

Editorial

Operations Research for Transportation and Sustainable Development

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Sustainable development is the core principle for meeting human development goals while at the same time sustaining the ability of systems to produce, extract, process, or manufacture the natural resources and services upon which the economy and society depend.

Transportation produces water, noise, and air contamination, being a large contributor to greenhouse gas emissions. These environmental shortcomings can be mitigated by considering and integrating sustainable social, environmental, and economic goals that impact and accelerate green and sustainable development. Furthermore, sustainable transportation can be viewed and integrated as an essential ingredient in sustainable development strategies. Components for evaluating transport sustainability include particular transportation means used for road, water, or air transport; the way they are organized, the source of energy, and the infrastructure used to accommodate the transport. In this context, optimization plays a relevant role. Methods from Operations Research have been extensively used to successfully deal with many of these challenges.

This special issue aims at examining the current progress, challenges, and approaches in transportation to achieve a sustainable development through optimization. Thus, the scope of this issue covers high-quality original research and review articles focusing on the use of Operations Research techniques (mathematical programming, metaheuristics, simulation based approaches, etc.) to deal with transportation for promoting a sustainable development, mitigating

the negative environmental impacts, and identifying main opportunities to accelerate the transition to sustainability.

An overview of the topics in the selected articles composing this special issue is given below.

Sustainable Waste Management Network Design. Designing a cost-effective waste management supply chain, while considering sustainability issues such as land-use and public health impacts, is possible thanks to optimization models, and particularly to multiobjective approaches.

Transportation Network of Recovering End-of-Life Vehicles. From the viewpoints of environmental protection and resource utilization, it is valuable to investigate an effective strategy through optimization for recycling end-of-life vehicles. Fuzzy and stochastic parameters are keys to model these uncertain environments.

Electric Vehicle Routing Problems. Due to the challenges emerging from the integration of electric vehicles in logistics processes, a review of state-of-the-art Operations Research solution approaches and procedures for solving the Electric Vehicle Routing Problem (E-VRP) is useful.

Cruise Control of High-Speed Trains. High-speed train transportation has many more advantages than traditional railway traffic, such as high speed, large volume, and a safe and comfortable environment. Acceleration and deceleration also

have an impact on energy consumption and sustainability, so an optimized control method is important.

Location of Biogas Plants in Supply Chains. Biogas from animal manure not only provides energy efficiency but also minimizes carbon emissions compared to existing biomass products. Therefore, it is interesting the use of Operations Research techniques to consider biogas plants and minimize the total supply costs and carbon emissions.

Bus Crowding and Passenger Flow. Traffic congestion problems have seriously restricted economic development and affected people's daily lives. The improvement of public transportation should have priority, increasing the service quality and ameliorating the travel environment. One relief can be obtained minimizing the impact of the randomness of passenger flow on the determination of bus crowd coefficient.

Airborne Delay Minimization in Free-Route Airspace. Airborne transportation has a relevant economic impact for international business, trade, and tourism. It involves the management of a rising number aircrafts requiring safe separation distances among them. Thus, having decision support approaches for preventing collisions and managing conflicts at a pretactical level is necessary and crucial.

Equilibrium and Optimization in a Double-Ended Queueing System. Taxis service plays a relevant role in sustainable mobility. In order to make a more efficient use of this resource, optimal strategies which adjust the arrival rate of taxis to the passengers demand are necessities. This problem can be modelled as a double-ended queueing system.

Transportation Network Reliability under Emergency. Urban traffic networks are designed to address daily traffic demand. When an emergency occurs, the existing capacity of the infrastructure is usually not able to meet the demand of evacuation. To evaluate the maximum emergency evacuation demand that can be satisfied by of the network is necessary to consider its reliability under emergency.

Short-Term Forecast in Rail Transit. The short-term forecast of rail transit is one of the most essential issues in urban intelligent transportation system. Combining spatiotemporal features based on long short-term memory network allow to propose novel forecast models.

Flow Shop Scheduling Problem. This problem arise in many manufacturing companies. In the particular case of the automotive business, the idea is to schedule the jobs with precedence constraints, release dates and delivery times, in order to satisfy client demands as soon as possible, i.e., minimizing the latest date a client receives its products. This involves a better development of this industry by Operations Research techniques.

Tram Schedule and Signal Priority at Intersections. With the purpose of improving punctuality and reliability in trams, transit signal priority is used at intersections, which can extend or insert green phase to trams. Given the fact that

this may produce delays to crossing vehicles, an integrated optimization model on tram schedule and signal priority can balance the delay between trams and other vehicles in order to minimize person delay.

The guest editors of this special issue hope that the selected articles will be able to arise the interest of Operations Research for Transportation and Sustainable Development, especially in the aforementioned fields.

Conflicts of Interest

The guest editors declare that there are no conflicts of interest regarding the special issue.

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