

## **Continuous Optimization**

### **Learning Objectives :**

Effective models of physical problems often necessitate the minimisation of an energy functional. This raises the question of the existence of a minimizer in infinite dimension spaces. The goal of this course is to provide the tools and the theoretical background to address this question as well as to solve this kind of problem numerically.

### **Prerequisites :**

M1 Courses : functional analysis, partial differential equations

### **Detailed Description of the Course :**

- Existence of a minimum in spaces of infinite dimension for convex functions
- Optimality conditions: Euler inequality, Lagrange multipliers
- Saddle point, Kuhn and Tucker theorem, duality
- Applications
- Numerical Algorithms: gradient, Newton method

### **Textbooks & Further Reading :**

- Grégoire Allaire, *Analyse numérique et optimisation*. Éditions Ellipses, Paris (2006).