

**2016: Friday November 25, Thursday December 1, Friday December 9, Thursday December 15,
2pm to 7pm, room 5.2**

Models and Algorithms for Matching and Assignment Problems (4 lectures, 5 hours each)

Contents

- 1. Introduction:** matching, assignment, graphs, bipartite graphs, adjacency matrix, incidence matrix;
- 2. Theoretical foundations:** matching problems, Hall's marriage theorem, Koenig's algorithm, augmenting path, complexity, stable marriage problem;
- 3. Maximum matching applications:** vehicle scheduling, time slot assignment (TDMA), open shop scheduling;
- 4. Linear sum assignment problem:** weighted matching, constraint matrix, unimodularity, duality, Egervary's theorem, initialization algorithms;
- 5. The Hungarian algorithm:** main structure, rooted alternating tree, complexity, Kuhn's algorithm, Jacobi's theorem;
- 6. Non-Hungarian algorithms:** Dinic-Kronrod's algorithm, primal simplex algorithms, Egervary's algorithm, Birkhoff-Von Neumann theorem;
- 7. Other linear assignment problems:** k-cardinality assignment, bottleneck assignment, threshold algorithm, balanced assignment;
- 8. Quadratic assignment problems:** combinatorial formulation, complexity, integer quadratic formulation, inner product formulation, trace formulation, exact solution, heuristics.

Spring 2017, 5 hour course

Approximate Solution of Optimization Problems

Contents

1. Mathematical models of combinatorial optimization problems
2. Approximation algorithms
3. Heuristic algorithms
4. Metaheuristic algorithms

The slides of each lecture will be available few days in advance at my web page:

http://www.or.deis.unibo.it/staff_pages/martello/cvitae.html → Courses → PhD courses

It is recommended to print the slides.

LAPTOPS, SMART/CELL PHONES, etc must be switched off during lectures.