

Program of the Course

Optimization Methods for Computational Biology

Prof. Renato Bruni

- 1 Introduction to Optimization
- 2 Using Optimization Models
3. Types of Optimization Models: Linear Programming, Integer Programming, Nonlinear Programming.
4. Linear Programming examples
5. Geometry of Linear Programming
6. Duality in Linear Programming
7. Modeling Techniques
8. Solution techniques, overview of Simplex algorithm and Branch & Bound algorithm
9. Solution software: AMPL Modelling language and Cplex solver
- 10 Combinatorial Optimization
- 11 Heuristics approaches for Combinatorial Optimization
- 12 Greedy algorithm
- 13 Local Search and Taboo search
- 14 Short overview of Machine Learning and Data Mining
- 15 Data Mining tasks: Classification, Regression, Clustering, Rule Learning and Summarization

Material of the course

The material of the course is fully contained in the slides of the lessons, available from the teacher' website <http://www.diag.uniroma1.it/~bruni/>

Exam

The exam is a written exam.

The student may also present a personal work, in which the techniques seen during the course are used to solve some relevant practical bioinformatic problem chosen by the student.

The personal work is optional and, if done correctly, may increase the grade of the written exam up to 4 points. The subject of the personal work must be approved in advance by the professor.

Contact

To contact Renato Bruni, use bruni@diag.uniroma1.it and ALWAYS insert the subject "Course in Optimization Methods". Emails not using this subject may remain unseen and/or go into the spam folder.