CIRRELT

Séminaire conjoint / Joint Seminar

Chaire de recherche du Canada en logistique et en transport et Chaire de recherche du Canada en distributique / Canada Research Chair in Logistics and Transportation and Canada Research Chair in Distribution Management

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MODELS FOR TECHNOLOGY CHOICE IN A TRANSIT CORRIDOR

Abstract: This talk presents three extensions to a base optimization model for a transit line which can be used to strategically evaluate technology choices such as bus rapid transit, light rail transit, metro, or commuter rail. In the base model the optimized variable is the frequency, the objective function is the minimization of the sum of passenger and operator costs, and the demand is assumed to be fixed in a single period. This model can be solved analytically. We first extend the base model to account for optimal stop spacing. We then introduce optimal train length and a crowding penalty. Finally, we consider a two-period case and a multi-period generalization. The proposed extensions can be solved by simple approximation schemes which provide some analytical insights into the structure of optimal solutions. Their significance is illustrated by means of an example in which two road modes and two rail modes are defined by a set of techno-economical parameters. These parameters loaded in the base model yield dominance of road modes for all but the largest demand levels. We consistently keep this set of parameters for all models, and show how the break-even points between road and rail modes progressively recede toward lower demand levels when model refinements -- not parameter changes -- are applied.

Note: Luigi Moccia is a researcher at the Institute of High Performance Computing and Networking of the National Research Council (ICAR-CNR), Italy. His research interests are in decision support systems for multimodal logistics, urban transportation, and green logistics. He received his MSc degree summa cum laude in Management Engineering at the University of Calabria (1997), as well as his PhD in Operations Research (2004). Between 2002 and 2004 he was a visiting PhD student at the Centre de Recherche sur les Transports (CRT) in Montréal. In 2005 his PhD thesis won the Transportation Science and Logistics Dissertation Prize awarded by INFORMS.

LUNDI / MONDAY

29 août 2016 / August 29th, 2016
10h30

Salle / Room 5441
Pavillon André-Aisenstadt
Université de Montréal

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