Development of subsystems for solving optimization problems with the help of genetic algorithms.

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Abstract - article describes a linguistic support subsystem for solving optimization problems using genetic algorithms. It is described an algorithm for work of subsystem, and was made research and testing of developed system.

Keywords - genetic algorithms, optimization problems, target function, subsystem, polish notation.

INTRODUCTION

Today, the problems of searching of optimal solutions undoubtedly increase their urgency and significance. The need for decision making of different importance grows, rises responsibility for the solutions accepted, and their consequences become more significant. Thus, appears the need for the methods, the tools and, first of all, the computer subsystems, which make possible for man to find the most acceptable solutions among variety of alternatives.

LINGUISTIC SUPPORT SUBSYSTEM

For descriptions of target function and limits are used numbers (a record made following certain rules of constants - names, symbols of operations and brackets). Constants and names in expression indicate operands and symbols of operations in brackets set sequence of operations, performance of which generates value of expression.

There are several ways to represent sequence of operations, set with the expression. One of them is representation of expression with its reverse polish notation [1]. Such representation of expression was used in given subsystem.

CONSTRUCTION OF MAJOR ALGORITHMS OF SUBSYSTEM’S WORK.

Developed subsystem functions with defined in advance algorithm, which is used by almost all genetic algorithms [2]. The work of such algorithm begins with the input of input data, namely: the target function, limits, the number of populations and chromosomes etc.

The second step involves generation of values for the chromosomes. Here was used generator of random value uniform law. The next step involves the “health” evaluation of chromosomes and selection of the best results (the most optimal). Step No. 5 is allocated for operation of crossing. According to this, user can set on his own the performance of given operation in automatic mode, moreover in given block mutations can happen, probability of which is set by the subsystem user.

Fig. 1 Main menu of subsystem.

RESULTS OF RESEARCH AND TESTING OF DEVELOPED SUBSYSTEM

To check the accuracy and correctness of subsystem’s work and solving of optimization tasks it was used test examples that are given in the literary sources with solution.

Fig. 2 Bookmark “Graphics”

The results coincide with calculations and confirm the correctness and accuracy of developed algorithm and implemented subsystem. Also it was constructed and implemented linguistic support of subsystem; in particular it was used reverse polish notation to describe the parameters of the target function.

REFERENCES
