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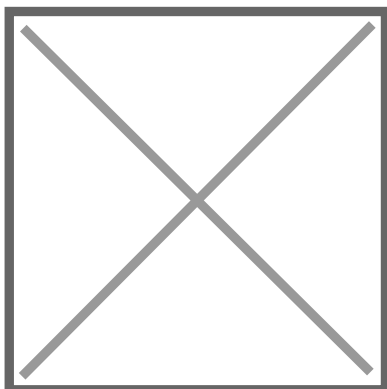
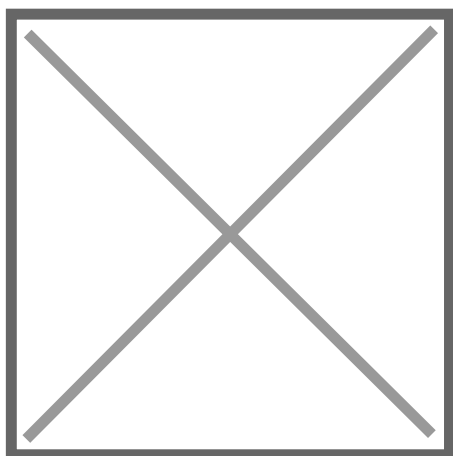
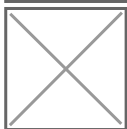
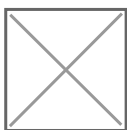
Envoyer

Une erreur est survenue. Merci de réessayer ultérieurement

Le mail de partage a bien été envoyé.

