

ABSTRACT

Master's dissertation: 134 pp., 35 figs., 44 tables, 65 sources, 1 appendix.

Topicality. The problem of placing rectangles on a semi-infinite tape in the modern world has a practical application and various variations: the problem of packing rectangles, the problem of scheduling and others. Within the framework of calendar planning it is expedient to consider methods and models of the theory of schedules. Since most problems of schedule theory are classified as problems of NP complexity, it is impossible to find exact solutions in a reasonable time. In this case, only the search for local optimums is possible, using approximate algorithms.

Geometric placement problems are widely used in various fields. The task of placement is to determine the optimal position of a finite number of geometric objects in a given area, taking into account various constraints. Technological processes usually use the stage of cutting or placement of parts. This step is important because it can save resources, but it is time consuming due to the need to find the optimal solution. This stage can be described by optimization problems of geometric placement. The classical problems of the studied type include the problems of cutting and packaging, geometric placement.

Connection of work with scientific programs, plans, themes. The work was performed at the Department of Automated Information Processing and Control Systems of the National Technical University of Ukraine "Kyiv Polytechnic Institute. Igor Sikorskyy" within the theme "Effective methods for solving problems of schedule theory" (№ DR 0117U000919).

The purpose of the study is to modify and improve the algorithms for placing rectangles on a semi-infinite tape to reduce its length.

To achieve this goal must perform the following tasks:

- determine the class of tasks to which this task belongs;
- review existing methods for solving rectangle placement problems;

- develop an algorithm for solving the placement problem (greedy, local algorithms and search taboos);
- develop a software implementation of the above algorithms;
- perform an analysis of the results of the study.

The object of study is the process of placing rectangles on a semi-infinite tape.

The subject of research - models and methods of optimizing the placement of rectangles.

The scientific novelty of the obtained results will be improve existing algorithms for placing rectangles on a semi-infinite tape.

Publications. Materials of the work are published in the collections: Scientific support of technological progress of the XXI century: materials of the international scientific conference (Vol. 2) (2020, Chernivtsi), Proceedings of the International Scientific and Practical Conference (2019, Valletta), Science and Technology of the XXI Century: Proceedings of the XXI International Students R&D Online Conference (2020, Kyiv), VI All-Ukrainian scientific-practical conference of young scientists and students "Information systems and management technologies" (ISTU-2021, Kyiv); and in the professional edition - Scientific Bulletin of Uzhhorod University, series "Mathematics and Informatics".

PERMUTATION, PLACEMENT OF RECTANGLES, SCHEDULE THEORY,
COMBINATORY OPTIMIZATION, GREEDY ALGORITHM, LOCAL SEARCH,
TABU SEARCH