

SYLLABUS
OPTIMIZATION - THEORY AND ALGORITHMS

The aim of this course is to introduce to graduate students the theory of optimization and its resolution through numerical algorithms. We will be interested in solving the following problem

$$\begin{aligned} \min f(x) \\ \text{s.t. } x \in D \end{aligned}$$

where $f : \mathbb{R}^n \rightarrow \mathbb{R}$ and $D \subseteq \mathbb{R}^n$. We will study iterative optimization algorithms : build sequence of points that converges to the solution.

The content of the course is the following :

- Reminders of multivariable calculus and fundamentals of optimization.
- Description of algorithms and speed of convergence.
- Gradient descent and line search methods.
- Conjugate gradient methods.
- Newton method.
- Quasi-Newton methods.
- Linear Programming and the simplex method.

References :

Nocedal and Wright “*Numerical Optimization*”.

Lecture notes.