UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

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

# Seminar announcement

**Thursday 5th December 2024, Time: 15:30 - 16:30**
**Room NA-T-A1** - Via Nuova Agnano, 30-38 - NAPOLI


## Prof./Dr. Renata Mansini

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# Time Window Assignment for Attended Home Delivery


**Abstract**: We study a multi-period stochastic variant of the Time Window Assignment Vehicle Routing Problem incorporating uncertainty in customer demands, locations, and service times. Customers are partitioned into geographical zones, each requiring a predetermined number of visits over a multi-day planning horizon. Whenever a zone is visited, a time window is assigned. Time windows are decided before knowing customers and their demands. A fleet of identical vehicles is available for daily customer service. At a tactical level, the problem looks for a time window assignment that minimizes the expected traveling costs plus the expected penalty costs for unserved customers. We propose a two-stage formulation and a solution approach, which relies on the Sample Average Approximation Method, while encompassing a perturbation method to assign time windows in the first stage and an Adaptive Large Neighborhood Search to optimize routes in the second stage. We conduct an extensive computational analysis on both synthetic and real instances from a Canadian retailer. Our method's performance is evaluated by comparing it to a lower bound derived from the exact solution of a deterministic equivalent formulation across a finite set of scenarios. Our method outperforms the manual approach used by the company.


**Lecturer short bio:** Renata Mansini is a Full Professor in Operations Research, at the Department of Information Engineering (DII) of the University of Brescia (UNIBS), Italy. She holds a Ph.D. from the University of Bergamo and has been Ph.D. Exchange Visitor at Washington University, St. Louis, Missouri (USA). At present, she is Research Vice-Chancellor at UNIBS, the scientific coordinator of the research area Optimization Models and Algorithms, and the director Laboratory of Operations Research (http://or-dii.unibs.it/). She has been in the editorial board of international journals and member of international groups and scientific societies. She served as an international scientific advisor to the Executive Government Agency of the National Science Center of Poland, the Research Grants Council of Hong Kong, China, and the Romanian Council for Research and Development. Her research focus is on Combinatorial Optimization models and algorithms. Her primary research interests lie in MILP models, and in the development of exact algorithms (branch-and-bound, branch-and-cut, branch-and-price), heuristic methods (meta-heuristics, matheuristics), and approximation algorithms (computational complexity, worst-case analysis). She has published more than 130 papers in different application areas including distribution logistics, vehicle and arc routing, financial risk and safety measures, knapsack, and scheduling problems.


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