

Optimization

Màster de Fonaments de Ciència de Dades

Gerard Gómez & Lluís Garrido

Contents

- I Optimization. First examples and background
- II Unconstrained and constrained optimization with equalities. Optimality conditions
- III Gradient methods for unconstrained optimization
- IV Alternating directions methods
 - V Constrained optimization. Optimality conditions
- VI Penalty methods for constrained optimization
- VII Heuristic optimization methods: particle swarm optimization, ant colony optimization, genetic algorithms
- VIII Convexity
 - IX Subgradient methods
 - X Stochastic optimization methods. Machine learning
- XI Duality

References

1. Mordecai Avriel: *Nonlinear Programming*. Prentice-Hall, Inc., 1976.
2. Dimitri P. Bertsekas: *Nonlinear Programming*. Athena Scientific, 2003.
3. Igor Griva, Stephen G. Nash, and Ariela Sofer: *Linear and Nonlinear Optimization*. SIAM, 2009.
4. Lecture notes slides, and laboratory slides, Campus Virtual UB, 2021.

Calendar (Room: T1)

September							October						
Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su
		1	2	3	4	5					1	2	3
6	7	8	9	10	11	12	4	5	6	7	8	9	10
13	14	15	16	17	18	19	11	12	13	14	15	16	17
20	21	22	23	24	25	26	18	19	20	21	22	23	24
27	28	29	30				25	26	27	28	29	30	31

November							December						
Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7			1	2	3	4	5
8	9	10	11	12	13	14	6	7	8	9	10	11	12
15	16	17	18	19	20	21	13	14	15	16	17	18	19
22	23	24	25	26	27	28	20	21	22	23	24	25	26
29	30						27	28	29	30	31		

In red, regular lecture (14), Tuesday 16:00–18:00

In blue, laboratory session (12), Mondays 14:00–16:00

Evaluation

Laboratory projects + exercises + final exam

- ▶ 50% laboratory projects
- ▶ 30% exercises

Each exercise must be **delivered by e-mail** to:

`gerardgomez@ub.edu`

before the announced date for each exercise, as a pdf file

The name of the pdf file must be:

`Exnn-YourSurname.pdf`

Example: `Ex01-Gomez.pdf`

- ▶ 20% final exam

Contact emails

- ▶ Lluís Garrido `lluis.garrido@ub.edu`
- ▶ Gerard Gómez `gerardgomez@ub.edu`