

ABSTRACT

Master's dissertation consists of 107 pages., 26 images., 5 tables., 4 appendixes, 117 referring sources.

Actuality. The success of production and its profitability directly depends on the process of planning work on it. A key component of the planning process is the development of an effective plan for the implementation of job activities. To create such plans, different methods are used. Among them are methods of the theory of schedules.

Majority of scheduling problem belong to the class of NP-complete problems. The problem is that known methods do not always result in solutions with close to the optimal job schedules for an acceptable amount of time.

Along with other NP-complete scheduling problem, the scheduling problem jobs with precedence relation on parallel machines to minimize the makespan. According to this statement, it is important to develop algorithms for this problem, which will ensure the high quality of the results obtained and will not require significant computing resources.

Purpose of the study – to increase scheduling effectiveness by constructing an optimal or near-optimal job schedule with precedence relation on parallel machines to minimize the makespan.

To achieve the goal, it is required to accomplish the following **tasks**:

- provide an overview of the already known solutions for the problem set within the work objective;
- develop initial schedule algorithms and to conduct experimental studies of their effectiveness;
- formulate sufficient optimal conditions for the target problem;
- develop a schedule plan creational algorithm to minimize the makespan with precedence relation on parallel machines;
- develop a software for a schedule plan creational algorithm to minimize the makespan with precedence relation on parallel machines;
- provide result analyzes.

The object of research - the process of job scheduling execution.

Subject of research - methods of calendar planning of the job execution on parallel machines.

Relationship of work with scientific programs, plans, themes. The work was carried out at the Department of Computer-Aided Management And Data Processing Systems of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" within the objective of the work "Effective Methods for Solving the Problems of the Theory of Schedules" (№ ДП 0117U000919).

Scientific novelty of the obtained results

Approaches and methods of solving the defined task were developed. The use of created models based on developed sufficient conditions of optimality (SCO), can significantly improve the speed of scheduling in the enterprise.

Publications. The materials of the work are published in the collection of articles of the International scientific conference "Global Competitive Environment: Development of Modern Socio-Economic Systems", Kishinev, Republic of Moldova, April 21, 2017 [1]; in the collection of articles of the International scientific-practical conference "Informatics and Computing Technology-IOT-2018", Kyiv, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" April 23-24, 2018 [2].

PARALLEL MACHINES, SCHEDULING, CALENDAR PLANNING,
RELATION OF PRECEDENCE, MINIMIZE MAKESPAN IN TASKS SCHEDULING