

ATM 교환기의 위치 선정 문제에 관한 연구*

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Algorithm for the ATM Switching Node Location Problem*

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■ Abstract ■

We consider the development of an integer programming model and algorithm for the ATM switching node location problem. There are two kinds of facilities, hub facilities and remote facilities, with different capacities and installation costs. Each customer needs to be connected to one or more hub facilities via remote facilities, where the hub(remote) facilities need to be installed at the same candidate installation site of hub(remote) facility. We are given a set of customers with each demand requirements, a set of candidate installation sites of facilities, and connection costs between facilities. We need to determine the locations to place facilities, the number of facilities for each selected location, the set of customers who are connected to each installed hub facilities via installed remote facilities with minimum costs, while satisfying demand requirements of each customer.

We formulate this problem as a general integer programming problem and solve it to optimality. In this paper, we develop a branch-and-cut algorithm with path variables. In the algorithm, we consider the integer knapsack polytope and derive valid inequalities.

Computational experiments show that the algorithm works well in the real world situation. The results of this research can be used to develop optimization algorithms to solve capacitated facility location problems.

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