

복수 지역 우체부 문제 해법  
(The Multiple Rural Postman Problem Algorithms)

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A B S T R A C T

The Multiple Rural Postman Problem is to find the minimum total cost routes of  $M$  or less postmen(vehicles) to traverse the required arcs(streets) at least once, and return to their starting depot on a directed network.

The purpose of this paper is to present a mathematical model and to find an exact and heuristic algorithms in the Multiple Rural Postman Problem.

First, a mathematical model is formulated as a minimizing cost flow model with illegal subtour elimination as constraints, and with the fixed cost and routing cost as an objective function. The number of postmen is allowed to vary within an given upper bound.

Second, an efficient branch and bound algorithm is developed to obtain an exact solution. A subproblem in this method is a minimizing cost flow problem relaxing illegal subtour elimination as constraints.

The branching strategy is a variable dichotomy method according to the entering nonrequired arcs which are candidates to enter into an illegal subtour.

Third, the Double Shortest Arborescence Merging Method is developed to obtain a heuristic solution. The Double Shortest Arborescence is a tree which is made of shortest path trees and have a information about a shortest path through arc and node.

Computational results based on randomly generated networks reports that the Double Shortest Arborescence Merging Method is an efficient heuristic algorithm.