current practice of charging developers traffic impact fees according toexcess traffic they generate.

TRANSPORTATION NETWORKS

Dynamic traffic congestion modeling: With an application to Seoul. Kim, Kabsung, Ph.D. *University of Pennsylvania*, 1995. 221 pp. Supervisor: Tony E. Smith.

Order Number DA9532219

Equilibrium queuing patterns are analyzed in the context of a network which has three bottlenecks with two origins and a single destination. The individual in the model chooses his/her departure time as well as route, considering the tradeoff between travel time and schedule delay. At equilibrium, no one can alter his/her departure time and route in the sense of the Wardrop principle. Four different configurations are analyzed associated with the capacities of the upstream and the downstream bottlenecks and the queuing start times at both bottlenecks. Queuing periods at three bottlenecks are determined in the model. It is found that a queue does not occur at the upstream since the departure rate is always equal to its capacity level at equilibrium. The route choice is determined by the relationships among the capacities of the downstream and the alternate route, the number of individuals from both origins, the fixed travel time of three links, and the parameter values. The sensitivities of the exogenous variables are also analyzed.Traffic congestion in Seoul is analyzed by the simulator, CONTRAM. Queuing time accounts for over half of the total journey time in the network. Five transportation policy scenarios are proposed and evaluated. Transportation system management (TSM) actions such as reversible lanes and zonal restrictions are very effective in easing traffic congestion in the short run. The author recommends that network capacity be expanded on the congested roads and the subway in the long run. Flexible work scheduling can also be effective in easing traffic congestion.

Estimating dynamic origin-destination demands from link and probe counts. Hellinga, Bruce Robert, Ph.D. *Queen's University at Kingston (Canada)*, 1994. 306 pp. ISBN: 0-315-95625-9.
Order Number DA95625

This dissertation presents the development, application, and evaluation of two models capable of inferring temporal origin-destination (O-D) traffic demands on the basis of observed link traffic flows and assumptions regarding drivers' route choices. The dissertation presents a Least Squared Error (LSE) and a Least Relative Error (LRE) model, each of which is capable of estimating either static demands, a time series of static demands, or dynamic demands. The potential of using probe data from route guidance system (RGS) equipped vehicles, to enhance these estimated dynamic O-D demands is examined. The proposed iterative solution algorithms have been incorporated into a computer model called QscUEENSOD. This model can be applied to real networks using current computer memory constraints. The LSE and LRE models were applied to a 35 km section of multilane urban freeway in Toronto, Canada, in which alternate parallel routes exist. Dynamic 15-minute O-D demands were estimated for the eastbound direction for the period from 5 am to 11 am. Despite FTMS detector data being available for only 45% of the network, a correlation coefficient of approximately 98% wasobtained for both models. The statistical analysis of the expected quality of O-D demands, which are estimated solely on the basis of RGS probe vehicle data, indicated that even for levels of market penetration of 30%–50%, the O-D estimates are unlikely to be of sufficient quality to be of practical benefit.

Intermodal commuter network planning. Boile, Maria P., Ph.D. *New Jersey Institute of Technology*, 1995. 178 pp. Adviser: Lazar N. Spasovic.

Order Number DA9605741

The dissertation focuses on models that can estimate traffic volumes and travel costs on intermodal networks. The particular approach used in the models is demand and supply equilibrium where transportation flows are impacted by the performance of the transportation facilities. Several optimization models are formulated, and their equilibrium conditions are derived and stated clearly. A rigorous analysis of the mathematical properties of the models proves that these conditions are satisfied from the model solutions. The objective of these models is to alleviate some of the deficiencies encountered in the urban transportation planning process. A methodological framework is proposed which utilizes the models to analyze and evaluate operating and pricing policies in intermodal networks. To link theory and practice, the models are applied, within the proposed framework, to the analysis of a real-world intermodal commuter network. Policies aimed at improving the service quality of the intermodal network are evaluated based on their benefits compared to existing conditions. The models are also used to design an optimal rail transit service by computing rail fares and headways to meet future demands.

A large-scale route choice model with realistic link delay functions for generating highway travel times. Berka, Stanislaw, Ph.D. *University of Illinois at Chicago*, 1994. 189 pp.

Order Number DA9516661

This study describes the application of a static, asymmetric user-optimal route choice model to generate travel time estimates in a real-world transportation network for use within a route guidance system. The test area of 300 square miles is located in the suburbs of Chicago. The travel time