

An Analytical Framework for Local Impacts of Road Pricing Policy: A Case Study of the Tokyo Metropolitan Area

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Abstract

The Tokyo metropolitan government conducted a study to develop a road pricing policy in preparation for the 2020 Tokyo Olympics. Three plans were subsequently announced on the web site. For each plan, benefits were estimated in terms of comprehensive global assessments, that is, total transit time and cost. In this study, we estimated the local impacts of the proposed plans. These were analyzed using a Geographic Information System (GIS). Specifically, we set up road pricing facilities according to the plans along a digital road network and computed the traffic flow that would be affected by the facilities. Applying a GIS, we analyzed the resultant economic and social impacts in the units of local governments. In our numerical experiments, we assumed that there were several possible routes between origins and destinations. From a practical perspective, we determined the locations of the facilities so as to maximize the total captured traveler kilometers and the number of origin–destination pairs, in addition to standard traffic flows. Based on the configuration of the facilities, we assessed the impact of accounting facilities on the total traffic pattern. Consequently, we proposed a framework for analyzing the locations of the facilities using a GIS.

Keywords

A road pricing, network location-allocation problem, economic and social impact, traffic flow, Geographical Information System

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Biography

Yoichi Shimakawa is a Professor and Director of the Department of Computer Science and Technology, Salesian Polytechnic Japan. He received his B.S. and M.Sc. degrees from Chuo University in 1990 and 1996. In 1998, he joined the staff as a research assistant on the research project “Integrated Geographic Information Systems” at Chuo University. He received his D.E. degree from Chuo University. He received paper awards from the Operations Research Society of Japan (ORSJ) in 2002. He is a member of ORSJ and the Geographic Information Systems Association of Japan.

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