

СИСТЕМНИЙ АНАЛІЗ

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DEVELOPMENT OF AN ALGORITHM FOR SOLVING AN ASYMMETRIC ROUTING PROBLEM BASED ON THE ANT COLONY METHOD

Abstract. One of the major problems of transport logistics is planning optimal delivery routes. Solving this problem leads to combinatorial optimizations that require complex computations. The present research considers an asymmetric problem of transport routing with a limitation of the carrying capacity of transport facilities, the duration of the route and a heterogeneous transport facilities fleet. An algorithm for solving the routing problem based on the ant colony method is proposed. The web application that has been developed implements the proposed algorithm for solving this problem. The obtained optimal routes were compared with the results of route building by other cartographic services. The proposed algorithm showed the best result.

Keywords: optimization, asymmetric routing problems, graph route search, web applications, ant colony method.

INTRODUCTION

Transport logistics, both for individual enterprises and for the country as a whole, plays an important part in the modern world. For enterprises or organizations engaged in the delivery or transportation of goods or cargo the correct organization of transportation processes affects not only the reduction of their shipment costs, but also an increase in the flow of customers due to the timely provided services. Therefore, optimization of transport logistics processes is and remains an urgent issue. One of the main transport logistics problems is the planning of optimal delivery routes. Its resolving leads to the need of investigating such a current in the field of combinatorial optimization as the Vehicle Routing Problem (VRP). VRP tasks, as a rule, are aimed at minimizing the distance, cost or time associated with transportation by means of finding the optimal order of customer visits for transportation facilities (TF). Due to the practical significance and at the same time significant complexity of these tasks, they attract special attention of researchers.

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