
CURSO: Doutorado em Modelagem Matemática
2º trimestre de 2020/TURMA 2020
DISCIPLINA: **Otimização**
PROFESSOR: **Vincent Gérard Yannick Guigues**
CLASSIFICAÇÃO: Obrigatória
CARGA HORÁRIA: 45h
PRÉ REQUISITO: Análise Funcional: Fundamentos
HORÁRIO E SALA DE ATENDIMENTO:
SALA:

PLANO DE ENSINO

1. Ementas

Optimization problems aim at minimizing or maximizing functions over a set. They are used in a wide range of applications, in particular engineering and finance. The objective of the course is to develop modelling skills (writing some real-life applications as optimization problems), to learn important tools of convex analysis, and to study solution methods for some classes of optimization problems:

- 1) Convex analysis..
- 2) Classes of optimization problems.
- 3) Optimality conditions.
- 4) Lagrange multipliers and duality.
- 5) Dynamic Programming
- 6) Augmented Lagrangian
- 9) Douglas Rachford
- 10) Stochastic Dynamic Programming.

2. Objetivos da disciplina

Learn important tools of convex analysis, theory for optimization problems and present optimization algorithms in deterministic and stochastic settings.

3. Procedimentos de ensino (metodologia)

Online classes.

4. Conteúdo programático detalhado

1. Convex analysis
2. Convex analysis
3. Classes of problems: linear and conic problems
4. Classes of problems: conic and semidefinite problems
5. Optimality conditions and duality

6. Presentations of articles
7. Douglas-Rachford
8. Augmented Lagrangian
9. Dynamic Programming
10. Dynamic Programming
11. Stochastic Dynamic Programming
12. Stochastic Dynamic programming
13. Presentations of articles

5. Procedimentos de avaliação

2 presentations of articles.

6. Bibliografia Obrigatória

- Ben-Tal e Nemirovski (2001) Lectures on Modern Convex Optimization, SIAM, Philadelphia.
- Bertsimas e Tsitsiklis (1997) Introduction to linear optimization, Athena Scientific.
- Boyd e Vandenberghe (2009) Convex Optimization, Cambridge University Press.

7. Bibliografia Complementar

- Shapiro, Dentcheva e Ruszczyński (2009) Lectures on Stochastic Programming: Modeling and Theory, SIAM, Philadelphia.
- Guigues (2017) Inexact decomposition methods for solving deterministic and stochastic convex dynamic programming equations, arXiv.
- Guigues (2016) Multistep stochastic mirror descent for risk-averse convex stochastic programs based on extended polyhedral risk measures, V. Guigues, Mathematical programming, 163(1), 169-212.
- Guigues (2017) Dual Dynamic Programming with cut selection: Convergence proof and numerical experiments, European Journal of Operational Research, 258, 47-57.

8. Minicurrículo do(s) Professor(s)

Vincent Gérard Yannick Guigues - Possui graduação em Engenharia Informática e Matemática Aplicada pela ENSIMAG (2000), mestrado em Otimização e Estatística pela ENSIMAG (2001), mestrado em Otimização e Estatística pela Universidade Joseph Fourier (2001) e doutorado em Inferência Estatística e Otimização Robusta pela Universidade Joseph Fourier (2005). Atualmente é Professor Associado II na FGV.

9. Link para o Currículo Lattes

<http://lattes.cnpq.br/6539383780616623>