

Department of Industrial Systems Engineering & Management, NUS, Singapore

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on

Routing Problems in Stochastic and Dynamic Networks

Speaker: Dr Xing Wu, Lamar University, USA

Date: Monday, 18 September 2017

Time: 10:00 am to 11:30 am

Venue: E1-06-07, Faculty of Engineering, NUS

Abstract: The mean-standard deviation shortest path model, also called travel time budget (TTB) model is defined as a route's mean travel time plus a travel time margin, which is the route travel time's standard deviation multiplied with a factor. The TTB model violates the Bellman's Principle of Optimality (BPO), making it difficult to solve it in any large stochastic and time-dependent network. It is found that if path travel time distributions are skewed, the standard deviation cannot reflect travelers' heterogeneous risk-taking behavior in route choice. This study proposes to use the upper or lower semi-standard deviation to replace the standard deviation in the conventional TTB model, so that it can well capture such heterogeneous risk-taking behavior when the path travel time distributions are skewed. More importantly, it shows that the optimal solutions of these two derived TTB models must be non-dominated paths under some specific stochastic dominance (SD) rules. These finding opens the door to solve these derived TTB models efficiently in large stochastic and time-dependent networks. Numerical examples are presented to illustrate these findings.

Biography: Dr. Wu is an Assistant Professor of Civil Engineering at Lamar University. He leads a number of research projects on highway system modeling and analysis, and risk analysis of waterway transportation, funded by the State of Texas, the navigation district at Southeast Texas and Oak Ridge National Laboratory of the United States. He now serves as the member for one standing Transportation Research Board Committee: Marine Safety and Human Factors (AW040). He has published more than 20 journal articles in Transportation Research Part B, Transportation Research Part A, Transportation Research Part C, Energy Policy, etc., and received over 600 citations so far. He received "Research 'SWEET SIXTEEN' 2017" from American Association of State Highway and Transportation Officials (AASHTO), as well as the University Merit Award, Larry Lawson Faculty Fellowship from Lamar University.

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