

## ABSTRACT

Master's thesis: 107 pages, 12 figures, 10 tables, 7 appendix, 82 references.

**Relevance.** Tasks scheduling for a team is an important process in many spheres like software development. Nowadays the iterative approach to work is gaining more and more recognition in different spheres. Scrum is one of the most used agile approaches today. The main idea of Scrum is splitting the work into iterations, where iterations are time spans of fixed length. In Scrum, these iterations are called Sprints. For each iteration, it is necessary to choose such a subset of tasks for the team that the work's result will have the biggest possible value for the product. But tasks discussion and making decisions about which tasks to include in the current iteration in accordance with the different productivity and experience of team members is a sophisticated process that takes a lot of time.

That's why the research of the optimal scheduling problem formal model of which results in difficult optimization problems is relevant. That requires development of approximate algorithms for solving the scheduling problem with performers having different productivity with the goal of maximizing the work's result value. Taking into account the terminology of scheduling problems sphere and the problem's specifics we will use the terms "performer" and "machine" as synonyms.

**Purpose and objectives of the study.** Increasing the effectiveness of tasks finishing by several unrelated performers(machines) by reducing the time spent on the planning of work.

To achieve this purpose it is needed to complete these tasks:

- perform a review of the known results for the problem that is considered;
- perform formalization of the optimal scheduling problem for the unrelated machines;
- develop approximate algorithms for solving the problem considered;
- develop a software implementation of the algorithms and models;
- perform the analysis of the results.

**The object of study is the scheduling process for the unrelated machines with different productivity.**

**The subject of study** are scheduling methods for the unrelated machines with different productivity.

**Scientific novelty of the results.** Formalization of the Sprint planning problem as a scheduling problem for machines with different productivity is performed, an approach to solving this problem based on splitting the problem into two subproblems is suggested; a greedy algorithm, local search algorithms and neighborhood generation procedure for the second subproblem are developed.

**Publications.** Materials were published in the international journal “Naukoviy ohlyad”, №3, 2018 [1, 2].

**Connection of the thesis with scientific programs, plans, topics.** The thesis was written at the branch of The Department of Department of Computer-aided management and data processing systems of the National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute” at the V. M. Glushkov Institute of Cybernetics of the National Academy of Sciences of Ukraine under the topic “To develop a mathematical apparatus focused on the creation of intelligent information technologies for solving combinatorial optimization and information security problems”(the topic’s index is BΦ.180.11).

OPTIMAL SCHEDULING, AGILE METHODOLOGIES, SCRUM, UNRELATED MACHINES, LOCAL SEARCH, SIMULATED ANNEALING, G-ALGORITHM