

Development of Algorithms for Solving and Analyzing Special Problems Transports Type

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Abstract : The article presents the results of an algorithmic study of a special optimization problem of the transport type (traveling salesman problem): 1) To solve the problem, a new natural algorithm has been developed based on the decomposition of the initial data into convex hulls, which has a number of advantages; it is applicable for a fairly large dimension, does not require a large amount of memory, and has fairly good performance. The relevance of the algorithm lies in the fact that, in practice, programs for problems with the number of traversal points of no more than twenty are widely used. For large-scale problems, the availability of algorithms and programs of this kind is difficult. The proposed algorithm is natural because the optimal solution found by the exact algorithm is not always feasible due to the presence of many other factors that may require some additional restrictions. 2) Another inverse problem solved here is to describe a class of traveling salesman problems that have a predetermined optimal solution. The constructed algorithm 2 allows us to characterize the structure of traveling salesman problems, as well as construct test problems to evaluate the effectiveness of algorithms and other purposes. 3) The appendix presents a software implementation of Algorithm 1 (in MATLAB), which can be used to solve practical problems, as well as in the educational process on operations research and optimization methods.

Keywords : traveling salesman problem, solution construction algorithm, convex hulls, optimality verification

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