ODS 2021:
International Conference on Optimization and Decision Sciences

Rome, Universitá degli studi di Roma La Sapienza, 14 – 17 September 2021
50th Conference of Italian Operations Research Society

Optimization in Artificial Intelligence and Data Science

Book of Abstracts

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Presentation of ODS2021

This book contains the abstracts of the contributions presented at the International Conference on Optimization and Decision Science (ODS2021), Rome, Italy, September 14th - 17th, 2021.
ODS2021 is the 50th annual meeting and the first hybrid conference organized by AIRO, the Italian Operations Research Society and the Department of Statistical Sciences Sapienza - University of Rome and supported by Springer. ODS2021 aims at being a unique opportunity for researchers, and practitioners focused on today's problems of knowledge, growth, sustainability and operational excellence from various sectors (quantitative management, engineering, applied mathematics, statistics, computer science, economics and finance, medicine and healthcare), private and public companies, industries and policymakers, to present and share ideas, experiences and knowledge, as well as to enforce or creating a new cooperation network.
The conference theme is open in the wide field of analytics, optimization, problem-solving, and decision-making methods and their application in Production, Service, Knowledge, and IT Systems. However, a special focus is on Optimization in Artificial Intelligence and Data Science.
A number of short papers submitted to ODS2021 were selected for publication. The peer-review process was conducted by experts in Operations Research and related fields. All these contributions will be collected in the Airo Springer Series dedicated to the ODS2021 conference: https://www.springer.com/series/15947?detailsPage=free
We express our gratitude to the plenary speakers for their invaluable contributions, to the authors for their work and dedication, and to all members of the Program Committee and auxiliary reviewers who helped by offering their expertise and time.We deeply thank Springer for strongly supporting us for the online services for presentation and participation.

The Organizing Committee,
Department of Statistical Sciences. Sapienza University of Rome.

Invited Session: OPTSM 6 A6

Lorenzo Castelli, Mitigating demand-capacity unbalances through inter-airline slot tradings

Zhouchun Huang, Optimal aircraft arrival scheduling model based on continuous descent operation in busy terminal maneuvering areas

Dilay Aktas, A demand responsive public bus system with short-cuts

Luigi De Giovanni,A matheuristic approach to preference aware air traffic flow management

A matheuristic approach to preference aware air traffic flow management

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The main objective of Air Traffic Flow Management (ATFM) is to assign 4D trajectories to flights to guarantee both safe operations and efficient use of airspace. In this talk, we present a new approach to ATFM that explicitly takes AUs routes' preference into account. A set of relevant trajectories is extracted from air traffic data repositories, using data analytics to learn the preference of each flight for each trajectory. The information feeds an Integer Linear Programming (ILP) model where variables assign a trajectory and a ground delay to each flight. For real-size instances, the number of trajectories leads to prohibitively large models and we propose a heuristic that, at each iteration, solves the ILP model restricted to a suitable subset of variables determined through machine learning techniques. The randomized selection comes from a tree classifier that considers features related to candidate variables, as well as to current solution and search state, and is preliminarily trained on reduced size instances. Computational results, compared to a heuristic based on column generation, show the ability of the proposed method to effectively solve realistic instances and sensibly reduce running times while preserving the quality of the solutions.

[1] Estes, A.S, Ball, M.O.: Alternative Resource Allocation Mechanisms for the Collaborative Trajectory Options Program (CTOP). In Thirteenth USA/Europe AirTraffic Management Research and Development Seminar, 1-9, (2019)

[2] Lancia, C., De Giovanni, L., Lulli, G.: Data analytics for trajectory selection and preference-model extrapolation in the European airspace. In: The OR2018 Proceedings. Springer, 7 p., (2018).