

# 琉球大学学術リポジトリ

## デマンドバスを用いた階層型協調交通システムに関する研究

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## 論 文 要 旨

### 論 文 題 目

Study on a Hierarchical Cooperative Transport System Using Demand Responsive Buses  
デマンドバスを用いた階層型協調交通システムに関する研究

This dissertation describes a hierarchical cooperative transport system using demand responsive buses to improve efficiency of public transport systems. In suburbs of local cities, many people rather use their car than a public transport system because it is inconvenient. The reason for the inconvenience can be considered as the distance from origin/destination to bus stop, reliability for punctuality, and a fewer number of available buses. To deal with the issues, we focused on a demand responsive bus system. The demand responsive bus system can provide flexible routes and schedules to meet customers' requests (origin, destination, and time). However, computational time of planning their routes and schedules extremely increases with the number of requests increases. The problem called dial-a-ride problem is known to be an NP-hard problem.

We have proposed the hierarchical cooperative transport system that can solve within the shorter computational time than conventional methods by dividing the problem into clusters of smaller problems. The system can be composed of various transportations such as trains and buses, depending on the structure of a target city. Thus, we have introduced two types of the systems consisting of different transportation. The first system is combined with urban transport system such as monorail and/or train. The system can effectively utilize existing resources. Another system consists of terminal demand responsive buses and backbone rapid buses. It can be introduced to a provincial city where insufficient transportation is provided. We have evaluated the effectiveness of the system on both static and dynamic traffic simulations with realistic geographical data and trip data. The systems have been compared with common fixed route buses and traditional demand responsive bus system. Finally, the feasibility of the system has been discussed.

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