Reliability-based stochastic transit assignment with capacity constraints: Formulation and solution method

Date/Time: June 21, 11:30am-12:30pm
Location: JAB 473

Speaker: Professor Wai Yuen Szeto
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Abstract

This study proposes a Linear Complementarity Problem (LCP) formulation for the reliability-based stochastic transit assignment problem with capacity constraints and non-additive link costs, where in-vehicle travel times and waiting times are uncertain. The capacity constraints are developed via the notions of effective capacity and chance constraints. An equivalent route-based linear program (LP) for the proposed problem is formulated to determine the patronage of each line section, critical links, critical service frequencies, unmet demand and the network capacity, which considers the risk-aversive behavior of travelers. A solution method is developed, utilizing the $K$-shortest path algorithm, the column generation technique, and the revised simplex method, to solve the proposed LP with guaranteed finite convergence. Numerical experiments are also set up to illustrate the properties of the problem and the application of the proposed model for reliability analysis.

BRIEF BIO

Dr Wai Yuen Szeto is Associate Professor at the Department of Civil Engineering at The University of Hong Kong and Deputy Director of Institute of Transport Studies at the same university. He obtained his PhD at The Hong Kong University of Science and Technology in 2003. He was a Lecturer in Transportation Engineering at the Department of Civil, Structural and Environmental Engineering at Trinity College Dublin from 2004 to 2007. He then worked as Assistant Professor at the Department of Civil Engineering at The University of Singapore for 2.5 years, and joined The University of Hong Kong in late 2009 as Assistant Professor.

Dr Szeto is authors of more than 90 refereed journal papers. The papers are related to dynamic traffic assignment, transport network design, public transport, network reliability, game theoretic approaches to transport and logistic problems, modeling land use, transport and environment interaction, and sustainable transport. He has been received the World Conference on Transport Research Prize, the Eastern Asia Society for Transportation Studies Outstanding Paper Award, the Hong Kong Institute of Engineers Outstanding Paper Award for Young Engineers/Researchers, the Hong Kong Society for Transportation Studies Outstanding Dissertation Paper Award and the Gordon Newell Memorial Prize. He is one of the top 1% scholars according to ISI's Essential Science Indicators in 2015.

Currently, Dr Szeto is an Editor of Transportmetrica B and Open Engineering, the Editor in Asian Region, International Journal of Transportation, an Area Editor of Networks and Spatial Economics, an Associate Editor of Journal of Intelligent Transportation Systems, Transportmetrica A, Travel Behaviour and Society, and an Editorial Board Member of Transportation Research Part B, Transportation Research Part C, Journal of Advanced Transportation, International Journal of Sustainable Transportation, and International Journal of Traffic and Transportation Engineering. He is also a Guest Editor of 8 journals and reviewer of about 60 international journals. He received Certificate of Excellence in Reviewing from Transportation Research Part B and Transportation Research Part C in 2013.

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