

A study on a routing problem focusing on freight transportations

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Abstract

We propose a routing model suited for freight transportation by mid- and large-size trucks. A digital road network data that includes non-arterial roads is used. Passenger vehicles and lightweight trucks often run on non-arterial roads, because in many cases their destinations are residential districts. Moreover, mid- and large-size trucks frequently work for deliveries from a factory to distribution stations. These stations are often located beside an arterial road. The latter type of transportation would cause air pollution, because trucks often idle on a street to wait for their scheduled time. To address this issue, we first reveal features of routing policy of mid- and large-size trucks. Then, we solve a routing problem in which a penalty for left- and right-turns is taken into account. The penalty has the same characteristics as that of the route selection of mid- and large-size trucks. Further, we implement a procedure for solving the constructed problem to work on a geographical information system. A simulation is conducted using a network data of both arterial and non-arterial roads in Tokyo, Japan. Numerical results demonstrate the effectiveness of the proposed approach.

Keywords

Multi-objective optimization, Routing Problem, Transportation, Geographical Information System

Biographies

Tatsuya Komiya is currently a student of the advanced course in Production Systems Engineering, Salesian Polytechnic Japan. His research interests include discrete mathematics, large scale numerical computation and operations research.

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