. Gradient descent method
- 1.5. Binary and ternary search
- 1.6. Newton and quasi-Newton methods

2. Mathematical optimization

- 2.1. Linear programming
- 2.2. Mixed-integer programming
- 2.3. Lagrangian relaxation
- 2.4. MIP formulations. Tips and tricks

3. Sampling

- 3.1. Rejection sampling
- 3.2. Monte-Carlo Markov Chain

4. Metaheuristic methods

- 4.1. Simulated annealing
- 4.2. Genetic programming
- 4.3. Evolution strategies