



Seminar

Jointly organized by

Department of Civil Engineering & Institute of Transport Studies, HKU

Hong Kong Society for Transportation Studies

Solution to static traffic assignment problem with shock structures on a single origin-destination parallel road network

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Date: May 12, 2026 (Tuesday)

Time: 5:00 p.m. – 6:00 p.m.

Venue: Room 612B, 6/F Haking Wong Building, The University of Hong Kong

Language: Putonghua

Abstract

It mathematically indicates that shock structures are essential in static traffic assignment (STA) problems. The study is based upon the Lighthill-Witham-Richards (LWR) model or the theory of fundamental diagram, and takes a single origin-destination (OD) parallel road network as an instance, in which the user-equilibrium condition is satisfied. Taking the total number of users on the network as the independent variable, it shows that there are no classical steady-state solutions to the problem for the number between two critical values, thus shock structures must be introduced to complete the solution in the interval. Dynamic simulation of the LWR model on two ring networks is implemented to show that casually distributed traffic flow converges to analytical solutions, corresponding to the user number on the ring network. However, extensions of this study to more complex road networks are still challenging. For more details, see Z. Lin, P. Zhang, et al, *Transportmetrica B: Transport Dynamics*, 2024, vol.12, No.1, 2341012; Lyu, Y.P., *Steady-State Solution on a Simple Single Origin-Destination Road Network based on LWR Model and User-Equilibrium Conditions*, Dissertation, Shanghai University, 2022.

About the Speaker

Professor Peng Zhang has a bachelor's degree in Mathematics from Sichuan University, a PhD and DSc in Mathematics from the University of Science and Technology of China. He is now a full professor at School of Mechanics and Engineering Sciences, Shanghai University, China. Professor Zhang has an educational and research background in the computational theory of hyperbolic conservation laws, and he focuses on traffic flow problems using the theory. His contribution to traffic flow problems mainly involves the mathematical theory, which includes the analytical properties in (1) the higher-order model; (2) the multi-class model; and (3) the models with discontinuous fluxes or inhomogeneous road conditions. Since 2003, he has published more than 50 SCI papers on such reputed Journals as *J. Comput. Phys.*, *Euro. J. Appl. Math.*, *Numer. Meth. Partial Diff. Equ.*, *SIAM J. Appl. Math.*, *Appl. Numer. Math.*, *J Comput. Appl. Math.*, *Phys. Rev. E*, *Trans. Res. Part B*, etc.

- ALL ARE WELCOME -