

Faculty of Applied Sciences



INMA2471 Optimization models and methods

[30h+22.5h exercises] 5 credits

This course is not taught in 2006-2007

This course is taught in the 2nd semester

Teacher(s): François Glineur
Language: French
Level: Second cycle

Aims

Learn how to formulate, analyze and solve optimization problems.

Main themes

1. Basic concepts and classification of optimization problems.
2. Introduction to three categories of problems : linear optimization, convex optimization and nonlinear optimization ; for each of them :
 - a. What problems can we formulate ?
(presentation of the class of problems that can be modelled)
 - b. How can we solve them ?
(description and analysis of relevant solving techniques)
3. Modelling and practical resolution of real-world problems using a modelling language and/or specialized software.

Content and teaching methods

Course

1. Optimization models

Linear optimization and duality.

Convex optimization, duality and conic formulation.

Nonlinear optimization and optimality conditions.

2. Optimization methods

Interior-point methods for linear optimization, conic optimization (quadratic and semidefinite) and convex optimization ; algorithmic complexity.

Trust-region methods and Nelder-Mead method for nonlinear optimization.

Exercises and projects

Formulation and resolution of concrete problems.

AMPL modelling language.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Prerequisites :

Basic notions of real calculus, linear algebra and matrix theory (course INMA2702 is not a prerequisite).

Evaluation :

Group projects during the semester and final written exam ; course material available on the icampus web site.

Other credits in programs

FSA3DA	Diplôme d'études approfondies en sciences appliquées	(5 credits)
INFO23	Troisième année du programme conduisant au grade d'ingénieur civil informaticien	(5 credits)
STAT21MS/MM	Première année du master en statistique, orientation générale, à finalité spécialisée (méthodes mathématiques)	(5 credits)
STAT22MS/MM	Deuxième année du master en statistique, orientation générale, à finalité spécialisée (méthodes mathématiques)	(5 credits)