



## **A Model for Integrating Home-Work Tour Scheduling with Time-Varying Network Congestion and Marginal Utility Profiles for Home and Work Activities**

Author(s): **Muhammad Adnan David Watling, Tony Fowkes**  
(Reproduced with the permission of Transportation Research Board)

Volume: **VI** No: **2**

Pages: **123-136**

Date: **December 2009**

**Abstract:** The existing literature in the activity-based modelling has emphasised the fact that individuals schedule their activities keeping the whole-day activity pattern in their mind. Several attempts have been made to integrate this with the network congestion; however, for explicit explanation of travel behaviour of individuals further improvements are required. In this paper, a combined model is proposed that deals with the scheduling of the home-work tour with time-varied network congestion in a fixed point problem framework. Marginal utility profiles that represent individual time-of-day preferences and satiation effect of the activities are incorporated for the measurement of the utility of activity engagement along with the disutility of travel. It has been noticed that consideration of only time-of-day dependent marginal utility profiles of activities in the utility function does not appropriately integrate the activities and travel within the tour. The proof of this has been shown analytically and numerically. This finding contradicts with the earlier researches that have been done to integrate morning-evening commutes together with the network congestion. Additionally, the results of two numerical experiments are presented in the paper. In the first experiment, an arbitrary dynamic tolling strategy is assumed and then a detailed analysis is performed to show the variation in the balance of trade-offs involved in the process. The second experiment is conducted to assess the sensitivity of the combined model through incorporation of different dynamic traffic loading models. Some meaningful observations are drawn from these experiments and are discussed with the identification of avenues for future research.

**For full paper, contact:**

**Prof Muhammad Masood Rafi**

Editor, NED University Journal of Research

Ph: +92(0 )21 992611261-8 Ext. 24 13

Fax: +92 (0 )21 99261255

Email: [NED-Journal@neduet.edu.pk](mailto:NED-Journal@neduet.edu.pk)

Website: <http://www.neduet.edu.pk/NED-Journal>