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GUEST EDITORIAL

Special Issue on Applied Mathematics for Traffic and Transport Systems

This special issue originates a conference held in Delft, in October 2018. The conference MATTS, Mathematics Applied to Traffic and Transport Systems, which brought together scientists and researchers from theory and application side. The papers presented in this special issue have been selected from numerous submissions.

This special issue combines the thoroughness of a solid mathematical approach with the applicability of practical transportation engineering. The papers presented in this special issue can hence pave the way for future applications and provide long-term reference for transportation systems. Let's discuss the individual papers:

The first paper is entitled 'Investigating the Quality of Spiess-Like and SPSA approaches for Dynamic OD Matrix Estimation'. This paper discusses the qualities of OD demand estimations. This is a combination of an old problem (OD estimation) with new data. The key lies in the clever combination of these data, and indeed – as so often – the right usage of the data.

The second paper, 'On a general class of solutions for an Optimal Velocity Model on an infinite lane' discusses the fundamentals of car-following behavior. Models describing how drivers and vehicles follow each other are relevant for traffic patterns, and also a topic under discussion for several decades. The current paper adds another interesting insight, namely when models are stable and when not. Whereas the approach of one model for all drivers and a circular road might seem simplified, this does enable researchers to use analytical approaches and draw generic conclusions.

Traffic platoons and traffic instabilities are tightly linked. For platoons, one might initially think about motorways, but with connected and automated vehicles, also throughput inside cities can be increased. The ideas of green waves can be extended if these platoons are rightly formed. The paper 'Platoon Forming Algorithms for Intelligent Street Intersections' discusses so.

The paper 'Optimal Combined Traffic Routing and Signal Control in Simple Road Networks: An Analytical Solution' takes this idea one step further and combines traffic signals with traffic routing. In a way, the concepts posed in this paper would ensure the whole network can be optimally used.

Finally, the paper 'A Macroscopic Flow Model for Mixed Bicycle–Car Traffic' adds another mode. The paper is again a good example of combining traffic engineering and mathematics. Whereas the authors present a model for mixed car and bicycle traffic (relevant in terms of traffic engineering), the model and its mathematical formulation is more generic and it can hence be seen as a generic macroscopic two-class model.

All in all, the papers in this special issue show that a considerable amount of progress is possible in traffic engineering when applying and developing the right mathematical tools.

Guest Editors

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