Séminaire du CIRRELT Seminar

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Social Optimum in the Basic Bathtub Model

Coauthored with Richard Arnott

Abstract: The basic bathtub model extends Vickrey's bottleneck model to admit hypercongestion (traffic jam situations). A fixed number of identical commuters travel a fixed distance over a dense network of identical city streets between home and work in the early morning rush hour under dynamic macroscopic fundamental diagram congestion. This paper investigates social optima in the basic bathtub model and contrasts them with the corresponding competitive equilibria. The model gives rise to delay-differential equations, which considerably complicate analysis of the solution properties and design of computational solution algorithms. This paper considers the cases of smooth and strictly concave travel utility functions and of α–β–γ tastes. For each it develops a customized solution algorithm, which it applies to several examples, and for α–β–γ tastes, it derives analytical properties as well. Departures may occur continuously, in departure masses, or a mix of the two. Additionally, hypercongestion may occur in the social optimum. This paper explores how these qualitative solution properties are related to tastes. The last part of the presentation (5-10 minutes) will be devoted to an overview of recent applied research.

Link to the discussion paper version :
https://lem.univ-lille.fr/fileadmin/user_upload/laboratoires/lem/Doc_de_travail_2022/DT2022-05.pdf

Bio: Moez Kilani is a professor of economics at the University of Littoral Opal Coast in Dunkerque (Dunkirk, France) and member of the mixed research unit Lille Economics Management (CNRS, UMR 9221). He has held positions at University of Lille (France) and University of Sousse (Tunisia). The focus of his research is urban transportation and logistics. Recently, he conducted research projects on transport simulation in the North of France, including the modeling of the pandemic. He is visiting Francesco Ciari at Polytechnique Montreal.

Lien Webex : https://polymtl.webex.com/meet/francesco.ciari

Vendredi / Friday

6 mai 2022, 10h30
May 6th, 2022, 10:30

Salle / Room 5441
Pavillon André-Aisenstadt
Université de Montréal
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Francesco Ciari