Ajouter au comparateur

M2 Optimisation, Jeux et Contrôle



Master

Mention Mathématiques et applications

Régime(s) d'inscription

Formation initiale

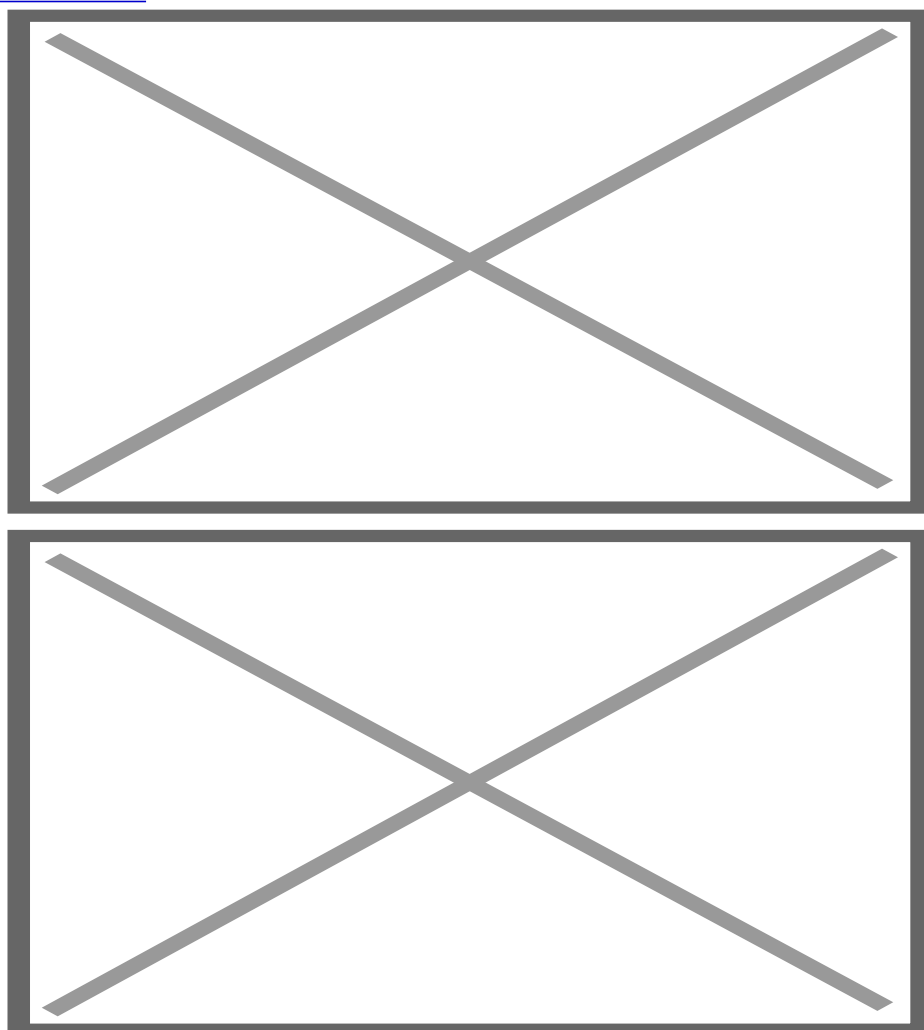
Langue(s) d'enseignement

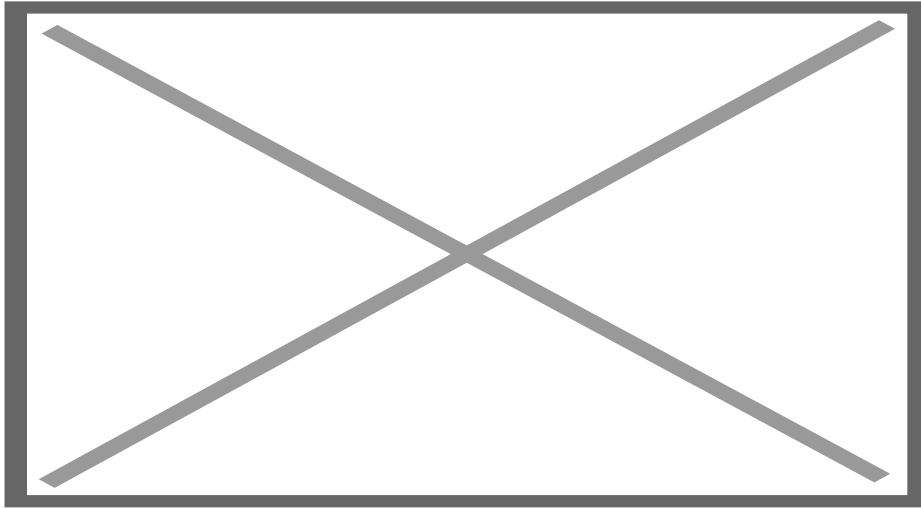
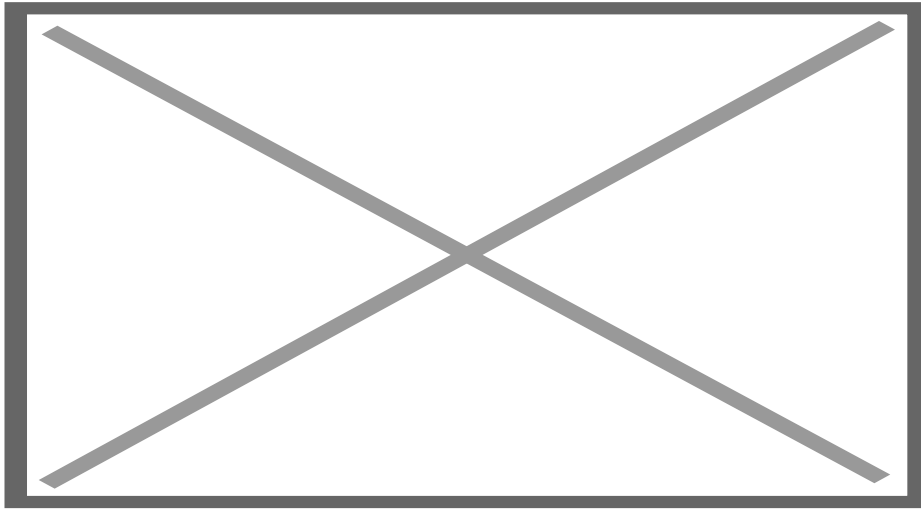
Anglais

L'optimisation est un domaine au confluent des mathématiques, de l'informatique et de l'économie, dont l'importance est croissante aussi bien sur le plan académique que sur le plan de ses applications à des problèmes socio-économiques. Le parcours de M2 "Optimisation, jeux et contrôle" concerne toutes les composantes de l'optimisation au sens-large, avec une attention particulière pour celles qui sont spécifiques au contexte de recherche du plateau de Saclay.

La formation est organisée en trois trimestres de cours, suivi d'un stage long dans un laboratoire de recherche académique ou industrielle. Les thématiques abordées sont variées : contrôle optimal (temps discret et continu, déterministe et stochastique), théorie des jeux (théorie, modélisation en économie et réseaux), calcul des variations (et plus généralement optimisation en analyse et en EDP), optimisation stochastique et méthodes stochastiques pour l'optimisation, recherche opérationnelle. Une part significative des cours proposés est mutualisée avec d'autres parcours et spécialités en mathématiques, informatique, économie.

[Télécharger la fiche détaillée](#)
[Je candidate](#)





■ ■

Informations

- [Présentation](#)
- [Admission](#)
- [Programme](#)

Présentation

Compétences

Comprendre et modéliser mathématiquement un problème afin de le résoudre.

Objectifs pédagogiques de la formation

Le parcours de M2 "Optimisation, Jeux, Contrôle" a pour objectif de fournir aux étudiants une solide formation à la fois théorique et numérique en optimisation mathématique, couvrant des notions allant des principes fondamentaux aux développements de recherche les plus récents. Le programme forme les étudiants à comprendre, modéliser et résoudre des problèmes complexes à l'interface des mathématiques, de

l'informatique et de l'économie. En associant une approche rigoureuse de la théorie à des applications pratiques dans des domaines tels que le contrôle optimal, la théorie des jeux, le calcul des variations, l'apprentissage automatique et les méthodes d'EDP, il prépare les diplômés à la recherche de pointe ainsi qu'à des carrières de haut niveau dans le milieu académique comme dans l'industrie.

