A Network Equilibrium Approach for Modelling Activity-travel Pattern Scheduling Problems in Multi-modal Transit Networks

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Abstract :

An activity-based network equilibrium model is proposed for scheduling daily activity-travel patterns (DATPs) in multi-modal transit networks. A new super-network platform is introduced with integration of the activity-time-space network (ATS) and the state-augmented multi-modal (SAM) network. It not only explicitly modelled the transfers and non-linear fare structures in multi-modal transit network in Hong Kong but also addressed the activity choices and travel choices simultaneously. Each route from origin to destination in the ATS-SAM super-network is denoted as a feasible DATP. Passengers schedule their DATPs based on the trade-off between the utility gained from activity participation and the disutility of the travel required so as to maximize their daily total utility. It is shown that the DATP scheduling problem can be transformed into a typical user equilibrium traffic assignment problem on the ATS-SAM super-network. Future research on this important topic will also be discussed together with the related research works that have recently been carried out in the Hong Kong Polytechnic University.

Speaker :

Dr. William H.K. Lam, is a Chair Professor of Civil and Transportation Engineering and Head of the Civil and Environmental Engineering Department at the Hong Kong Polytechnic University (www.cee.polyu.edu.hk/~cehklam/). Prof. Lam is currently the President of the Hong Kong Society for Transportation Studies (www.hksts.org) and the Immediate Past Chairman of the Logistics and Transportation Discipline Panel, the Hong Kong Institution of Engineers (www.hkie.org.hk). He is the Co-Editors-in-Chief of the Journal of Advanced Transportation and the founding Editor-in-Chief of the SCI Journal – Transportmetrica. Prof. Lam has is also the Convenor of the International Advisory Committee of the International Symposium on Transportation and Traffic Theory (ISTTT). He has over 30-year professional experience in research and practice for planning of transport infrastructures. Prof. Lam has published more than 400 SCI international journal and conference papers together with 70 consultancy reports. His research interests include: transport network modeling and infrastructure planning, travel demand forecasts and risk assessment, ITS technology and planning, public transport and pedestrian studies.