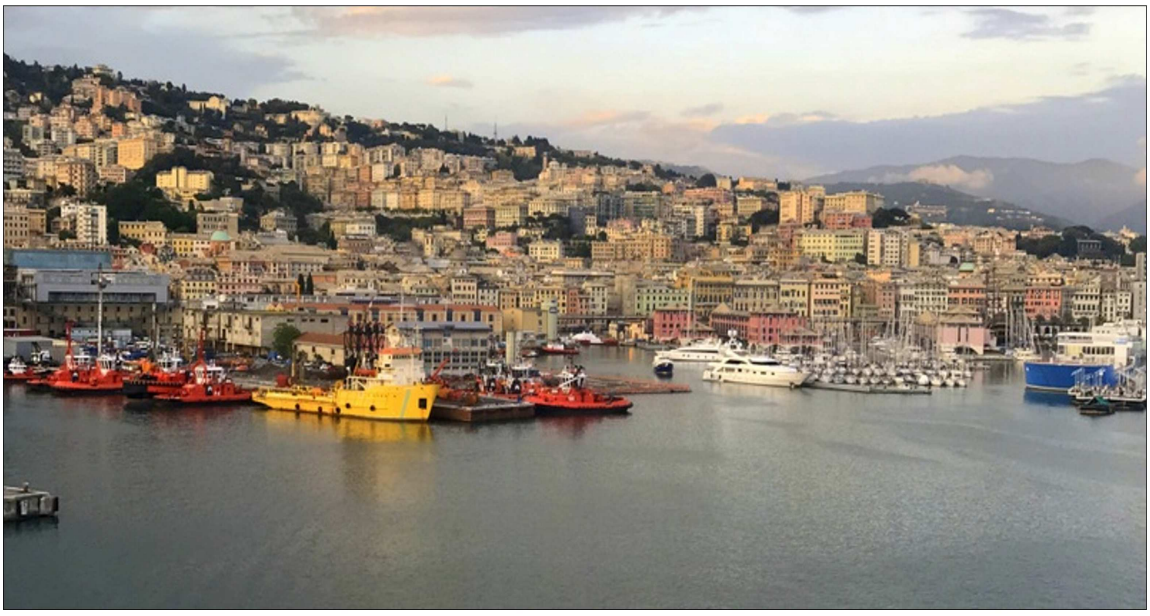
ODS 2019



International Conference on

Optimization and Decision Science

XLIX Annual Meeting of AIRO - Italian Operations Research Society

AIRO
ASSOCIAZIONE ITALIANA DI RICERCA OPERATIVA

Genova, 4-7 September, 2019
Department of Economics and Business Studies
Via Vivaldi, 5 (Darsena)

Book of Abstracts

Preface

Operations Research (OR) is known as the discipline of optimization applied to real-world problems and to complex decision making fields. The focus is on mathematical and quantitative methods aimed at determining optimal or near-optimal solutions. OR has a wide range of applications proving the inter-disciplinarity of its solving approaches, methodologies and tools. Referring to the present book, we find both applications and theoretical results in the following different fields and areas: Smart Port Terminal Operations; Data Exploitation: Methods and Applications; Financial Modeling; Optimization in Public Transport; Optimization in Machine Learning; Support to Industry 4.0 and Smart Manufacturing; Health Care Management and Planning; Data Analytics and Optimization; Technology Transfer: From Data to Actionable Knowledge; Scheduling; Equilibrium Problems, Variational Models, and Applications; Mixed Integer Programming; OR Teaching; Transportation Networks Performance and Reliability; Nonlinear Optimization and Applications; VRP and Related Problems; Stochastic Programming: Optimization Under Uncertainty and Applications; Drone Applications; Optimization in Eco-Sustainable Transportation; Rail Port Operations; New Last-Mile Transportation Paradigms Under Clever Resource Usage and Prominent Technologies; Combinatorial Optimization; OR Applications in Routing; Inventory; Graphs; Travelling Salesman and Arc Routing Problems; Optimization in Telecommunication Networks and Queueing Systems; Optimization for Sustainable Energy Systems; Logistics; Game Theory.