Agenda

Début de la formation (date indicative)

31/08/2026

Fin de la formation (date indicative)

17/09/2027

Admission

Capacité d'accueil

Places

30

Public visé et prérequis

Formation de niveau M1 en mathématiques ou mathématiques appliquées.

Période(s) de candidature

Plateforme Inception

Du 01/03/2026 au 17/07/2026

Pièces justificatives

Obligatoires

Lettre de motivation.

Tous les relevés de notes des années/semestres validés depuis le BAC à la date de la candidature.

Curriculum Vitae.

Facultatives

Justificatifs (TOEFL, TOIC, attestation d'un enseignant...) d'un niveau d'une langue étrangère.

Dossier VAPP (obligatoire pour toutes les personnes demandant une validation des acquis pour accéder à la formation) <https://www.universite-paris-saclay.fr/formation/formation-continue/validation-des-acquis-de-lexperience>.

Fiche de choix de M2 (obligatoire pour les candidats inscrits en M1 à l'Université Paris-Saclay) à télécharger sur <https://urlz.fr/i3Lo>.

Document justificatif des candidats exilés ayant un statut de réfugié, protection subsidiaire ou protection temporaire en France ou à l'étranger (facultatif mais recommandé, un seul document à fournir) :

- Carte de séjour mention réfugié du pays du premier asile
- OU récépissé mention réfugié du pays du premier asile
- OU document du Haut Commissariat des Nations unies pour les réfugiés reconnaissant le statut de réfugié
- OU récépissé mention réfugié délivré en France
- OU carte de séjour avec mention réfugié délivré en France
- OU document faisant état du statut de bénéficiaire de la protection subsidiaire en France ou à l'étranger.

Programme

Semestre 1

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
Aspects théoriques de la programmation linéaire	5	Semestre 1	30								

Aspects théoriques de la programmation linéaire

ECTS : 5

Semestre calendaire : Semestre 1

Détail du volume horaire

Cours magistraux : 30

Langue d'enseignement

Anglais

Enseignement à distance

non

Programme / plan / contenus

This course will guide you through the history of the complexity of linear programming, from Dantzig's Simplex Method to the most recent breakthroughs. It focuses on methods with a geometric or combinatorial flavor, such as simplex-like, ellipsoid or interior point methods, as well as their theoretical foundations (combinatorics of polytopes, self-concordant barriers, diophantine approximation, etc). No special knowledge of computational complexity or programming is required.

Objectifs d'apprentissage

Linear Programming (LP), i.e., optimizing a linear objective under linear inequality constraints, plays a central role in Operations Research and combinatorial optimization. Its success comes from the variety of applications and the existence of efficient algorithms to solve it. Despite LP is widely used in practice, its computational complexity is still subject to major open problems, the most emblematic being «Does the simplex method terminate in a polynomial number of steps?».

Bibliographie

- Geometric Algorithms and Combinatorial Optimization, Martin Grötschel, László Lovász, Alexander Schrijver
- Theory of Linear and Integer Programming, Alexander Schrijver
- Lectures on Polytopes, Günter M. Ziegler

Nature de l'évaluation

Evaluation Terminale

[Théorie des jeux avancée et applications](#)

5

Semestre 1 30

Théorie des jeux avancée et applications

ECTS : 5

Semestre calendaire : Semestre 1

Détail du volume horaire

Cours magistraux : 30

Langue d'enseignement

Français

Enseignement à distance

non

Prérequis

Basics of optimization theory.

Programme / plan / contenus

Technically, the following aspects will be developed:

- Methodologies to study equilibria in games (existence theorems, uniqueness — when relevant —, efficiency, etc.).
- Important special classes of games: potential games, S-modular games, and congestion games. Mathematical properties and applications.
- Repeated games and stochastic games: Folk theorems for the case with perfect monitoring and imperfect monitoring. First connections with Shannon theory coding theorems.
- Coalitional form games (solution concepts such as the core and nucleolus, existence theorems, etc.).
- Multi-agent learning. Description and analysis of well-known learning rules: reinforcement learning in games, regret matching, etc. The role of stochastic approximation.

