NED UNIVERSITY JOURNAL OF RESEARCH

MODELLING DAILY TOURS SCHEDULING DIMENSIONS USING STOCHASTIC DYNAMIC USER EQUILIBRIUM APPROACH

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Volume: **VIII**

No: **1**

Pages: **35-50**

Date: **June 2011**

Abstract:
The relationship between travel growth, increased congestion and effectiveness of traffic management measures can be better understood by examining how people actually change their travel patterns in order to cope with congestion and policies that are implemented to increase transport efficiency. This requires a model that utilises a mechanism based on trade-offs between benefits gained through participation in an activity and the disutility of travel on the road network in a manner that integrates entire day activity-travel pattern of an individual. This paper presents a model that deals with the scheduling dimensions of daily tours such as activity departure times, durations, sequence and route choice along with the consideration of time-varied network congestion. The model is formulated as a fixed point problem under stochastic setting that brings the system in stochastic dynamic user equilibrium (SDUE). Moreover, the model considers multiple user classes in such a manner that each user class performs a different tour in a day. Utility of an activity participation considered in the model is based on two major components i.e. time-of-day preference of an individual and activity satiation effect. This has been suggested empirically and analytically in previous researches for perfect integration of consecutive activities in a tour. The disutility of travel is primarily based on travel time, which is obtained using a macroscopic dynamic traffic loading model. Results of numerical experiments are also presented that describe the model functionality, convergence pattern and its application in different scenarios. Some meaningful observations are drawn from these experiments and are discussed with the identification of avenues for future research.

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