UE An Introduction to Shape and Topology Optimization

Level
Baccalaureate +5

ECTS
3 credits

Component
UFR IM2AG (informatique, mathématiques et mathématiques appliquées)

Semester
Automne

- **Teaching language(s):** English
- **Open to exchange students:** Yes
- **Code d'export Apogée:** GBX9AM28

Presentation

Description

In a very broad acceptation, shape and topology optimization is about finding the best domain (which may represent, depending on applications, a mechanical structure, a fluid channel,…) with respect to a given performance criterion (e.g. robustness, weight, etc.), under some constraints (e.g. of a geometric nature). Fostered by its impressive technological and industrial achievements, this discipline has aroused a growing enthusiasm among mathematicians, physicists and engineers since the seventies. Nowadays, problems pertaining to fields so diverse as mechanical engineering, fluid mechanics or biology, to name a few, are currently tackled with optimal design techniques, and constantly raise new, challenging issues.

Objectives

The purpose of this course is to discuss the main aspects related to the numerical resolution and the practical implementation of shape and topology optimization problems, and to present state-of-the-art elements of response. It focuses as well on the needed theoretical ingredients as on the related numerical considerations. More specifically, the following issues will be addressed:

via the solution of a Partial Differential Equation posed on it;

and to deal with their evolution in the course of the optimization process.

Course parts

Lectures	Lectures (CM)	18h

Recommended prerequisites

Only a basic knowledge of functional analysis and scientific computing will be assumed: differential calculus, Finite Element method, etc.

Period : Semester 9

Useful info

Contacts

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Campus

Grenoble - University campus