Objectifs d'apprentissage

The standpoint of this course is built on three objectives:

(i) to give a unified overview of game theory to the students (direct game theory and mechanism design, strategic form and coalition form, analysis and algorithms, etc.); (ii) to provide students a good and rigorous methodology to study equilibria in games; (iii) to

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
Théorie des Jeux	5	Semestre 1	30								
■											

Théorie des Jeux

ECTS : 5

Semestre calendaire : Semestre 1

Détail du volume horaire

Cours magistraux : 30

Langue d'enseignement

Français

Enseignement à distance

non

Programme / plan / contenus

- Decision problems (one-player games): Preference relations, utility and payoff functions, decision under risk and VnM axioms, representation theorems.
- Zero-sum games: MinMax Theorems, pure and mixed strategies. n-player games: Dominance and Rationalizability. Nash equilibria and fixed points, correlated equilibria.
- Extensive form games: perfect information and backward induction, Zermelo and Kuhn's Theorems. Imperfect information, mixed and behavioral strategies, perfect recall and equivalence Theorems.
- Incomplete information and Bayesian games.
- Repeated games and Folk Theorem

Objectifs d'apprentissage

This course will present the main models of strategic games, related mathematical tools, important results and applications.

Nature de l'évaluation

Evaluation Continue non Intégrale

Programmation dynamique	5	Semestre 1	30
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Programmation dynamique

ECTS : 5

Semestre calendaire : Semestre 1

Détail du volume horaire

Cours magistraux : 30

Langue d'enseignement

Français

Enseignement à distance

non

Prérequis

Probabilities

Programme / plan / contenus

We shall consider essentially stochastic dynamical systems with discrete time and finite state space, or finite Markov chains. This framework already contains the essential difficulties (for instance for long term problems), and allows one to give at the same time an insight of algorithms, mathematical techniques and qualitative properties.

We shall present the different types of stochastic control problems: complete and incomplete observation problems, criteria with finite horizon, discounted infinite horizon, stopping time, ergodic criteria, risk-sensitive criteria, constrained problems. For some of these criteria, we shall state the corresponding dynamic programming equations, study their qualitative properties, and the algorithms for solving them (value iterations, policy iterations, linear programming), and deduce in some cases the structure of optimal strategies.

Objectifs d'apprentissage

The aim of this course is to introduce different stochastic control models and to present dynamic programming as a tool for solving them. Illustrations selected among stock management, portfolio selection, yield management, transportation or Web PageRank optimisation will be presented.

Bibliographie

D. P. Bertsekas. Dynamic programming. Prentice Hall Inc., Englewood Clis, NJ, 1987.

M. L. Puterman. Markov decision processes: discrete stochastic dynamic programming. John Wiley & Sons Inc., New York, 1994.

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
Optimisation stochastique	5	Semestre 1	30								

Optimisation stochastique

ECTS : 5

Semestre calendaire : Semestre 1

Détail du volume horaire

Cours magistraux : 30

Langue d'enseignement

Français

Enseignement à distance

non

Prérequis

Linear Programming, Probability theory, Convex analysis

Programme / plan / contenus

Two directions are explored:

We investigate the so-called "open-loop" situation, that is, the case where decisions do not depend on information available for the problem, and we thoroughly study the stochastic gradient method and its variants,

We also study "closed-loop" optimization problems, that is, the case where decisions are based on partial information. In particular, we details the two-stage case, providing modelization tools as well as dedicated algorithms (Progressive Hedging, L-Shaped), that can be extended to multistage limit. We also develop the Dynamic Programming approach when the uncertainty is stagewise independent. Both approaches are merged to give the Stochastic Dual Dynamic Programming algorithm, well known by the energy community.

Objectifs d'apprentissage

The course presents both theoretical and numerical aspects of decision problems with uncertainty, where one sets a probabilistic framework in order to minimize the expectation of a cost.

Bibliographie

Lectures on Stochastic Programming, Shapiro,
Dentcheva, Ruszczyński Course website:
<https://leclere.github.io/teaching/OS>

Nature de l'évaluation
Evaluation Terminale

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
Optimisation sans gradient	5	Semestre 1	30								

Optimisation sans gradient

ECTS : 5

Semestre calendaire : Semestre 1

Détail du volume horaire

Cours magistraux : 30

Langue d'enseignement

Anglais

Enseignement à distance

non

Prérequis

Basics in probability and statistics

Programme / plan / contenus

Among the deterministic algorithms, we will present the Nelder-Mead method, the trust-region NEWUOA algorithm as well as quasi-Newton techniques where the gradient is evaluated numerically. For the stochastic (or randomized) part we will present concepts ensuing from Evolution Strategies and Estimation of Distribution Algorithms, discussing step-size and covariance matrix adaptation techniques. We will in particular present the CMA-ES algorithm.

The course will cover theoretical aspects of the methods related to invariance, (linear) convergence as well as practical ones. The students will have the opportunity to implement or to use the implementation of certain algorithms, to learn how to recognize and to diagnose numerical problems and the failure of one algorithm as well as to identify the convergence type. We will also explain how to conduct (fair) performance assessment. In the last part we present concepts related to multiobjective optimization.

