UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

DOTTORATO DI RICERCA / PHD PROGRAM IN
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING

Seminar announcement

Friday 9th May 2025, Time: 12:30 - 13:30
Room CL-T4, Building 1, - Via Claudio, 21 - NAPOLI

Dr. Roberto Maria Rosati

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Multi-Neighborhood Search for Combinatorial Optimization

Abstract: The composition of multiple local search neighborhoods enhances the connectivity in the search space, while reducing the risk of getting stuck in local minima. In this seminar, we will discuss Multi-Neighborhood Search, a methodological approach that embraces how neighborhoods are designed and composed together, their behavior and interaction with the search space and with the cost function, and their integration inside a metaheuristic. In our approach, neighborhoods are explored stochastically, balanced through probabilities, which can be static or dynamic, and internal biases. Simulated Annealing is used as underlying metaheuristic that guides the search. Multi-Neighborhood Search has shown capable to outperform the state-of-the-art on a variety of scheduling and timetabling problems, and ranked second in the International Timetabling Competition 2021 (ITC2021). Some concrete applications will be presented in the seminar.

Lecturer short bio: *Roberto Maria Rosati is a postdoctoral researcher at the WU Vienna University of Economics and Business, where he is working on the project "improving the performance of railway systems by using real-time algorithms in disruption management". He completed his PhD at the University of Udine in March 2024 with a thesis titled "Multi-Neighborhood Search for Combinatorial Optimization", under the supervision of Prof. Andrea Schaerf. During his PhD, he has visiting student at the Artificial Intelligence Research Institute (IIIA-CSIC), in Barcelona, and at the Technical University of Vienna (TU Wien). His broad research interests concern the design of efficient algorithms for solving complex, large-scale scheduling and timetabling problems.*

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