ODS2019, International Conference on Optimization and Decision Science, is the XLIX annual meeting organized by the Italian Operations Research Society (AIRO) in Genova, Italy, September 4th – 7th, 2019, in cooperation with the Department of Economics and Business Studies (DIEC) and the Department of Informatics, Bioengineering, Robotics, and Systems Engineering (DIBRIS) of the University of Genova. The conference is held at **DIEC**, Via F. Vivaldi, 5 – Darsena – 16126 Genova, Italy. ODS2019 has attracted academics and practitioners from private and public companies and industries thus highlighting the strict relationship between OR and its applications. The Conference participants are more than 200 researchers from 26 different countries, representing Europe, North and South America, and Asia, witnessing the international character of the conference.

The book contains the abstracts of the scientific contributions accepted for presentation. The order of the abstracts in the book corresponds to the order of presentation in the conference programme. The short papers corresponding to the abstracts marked with a star in the title have been accepted for the publication in the ODS2019 Special Volume of the AIRO Springer Series "Advances in Optimization and Decision Science for Society, Services and Enterprises". All the contributions were accepted for presentation at the conference after a peer-review process by experts in OR and related fields belonging to the Program Committee. Despite the fact that this book is a list of abstracts and does not contain the core results of the single researches, it provides a realistic and current picture of the state-of-the-art of modern research in the field of OR.

This book has been edited by the Organizing Committee of the conference.

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Programme at Glance

Wednesday - September $4^{th}, 2019$

11:00-13:30	**Registration**			
Room	**Embriaco**			
13:45-14:30	**Opening Session**			
Room	**Embriaco**	**Caffaro**	**Doria**	**Boccanegra**
14:30-16:30	W1 Smart Port Terminal Operations - 1	W2 Data Exploitation: Methods and Applications	W3 Financial Modeling	W4 Optimization in Public Transport (AIRO-OPTSM Chapter)
16:30-17:00	**Coffee break**			
Room	**Embriaco**			
17:00-18:00	**Plenary Lecture - Paolo Signorini**			
18:00-18:30	**Walking transfer to Palazzo San Giorgio**			
	Palazzo San Giorgio - Sala dei Capitani			
18:30-20:00	**Round Table** **Resilience and Management of Emergencies in Logistic Networks**			
	Palazzo San Giorgio - Portico			
20:00-22:00	**Welcome Cocktail**			

Thursday - September 5^{th}, 2019

Room	Embriaco	Caffaro	Doria	Boccanegra	Fieschi
8:30-10:30	T1 Optimization in Machine Learning - 1	T2 OR Support to Industry 4.0 and Smart Manufacturing - 1	T3 Health Care Management and Planning - 1	T4 Data Analytics and Optimization	Software Demo
10:30-11:00	**Coffee break**				
Room	**Embriaco**	**Caffaro**	**Doria**	**Boccanegra**	**Fieschi**
11:00-13:00	T5 Optimization in Machine Learning - 2	T6 OR Support to Industry 4.0 and Smart Manufacturing - 2	T7 Health Care Management and Planning - 2	T8 WORKSHOP OR Towards Technology Transfer: From Data to Actionable Knowledge	Software Demo
13:00-14:00	**Lunch**				
Room	**Embriaco**				
14.00-15.00	**Plenary Lecture - Nello Cristianini**				
Room	**Embriaco**	**Caffaro**	**Doria**	**Boccanegra**	**Fieschi**
15:00-16:30	T9 (AIRO)Young Reserchers in Machine Learning and Operations Research	T10 Scheduling	T11 Equilibrium Problems, Variational Models, and Applications - 1	T12 WORKSHOP OR Towards Technology Transfer: From Data to Actionable Knowledge	Software Demo
16:30-17:00	**Coffee break**				
Room	**Embriaco**	**Caffaro**	**Doria**	**Boccanegra**	**Fieschi**
17:00-18:30	T13 Mixed Integer Programming	T14 OR Applications - 1	T15 Equilibrium Problems, Variational Models, and Applications - 2	T16 (AIRO)Young Tutorial Session: Young OR Specialists in the Industry - Experiences, Tips, and Panel Discussion	Roundtable: Comparing the Contents of the OR Courses in Italian Universities
19:30-23:00	**Social Event: ODS Sport - Beach Volley Tournament**				