Objectifs d'apprentissage

Challenging numerical optimization problems occur in many domains in industry, medicine, biology, physics, ... The underlying functions can be non-convex, non-differentiable, non-smooth, ill-conditioned and noisy. Often, the gradient of the function is not available (or does not exist). In this context, derivative-free optimization techniques, also referred to as zero order black-box optimization techniques, are needed.

The objective of this lecture is to present the main deterministic and stochastic derivative-free optimization algorithms used nowadays.

Bibliographie

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
Algèbre tropicale, optimisation et jeux	5	Semestre 1	30								
■											

Algèbre tropicale, optimisation et jeux

ECTS : 5

Semestre calendaire : Semestre 1

Détail du volume horaire

Cours magistraux : 30

Langue d'enseignement

Anglais

Enseignement à distance

non

Nature de l'évaluation

Evaluation Continue non Intégrale

[Introduction à la](#)

[recherche](#)

[opérationnelle](#)

5

Semestre 1 24

Introduction à la recherche opérationnelle

ECTS : 5

Semestre calendaire : Semestre 1

Détail du volume horaire

Cours magistraux : 24

Langue d'enseignement

Anglais

Enseignement à distance

non

Prérequis

Linear algebra

Programme / plan / contenus

We will study how many optimization problems can be modeled as linear, mixed-integer linear, or integer quadratic programs. We will then introduce some of the main algorithms (simplex method, Branch & Bound algorithm) used to solve these types of problems. Finally, we will devote some time on modeling and solving practical optimization problems using a dedicated software (CPLEX).

Objectifs d'apprentissage

Operations Research is an area of applied mathematics aiming at helping organizations to make better decisions. It relies on a variety of mathematical techniques to model and solve decision and optimization problems arising in many different contexts such as manufacturing, transportation, healthcare, telecommunications or financial planning. The objective of the course is to provide an introduction to Operations Research and its applications by focusing mainly on the use of mathematical programming.

Bibliographie

F. Hillier and G. Libermann. Introduction to Operations Research 11th Edition. Mc Graw Hill, 2021.

Nature de l'évaluation

Evaluation Continue non Intégrale

[Contrôle optimal
des EDO](#)

5

Semestre 1 30

Contrôle optimal des EDO

ECTS : 5

Semestre calendaire : Semestre 1

Détail du volume horaire

Cours magistraux : 30

Langue d'enseignement

Français

Enseignement à distance

non

Prérequis

Basic knowledge in integration, calculus and optimization (Lagrange multipliers).

Programme / plan / contenus

The first part of the course will focus on Pontryagin's principle, a necessary optimality condition for optimal control problems. It will be established in various settings (time-optimal linear systems, linear-quadratic problems, nonlinear systems). It will lead to a numerical method called shooting method.

The second part of the course will focus on methods deriving from the dynamic programming principle. In particular, we will see how global solutions can be computed through the resolution of the Hamilton-Jacobi-Bellman equation, a nonlinear partial differential equation.

Objectifs d'apprentissage

The course is dedicated to the optimization of dynamical systems described by Ordinary Differential Equations (ODEs). We will consider situations for which at any time, an agent can have an impact on the evolution of the system through a variable called control.

Optimal control theory has applications in various fields, such as aerospace, energy management, biology, etc. A classical example is the Goddard problem : the fuel profile consumption of a rocket must be determined, so that the rocket reaches the highest possible altitude. For this problem, the ODE modeling the trajectory of the rocket derives from Newton's law.

Bibliographie

W.H. Flemming and R.W. Rishel. Deterministic and Stochastic Optimal Control, Springer, 1975. E. Trélat. Contrôle optimal : théorie et applications. Electronic version of 2013 (in French).

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
<u>Analyse et optimisation convexe</u>	5	Semestre 1	30								

Analyse et optimisation convexe

ECTS : 5

Semestre calendaire : Semestre 1

Détail du volume horaire

Cours magistraux : 30

Langue d'enseignement

Français

Enseignement à distance

non

Prérequis

basic optimization, differential calculus, Hilbert spaces

Programme / plan / contenus

We will in particular deal with the following topics:

Hahn-Banach theorem and representation of closed convex sets as intersection of closed half-spaces the subdifferential of a lsc convex function, and some subdifferential calculus rules the proximal operator of a convex function on a Hilbert space convex duality, and in particular Lagrangian duality and Fenchel-Rockafellar theorem

The second part of the course will explain how solutions to convex optimization problems (and more) can be constructed using fixed-point methods.

Objectifs d'apprentissage

The aim of this course is to introduce the basic knowledge in convex analysis and convex optimization, which will be used in many of the courses of the Optimization program. In the first part, we will see how to obtain optimality conditions for convex optimization problems, that may involve non-smooth functions, possibly living on infinite dimensional spaces.

