

ABSTRACT

Master's thesis: 107 pages, 22 figures, 29 tables, 7 appendix, 77 references.

Relevance. Today, it's impossible to imagine our life without appliances that consume electricity. Compared with the 20th century, electricity consumption has grown more than 100 times. The location of power plants depends on the ability to supply energy, which is why they are usually hugged with the possibility of their unobstructed and simple supply. Because of this, power stations are often located far enough away from the main consumers of electricity, which is why part of the electricity is lost during transportation. But a much more important problem is the impossibility of economically efficient storage of produced electricity, which causes significant material losses in case of improper planning of economic load between power plants.

A lot of methods and algorithms have been developed for the establishment of a cost-effective distribution of the load between the power plants in the grid, but each of them has certain disadvantages, which allows its effective use only for a certain part of the task of economic load dispatch and dynamic load dispatch. Given this, the task is relevant today. Its feature is the nonlinearity of the functions of generating electricity, which greatly complicates the development of an efficient algorithm.

Purpose and objectives of the study is reduction of fuel consumption for electricity production due to efficient allocation of load between power plants.

To achieve the goal must perform the following **tasks**:

- to perform an overview of existing methods of solving the task;
- to formalize the task of economic load dispatch and dynamic load dispatch;
- implement algorithms for the tasks;
- develop a software implementation of a modified algorithm;
- to conduct experimental research of existing and developed algorithms;
- to perform the analysis of the results.

The object of the study is the process of distributing the load between the power plants for a closed power system. **Subject** of the study is methods of effective distribution of load between power plants.

Scientific novelty of the results. The modification of the grey wolf optimizer for solving the problems of economic load distribution and dynamic load distribution has been developed. The method of transforming received solution of the defined problem to the possible one is provided.

Publications. Publications Materials of the work are published in the article in the international scientific journal “Scientific Review” [1,2].

Relationship of work with scientific programs, plans, themes. 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 “Develop a mathematical apparatus aimed at creating of intellectual information technologies for solving combinatorial optimization and information security problems” (topic’s index is BΦ.180.11).

ECONOMIC LOAD DISPATCH, DYNAMIC LOAD DISPATCH, GREY WOLF OPTIMIZER, PARTICLE SWARM OPTIMIZATION, GENETIC ALGORITHM, SWARM INTELLIGENCE, ELECTRIC POWER INDUSTRY