The Hong Kong Polytechnic University
Department of Logistics and Maritime Studies
Research Seminar

Handling High-dimensional Dependent Random Variables in Stochastic Vehicle Routing

by

Prof. Stein W. WALLACE
Professor of Operational Research
Department of Business and Management Science
NHH Norwegian School of Economics

Date: 5 January 2018 (Friday)
Time: 10:30am - 11:30am
Venue: M802, Li Ka Shing Tower
The Hong Kong Polytechnic University

(Conducted in English)

Abstract:

We study how to model and handle dependent stochastic travel times (speeds) in two-stage stochastic vehicle routing problems. The first stage is to pick a set of routes for a set of vehicles. The second stage is to follow these routes, taking properly care of the realized speeds. Contrary to existing literature, we allow these speeds to be stochastically dependent in time and space, that is, the speed on one link in one period will be correlated to speeds on the same link in nearby time periods, as well as speeds on neighboring links in the same time period. Hence we are handling a very high-dimensional dependent random vector. We discuss how such vehicle routing problems should be modeled in time and space, how the random vector can be represented, and how scenarios (discretizations) can meaningfully be generated to be used in a stochastic program. Our largest cases have over 25,000 dependent random variables. Our methodology is applicable also to other cases of high-dimensional dependent random variables.

Bio:

Stein W. Wallace is a Professor of Operational Research and leader of the Centre for Shipping and Logistics at NHH. He received his Dr. Scient degree in informatics from the University of Bergen in 1984. He has earlier held professorships at for example Lancaster University Management School, The Chinese University of Hong Kong and NTNU, as well as visiting positions at for example IBM Watson Research in NY, Columbia University, ENP Grenoble and The University of Washington.

Wallace has published close to 100 papers in internationally leading journals such as Operations Research, Management Science, Transportation Science, Transportation Research B and C, Mathematical Programming and INFORMS Journal on Computing. He is best known for his work in stochastic programming (in particular the two books Stochastic Programming (with Peter Kall from 1994) and Modeling with stochastic programming (with Alan King from 2012)), but also for work in logistics and energy systems. He has over 7000 citations.

He is on numerous editorial boards, in particular INFORMS Journal on Computing (since 1990). He founded the Norwegian OR Society and has held elected positions in The British OR Society as well as The Society for Transportation and Logistics in INFORMS and The Mathematical Programming Society.

Please email to winnie.wy.tang@polyu.edu.hk for enquiries.

All are welcome!