Bibliographie

Convex Analysis and Variational Problems, Ekeland and Temam
Convex Analysis and Monotone Operator Theory on Hilbert spaces, Bauschke and Combettes

Nature de l'évaluation

Evaluation Terminale

[Calcul des variations](#)

5

Semestre 1 30

Calcul des variations

ECTS : 5

Semestre calendaire : Semestre 1

Détail du volume horaire

Cours magistraux : 30

Langue d'enseignement

Anglais

Enseignement à distance

non

Prérequis

Integration theory, measure theory, functional analysis, weak convergence, Sobolev space

Programme / plan / contenus

The following themes will be presented:

Basic geometric measure theory (Radon measure, weak* convergence and differentiation of measures)

Hausdorff measures (area formula, rectifiable sets, approximate tangent space)

Functions of bounded variation (approximation, embeddings, traces, co-area formula)

Sets of finite perimeter (reduce and essential boundary, generalized Gauss-Green formula)

Fine properties of functions of bounded variation (approximate continuity, approximate differentiability, decomposition of the gradient)

Special functions of bounded variation and application to the Mumford-Shah problem

Objectifs d'apprentissage

This course aims to introduce geometric measure theoretic tools to study singular variational problems. Typical applications arise in geometric type problems such as the Plateau problem: isoperimetry, minimal surfaces, imaging (denoising, segmentation) or materials science (fractures or plasticity).

Bibliographie

Ambrosio, Fusco, Pallara: Functions of bounded variation and free discontinuity problems
Evans, Gariepy: Measure theory and fine properties of functions
Federer: Geometric measure theory
Giusti: Minimal surfaces and functions of bounded variation
Maggi: Sets of finite perimeter and

Stage ou mémoire

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
Stage ou Mémoire	21	Semestre 2									
■											

Stage ou Mémoire

ECTS : 21

Semestre calendaire : Semestre 2

Langue d'enseignement

Français

Enseignement à distance

non

Objectifs d'apprentissage

Internship: Students have to write a memoir on a 3+ months research internship, with can take place either in a university or a company research lab.

Nature de l'évaluation

Evaluation Continue non Intégrale

Semestre 2

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
Apprentissage séquentiel, optimisation et jeux	4	Semestre 2	20								

Apprentissage séquentiel, optimisation et jeux

ECTS : 4

Semestre calendaire : Semestre 2

Détail du volume horaire

Cours magistraux : 20

Langue d'enseignement

Anglais

Enseignement à distance

non

Prérequis

probability theory and notions of convex analysis

Programme / plan / contenus

- Regret minimizing algorithms
- Online linear/convex optimization
- Adaptive regret bounds
- Blackwell's approachability
- Adversarial bandits & partial monitoring
- Application to optimization, variational inequalities, fixed-point iterations
- Application to learning in games

Objectifs d'apprentissage

Online learning is an important topic at the intersection of machine learning, optimization and sequential decision.

This course focuses on a general class of sequential decision problems in adversarial environments. We first introduce the mathematical tools to design and analyze a wide range of regret minimizing algorithms in online linear/convex optimization. These results are then extended to a wider range of problems through Blackwell's approachability. We then explore deep connections with various optimization problems: (stochastic) optimization, minimax problems, variational inequalities, learning in games, fixed-point iterations.

Bibliographie

- "Prediction, learning, and games", Nicolò Cesa-Bianchi and Gábor Lugosi. Cambridge University Press, 2006
- "Approachability, regret and calibration: Implications and equivalences" ,Vianney Perchet, Journal of Dynamics & Games (2014)
- "A modern introduction to online learning", Francesco Orabona, lecture notes, 2023

Nature de l'évaluation

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
Jeux à champ moyen	3	Semestre 2	15								

Jeux à champ moyen

ECTS : 3

Semestre calendaire : Semestre 2

Détail du volume horaire

Cours magistraux : 15

Langue d'enseignement

Anglais

Enseignement à distance

non

Programme / plan / contenus

Although most of the mathematical concepts will be reintroduced, it is strongly recommended that you familiar with Bellman's dynamic programming (having taken the optimization course in the first semester for of the first semester for example). No knowledge of game theory is required. The course will be devoted largely to modelling issues, including the structural assumptions behind stability in these games. Preliminaries: game theory and optimization A first example from crypto-currencies Population evolution and equilibrium equations in a mean field game Example of optimal liquidation Master equation Additional modelling (learning procedure, presence of a majority player, ...)

