

# Numerical Optimization

## COURSE PROGRAM

- Mathematical background:
  - normal, unitary, Hermitian, positive definite matrices;
  - matrix norm induced by vector norms;
  - set in Euclidean space: open sets, closed sets, bounded sets;
  - function of several variables: continuity, direction derivatives, differentiability, second order derivatives, Taylor's formula.
  - convex functions, convex sets and optimization problems.
- Unconstrained optimization:
  - existence results, first and second order optimality conditions;
  - steepest descend;
  - Newton method;
  - trust region.
- Constrained optimization:
  - first order optimality condition;
  - Karush–Kuhn–Tucker Theorem;
  - linear programming.

## TEXTBOOK

- J. Nocedal, S. Wright, Numerical Optimization, Springer Series in Operations Research and Financial Engineering, 2006.

## EXAM

- interview.