SAID BUSINESS SCHOOL, University of Oxford

SEMINAR SERIES / Michaelmas 2012

Sandwiches and drinks will be provided

Please note: although the seminar programme detailed was correct at time of printing, seminar arrangements are subject to change – for the latest information, please check the seminar webpage.

'Exploring road networks with greedy navigators and their core-periphery structures'

Dr SangHoon Lee
OCIAM, Mathematical Institute, University of Oxford

Tuesday 13th November 2012, 12.30 -14.00
Andrew Cormack Seminar Room, Saïd Business School

ABSTRACT:

During the last decade of network research focusing on structural and dynamical properties of networks, the role of network users has been more or less underestimated from the bird's-eye view of global perspective. In this era of global positioning system equipped smartphones, however, a user's ability to access local geometric information and find efficient pathways on networks plays a crucial role, rather than the globally optimal pathways. In this talk, I will present a simple greedy spatial navigation strategy as a probe to explore spatial networks. These greedy navigators use directional information in every move they take, without being trapped in a dead end based on their memory about previous routes. The centralities measures have to be modified to incorporate the navigators' behavior, and present the intriguing effect of navigators' greediness where removing some edges may actually enhance the routing efficiency, which is reminiscent of Braess' paradox. In addition, using samples of road structures in large cities around the world, it is shown that the navigability measure we define reflects unique structural properties, which are not easy to predict from other topological characteristics. The inverse problem of optimizing network structures and their geometric layouts for better greedy navigability will also be discussed. Last but not least, I will present other properties of the road networks in regard to the core-periphery structures defined on the ground of topological/geometrical connections and backup pathways in terms of transportation.

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