Objectifs d'apprentissage

The aim of this course is to present the new medium-field game theory, notably through some of its applications in finance. The aim of this course is to present the new theory of mean-field games, in particular through some of its applications in finance. Mean-field games are games involving infinite number of "small" players, i.e. who have only a marginal influence on the game. influence on the game. We will see in particular through two examples that we will follow the course (one from a crypto-currency market and one from an optimal liquidation problem), why such games are We will see in particular through two examples that we will follow during the course (one from a crypto-currency market and one from an optimal liquidation problem) why such games are natural models in finance. From a mathematical point of view, this theory is essentially based on optimal control (stochastic) control and game theory.

Nature de l'évaluation

Evaluation Terminale

[Transport optimal](#) 3

Semestre 2 18

Transport optimal

ECTS : 3

Semestre calendaire : Semestre 2

Détail du volume horaire

Cours magistraux : 18

Langue d'enseignement

Français

Enseignement à distance

non

Prérequis

Basic convex optimization and measure theory.

Programme / plan / contenus

In the first part of the course we will study equivalent definitions of Optimal Transport (OT). A static formulation based on probability theory, a dual formulation based on convex optimization and a dynamical formulation based on PDE, Hamilton Jacobi equations. We then go through classical theory for existence, uniqueness and regularity. The theory will be at the interplay between probability, measure theory, PDE and convex analysis.

For the second part we will concentrate on applications of OT on the one hand for the study of PDE, such as Incompressible Euler equations and PDE that can be recast as Gradient Flows for the metric defined by OT. On the other hand for statistics and data analysis.

In a third part we will present some efficient numerical methods to compute OT and its applications such as entropic regularization, Semi-Discrete OT, Primal Dual methods. We will finish with a discussion on possible extensions of OT: (unbalanced and partial OT).

Objectifs d'apprentissage

Optimal transport is a powerful mathematical theory at the interface between optimization, PDE and probability theory with far reaching applications. It defines a natural tool to study probability distributions in the many situations where they appear: data science, partial differential equations, statistics or shape processing. In this course we will present the classical theory of optimal transport, efficient algorithms to compute it and applications.

Bibliographie

Optimal Transport for applied Mathematicians, F.

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
Contrôle géométrique	3	Semestre 2	18								
■											

Contrôle géométrique

ECTS : 3

Semestre calendaire : Semestre 2

Détail du volume horaire

Cours magistraux : 18

Langue d'enseignement

Anglais

Enseignement à distance

non

Nature de l'évaluation

Evaluation Terminale

[Cours invité](#)

2

Semestre 2

10

[PGMO](#)

■

Cours invité PGMO

ECTS : 2

Semestre calendaire : Semestre 2

Détail du volume horaire

Cours magistraux : 10

Langue d'enseignement

Français

Enseignement à distance

non

Prérequis

Basic knowledge of optimisation, control or game theory

-- depending on the topic of the course.

Nature de l'évaluation

Evaluation Terminale

[Français Langue](#)

2

Semestre 2

24

[étrangère](#)

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
■											

Français Langue étrangère

ECTS : 2

Semestre calendaire : Semestre 2

Détail du volume horaire

Cours magistraux : 24

Langue d'enseignement

Français

Enseignement à distance

non

Nature de l'évaluation

Evaluation Continue Intégrale

[Optimisation](#)

[coopérative pour l'apprentissage](#) 3 Semestre 2

Optimisation coopérative pour l'apprentissage

ECTS : 3

Semestre calendaire : Semestre 2

Langue d'enseignement

Anglais

Enseignement à distance

non

Prérequis

Previous course on convex optimization, especially first-order algorithms (gradient descent), optimality conditions (KKT), and duality.

Programme / plan / contenus

The course presents continuous optimization techniques that have been developed to deal with the increasing amount of data. In particular, we look at optimization problems that depend on large-scale datasets, spatially distributed data, as well as local private data.

We will focus on three different aspects: (1) the development of algorithms to decompose the problem into smaller problems that can be solved with some degree of coordination; (2) the trade-off of cooperation vs. local computation; (3) how to design algorithms that ensure privacy of sensitive data.

Objectifs d'apprentissage

Understand the challenges in cooperative optimization for large-scale data applications.

Nature de l'évaluation

Evaluation Continue Intégrale

[Algèbre et géométrie en optimisation](#)

3

Semestre 2 18

Matières	ECTS	Semestre	Cours	TD	TP	Cours- TD	Cours- TP	TD- TP	A distance	Projet	Tutorat
■											

