Optimal Control

Component
École Nationale Supérieure d'Électrotechnique d'Électronique

In brief

- **Ametys Code:** N9EE17B
- **Open to exchange students:** Yes

Presentation

Objectives

Understand the fundamental principles of optimal control for continuous or discrete dynamic systems. Know how to formulate, analyse and solve an optimal control problem using modern analytical and numerical tools

Description

This course presents the theoretical and practical foundations of optimal control applied to dynamic systems. It introduces the general formulation of a control problem: system dynamics, constraints on states and controls, and definition of a performance criterion. Classical methods are studied in detail, in particular Pontryagin's maximum principle. The course also covers numerical approaches such as shooting schemes and direct or indirect methods. Emphasis is placed on the interaction between theory, modelling and numerical computation, with examples from electromechanical control. The ultimate goal is to equip students with the skills to develop simple numerical methods for solving optimal control problems.

Pre-requisites

*Basic knowledge of dynamic systems (differential equations, stability).

*Continuous optimisation with constraints.