

Introduction to the special issue on public transport modelling

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This special issue consists of three papers that were submitted in response to an open call for papers that advance the state of the art of modelling public transport systems. The call was made in conjunction with COST action TU1004 on “Modelling Public Transport Passenger Flows in the Era of Intelligent Transport Systems” and the second European Symposium on Quantitative Methods in Transportation Systems (hEART).

Public transport models describe and predict transit system performance and the patterns of network usage by passengers, which are a fundamental input for planning and operations. The models currently used do not take adequately into consideration the effects brought about by the increasingly advanced and widespread Intelligent Transportation Systems on public transport operations and on users’ behavior. This special issue consists of three papers that extend existing public transport route choice and assignment models by considering flexible modes of operation, service reliability and real-time information and heterogeneity in multimodal door-to-door travel preferences.

The emergence of new flexible modes of transport calls for the development of new modelling techniques to analyze their impacts. In “Modeling intermodal networks with public transport and vehicle sharing systems” Klaus and Friedrich extend the well-established schedule-based transit assignment modelling approach to accommodate vehicle sharing systems. The representation of a rigid scheduled set of transit trips is adapted to consider the combination of transit and non-transit trip

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legs and the capacity constraints associated with vehicle sharing systems. The model allows analyzing the accessibility impacts of a sharing service that permits one-way rentals.

The availability of real-time information can potentially reduce the uncertainty associated with travel. In “Modeling the impacts of public transport reliability and travel information on passengers’ waiting-time uncertainty”, Cats and Gkioulou model a within-day network loading and a day-to-day learning process which are implemented in an agent-based simulation model. The impact of information is then studied while considering the impacts of service reliability, the performance of the prognosis scheme, and its perceived credibility. Their findings highlight the importance of behavioral adaptation when evaluating alternative measures which aim to improve service reliability.

Transit assignment models involve forecasting passenger flow distribution based on route choice preferences. Anderson et al. in “multimodal route choice models of public transport passengers in the Greater Copenhagen Area” estimate the determinants of multimodal passenger route choice. Using revealed preference data from Copenhagen, they estimated a choice-set generation model followed by a route choice model, allowing them to establish the trade-offs between the travel time components that the multimodal trip consists of. Their findings indicate that route choice preferences vary among user groups and distinguishing among them might be important in predicting passenger flows.

The three papers included in this special issue provide methodological and theoretical advancements to the state of the art of public transport modelling with contributions to both system operations and travel behavior aspects. We would like to thank all the reviewers and to the journal’s editor-in-chief, Michel Bierlaire, for their support and guidance throughout this process.