Algèbre et géométrie en optimisation

ECTS : 3

Semestre calendaire : Semestre 2

Détail du volume horaire

Cours magistraux : 18

Langue d'enseignement

Anglais

Enseignement à distance

non

Nature de l'évaluation

Evaluation Continue Intégrale

Lieu(x) d'enseignement

ORSAY

GIF SUR YVETTE

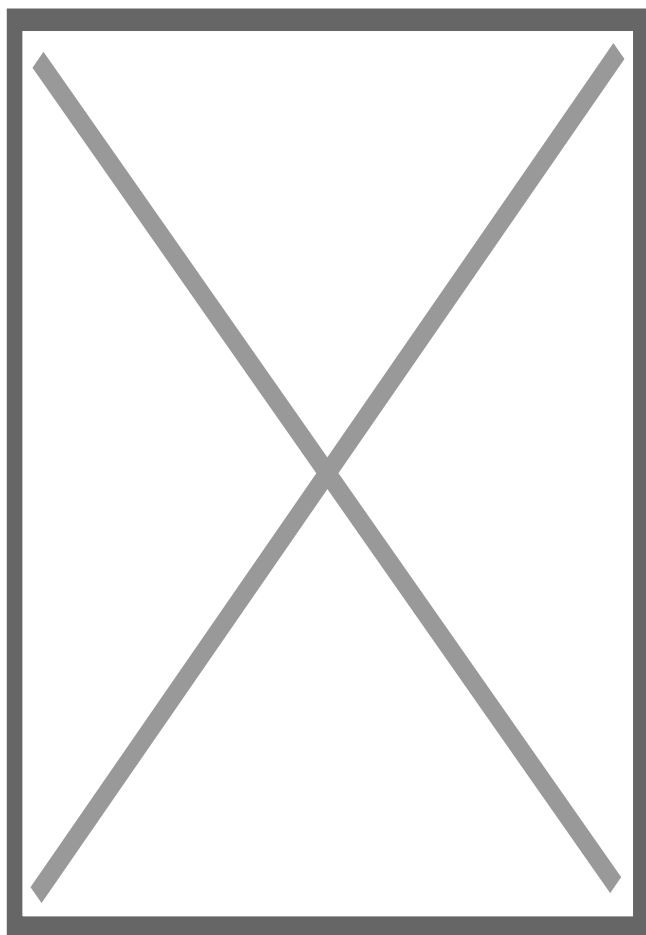
PALaiseau

Partenaire(s) académique(s) de la formation

Polytechnique, ENSTA, CentraleSupélec

Campus de la formation

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Orsay Bures

Orsay / Bures-sur-Yvette

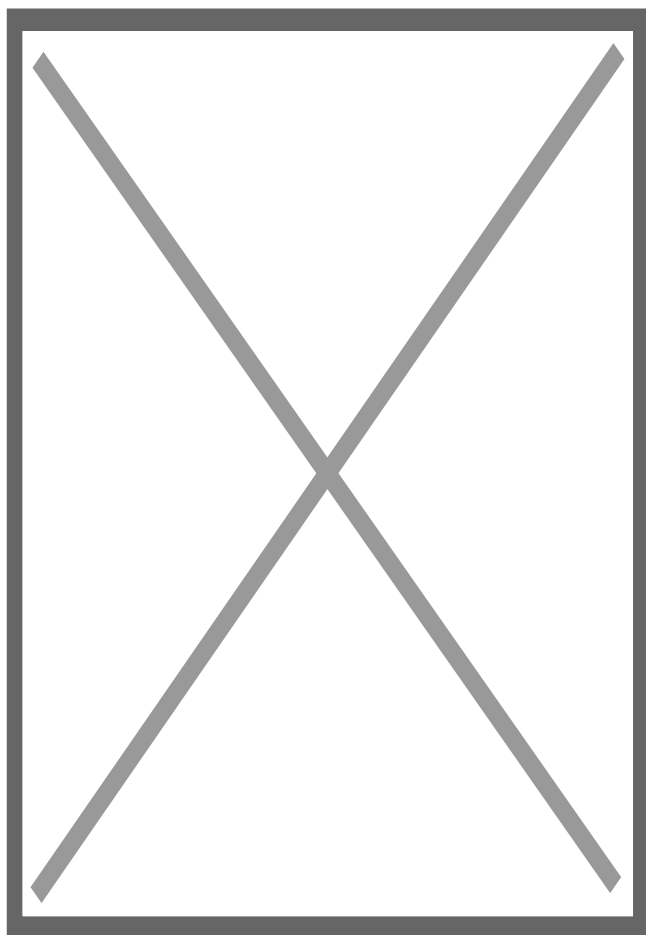
Bus 4607, 4626

RER B Orsay ville ou Bures-sur-Yvette

[Voir](#)

Bibliothèque

Maison des associations



Saclay Corbeville

Saclay / Palaiseau

Bus 4606, 4627, 5154, 9105, 9108

RER B Palaiseau, Palaiseau villebon ou Lozère

[Voir](#)

Restaurant CROUS

Résidence étudiante

Equipements sportifs

Contact(s)

- **Quentin Mérigot**

Liens

[Séminaire PGMO](#)

[Vidéo de présentation](#)

[Témoignages étudiants](#)

<http://www.universite-paris-saclay.fr/formation/master/mathematiques-et-applications/m2-optimisation-jeux-et-contrôle>