# ABSTRACT

Master dissertation: 87 pp., 28 fig., 14 tab., 1 app., 37 sources.

**The relevance**. In human activity, taking optimal solution appears frequently. Determining the order of performance is important in case of the work cannot be performed in a given period, as penalties can be imposed for the delay or advance performance, and their minimization is always urgent. Despite the ease of formulation of the problem, it is classified as NP-complete. Multi-machine scheduling problem can be reduced to the solution of single-machine problems because problem solution algorithm to minimize total weighted earliness and tardiness by one machine can be used to solve other more complex schedule problems.

**Relationship with academic programs, plans, themes.** Master work performed as part of the research topic "Effective methods for solving scheduling problems" (state registration number 0117U000917).

**The purpose and objectives of the study.** The goal is to increase efficiency of solving single-machine scheduling problem for minimizing total weighted earliness and tardiness for direct due date.

To achieve the goal it is necessary to perform the following tasks:

– to review  known approaches of solving the problem of minimizing the total weighted earliness and tardiness from due date for one machine;

– to analyze known algorithms of solving the problem;

– to formalize the minimizing total weighted earliness and tardiness from due one-machine scheduling problem and study the properties and particular cases of this problem;

– to develop the algorithm of the problem or develop a modification of an existing algorithm;

– to implement developed algorithms as a software;

– to perform an analysis of the results.

**The object of the study** is the process of scheduling order of performance work.

**The subject of the study** is solving methods for minimizing total weighted earliness and tardiness for direct due date single-machine scheduling.

**Methods** used in this paper are based on the methods of combinatorial optimization, scheduling theory, statistical analysis, heuristic algorithms.

**The scientific novelty of the results** are that a heuristic algorithm for solving minimizing the total earliness and tardiness for direct due date single-machine scheduling problem is developed and examined its effectiveness.

**Publications.** Work results are published in the conference abstracts of scientific conference of students, masters «Information and computer technology IOT-2017» [1] and the V International scientific-practical conference «Modern trends in science» [2].

SCHEDULING THEORY, NP-COMPLETE, MINIMIZING THE WEIGHTED EARLINESS AND TARDINESS, DUE DATE, COMBINATORIAL OPTIMIZATION