*Computer Science, Computer Engineering, Management and Innovation*

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**IMPLEMENTATION OF GENETIC ALGORITHM**

**FOR OPTIMIZING DISTRIBUTION**

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***Abstract*.***The implementation of the genetic algorithm used to solve the problem of optimization of the distribution process of producing holdings is proposed. For this, a criterion for the effectiveness of the developed genetic algorithm is introduced. In this capacity, the speed of finding the optimum in the task is used. A criterion for the effectiveness of the developed genetic algorithm is introduced. In this capacity, the ability of the genetic algorithm to find the global optimum in the task at hand is used. The process of applying the genetic algorithm to optimize the distribution process of a large manufacturing holding is considered.*

***Keywords :*** *heuristic algorithms****,*** *genetic algorithm,* *NP-complex problems, genetic operators, program code, fitness-function.*

**Introduction***.*

Large manufacturing holdings produce a wide range of small-tonnage products, characterized by packaging of different weight, which can be determined both by the technological process and by consumer orders. These include enterprises in the chemical industry, pharmaceutical industry, food industry, wholesale and retail trade enterprises, trucking companies, mail delivery, etc. All these enterprises, independently or with the involvement of third-party organizations, deliver their products to consumers. The peculiarity of the transportation of such goods is that, for example, special transport is required for the transportation of chemicals or radioactive substances, and for some goods (food products or pharmaceuticals), a special temperature regime is a critical factor. The transportation of goods, taking into account all the rules and regulations, is carried out by an independent branch of production - the transport industry. Efficient distribution of vehicles, taking into account their carrying capacity along the routes of movement, allows you to achieve the most complete provision of cargo flows. In addition, the rational use of the productivity of vehicles keeps the company from increasing the fleet and the cost of its maintenance [1].

Freight traffic planning touches upon another important aspect - vehicle routing [2]. The increased attention to the tasks of this area is explained by the fact that, according to various estimates, from 30% to 50% of all logistics costs are associated with transport costs. Considering all of the above, it can be argued that the work that allows you to accurately calculate the volume of cargo transportation, calculate the number of transport units required to ensure cargo flows, determine rational routes of movement, and also reduce the total costs of transportation are gaining special relevance. The problem posed belongs to the class of vehicle routing problems for cargo transportation - VRP (Vehicle Routing Problem) [3]. This problem belongs to the class of NP-hard problems, the complexity of the solution of which grows exponentially with the growth of the number and range of values ​​of dynamically changing variables. Therefore, to solve this class of problems, it is advisable to use heuristic methods [4]. Today genetic algorithms are one of the most popular and promising heuristic algorithms.

A genetic algorithm (GA) is a heuristic search algorithm used to solve optimization and modeling problems by random selection, combination and variation of the values of the initial parameters using genetic operators (mechanisms) borrowed semantically from the laws of biological evolution: inheritance, mutation, selection, and crossing [5].