

## ABSTRACT

Master dissertation: 110 p., 20 fig., 22 tab., 1 appendix, 84 sources.

**Relevance.** The World Tourism Organization (UNWTO) identifies the introduction of tourism innovations as one of the main functions of tourism marketing. Therefore, the use of information technology for the development of tourism is an actual task to date. Because of that, personalized Electronic Tourist Guides (PETs), which encapsulate tourist trip design problem (TTDP), have become widespread. When TTDP is solved, the mathematical model may differ in terms of what the terms of the subject area are taken into account. In this paper, the problem of Team Orienteering Problem with Time Windows (TOPTW) is the mathematical model.

As the response time for the software is an important feature, developing an effective algorithm for the task to date is an actual task. Therefore, this work is devoted to the research and improvement of the solution methods of TOPTW.

**Purpose and objectives of the study.** The purpose is to maximize the total usefulness of the built tourist routes of a given duration, taking into account the time periods of visiting tourist places. To achieve this goal it is necessary to solve the following tasks:

- to analyze known results of solving TOPTW;
- to develop a method (modification of the existing method) for solving a problem using parallel programming technologies;
- to develop algorithms for TOPTW;
- to develop software implementation of the algorithms;
- to study the effectiveness of the developed algorithms.

**The object of study** – the process of designing tourist routes.

**Purpose of the study** – team orienteering problem with time windows.

**The scientific novelty of the obtained results** is in modifying the Iterated Local Search algorithm, comparing it with the algorithm of Simulated annealing, using parallel programming technologies for modifying the Iterated Local Search algorithms and the Simulated annealing algorithm for solving TOPTW.

**Relationship of work with scientific programs, plans, themes.** The work has been carried out at the branch of the Department of Computer-Aided Management and Data Processing Systems of The National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" within the framework of the research topic of the **Glushkov Institute of Cybernetics** of National Academy of Sciences of Ukraine: "To develop a mathematical apparatus focused on the creation of intelligent information technologies for solving combinatorial optimization and information security problems" (topic code: VF.180.11).

**Publications.** The results of the work are published in [**Ошибка! Источник ссылки не найден.**, 83].

DETERMINISTIC LOCAL SEARCH, ITERATED LOCAL SEARCH, SIMULATED ANNEALING ALGORITHM, TOURIST TRIP DESIGN PROBLEM, TEAM ORIENTEERING PROBLEM WITH TIME WINDOWS, PARALLEL PROGRAMMING, METAHEURISTIC ALGORITHMS