Friday - September 6^{th}, 2019

Room	Embriaco	Caffaro	Doria	Boccanegra
8:30-10:30	F1 Smart Port Terminal Operations - 2	F2 Transportation Networks Performance and Reliability	F3 Nonlinear Optimization and Applications - 1	F4 VRP and Related Problems
10:30-11:00	**Coffee break**			
Room	**Embriaco**	**Caffaro**	**Doria**	**Boccanegra**
11:00 -13:00	F5 Sochastic Programming: Optimization Under Uncertainty and Applications	F6 OR for Drone Applications	F7 Nonlinear Optimization and Applications - 2	F8 Optimization in Eco-Sustainable Transportation
13:00-14:00	**Lunch**			
Room	**Embriaco**			
14:00-15:00	**Plenary Lecture: Bruce Golden**			
Room	**Embriaco**	**Caffaro**	**Doria**	**Boccanegra**
15:00-16:30	F9 Rail Port Operations	F10 New Last-mile Transportation Paradigms Under Clever Resource Usage and Prominent Technologies	F11 Combinatorial Optimization	F12 OR Applications in Routing
16:30-17:00	**Coffee break**			
17:00-18:30	**AIRO Meeting**			
From 18:00	**Visit to Genova Cathedral (two rounds)** **Social Dinner at "Chiostro di San Lorenzo"**			

Saturday - September 7^{th}, 2019

Room	Embriaco	Caffaro	Doria	Boccanegra
8:30-10:30	S1 OR Applications - 2	S2 Inventory	S3 Graphs	S4 Travelling Salesman and Arc Routing Problems
10:30-11:00	**Coffee break**			
11:00-12:30	S5 Optimization in Telecommunication Networks and Queueing Systems	S6 Optimization for Sustainable Energy Systems	S7 Logistics	S8 Game Theory
12:30-13:00	**Closing Session**			
15:00-19:00	**Social Event: Boat Trip to Paradiso and Tigullio Gulfs**			

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T3: Health Care Management and Planning - 1

Chair: **Elena Tánfani**

Nurse-to-Patient Assignment in Home Care Services with Uncertain and Temporally Correlated Patient Demand

Giuliana Carello[1], Ettore Lanzarone[2], Mara Servilio[3]

[1] Politecnico of Milano, giuliana.carello@polimi.it
[2] IMATI CNR, ettore.lanzarone@cnr.it
[3] Cyber Dyne s.r.l, mservilio@gmail.com

Abstract: Assisting patients at home, rather than in hospital, offers many advantages, from the decrease in hospitalization costs to the improvement in the quality of life of patients. Home care services will, therefore, become more and more common in the next future, especially for dealing with the elderly population, who, most of all, benefits from home care treatment. However, home care services are expensive and must be carefully managed in order to make them efficient. A key problem in planning home care services is the assignment of patients to nurses. It is a medium term decision which heavily affects the workload of nurses for a long time horizon. However, when assigning patients to nurses, their demand, namely the number of weekly visits, is not fully known. Indeed, it depends on the patients' conditions, and they may change along time. We consider the problem of assigning patients to nurses over a planning horizon of several weeks. Patients may require different kinds of continuity of care: they may require to be cared after by only one nurse, or they may accept to be assigned to different nurses in different weeks, but this should be discouraged, or they may be cared after by different nurses even in the same week. To deal with the uncertain temporal evolution of the patients' demands a robust solution is generated through an implementor-adversarial-like approach. Two levels of flexibility are considered and compared: in the less flexible case the assignment of patients with no continuity requirement is independent from the demand realization, while in the more flexible one it is re-optimized based on the current patients' conditions.

Keywords: Home Care, Nurse-to-Patient Assignments, Time Related Uncertain Demand

References:

[1] D. Bienstock.: Histogram models for robust portfolio optimization. Journal of Computational Finance, 11, 1-64 (2007).

[2] G. Carello, E. Lanzarone.: A cardinality-constrained robust model for the assignment problem in home care services. European Journal of Operational Research, 236, 748-762 (2014).

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