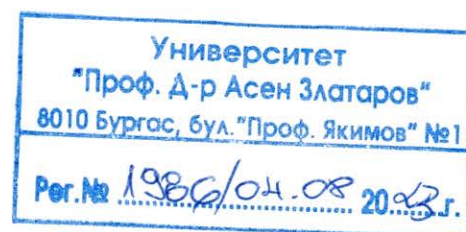


OPINION



of a dissertation to obtain an educational and scientific degree "doctor"

Author of the work: mag. Engineer Toncho Ivanov Boyukov

Topic of the thesis: "Generalized networks as a modeling tool of the railway transport in Bulgaria"

1. Relevance of the dissertation.

The work posed for opinion is in a dynamic field of study, with constantly increasing importance as the dissertation work deals with critical issues related to the reduction of carbon emissions, energy efficiency and improvement of cargo and passenger transport services, improvement of the connection between different types of transport and furthermore – implementation of models of the railway system in the Republic of Bulgaria, which on its own allows a number of simulations, optimizations, qualitative and quantitative assessments. This is the reason that makes the models and analytical tools developed in the dissertation work extremely innovative, taking into account the generalized network tools used in the work, provide in-depth analysis. Innovative approaches for generalized network description, specifically two-way generalized networks or DOM, are also presented and applied in the work, which further increases its quality.

2. General information of the dissertation

The dissertation consists of an introduction, six chapters, a conclusion, a list of research papers created during the research and a bibliography. The thesis volume is 127 pages, with 44 literary sources on the subject under consideration. The phd candidate divided the implementation of the set goals into solving four tasks as follows - creating a model of the model of the railway station of the city of Burgas, preparing a detailed generalized network model of the entire railway network of Bulgaria - Western Bulgaria, North Central Bulgaria, South Central Bulgaria Eastern Bulgaria, presentation of a model of the main railway networks in Bulgaria, provide the connections between Bulgaria and its neighboring countries and a generalized network model of the connections between different types of transportation in Bulgaria. In this form, the objectives of the work correspond to the tasks set and the obtained results, also the thesis is in compliance with the requirements.

3. Contributions of the dissertation work

The current work contributions are mainly in the field of an applied science, and the scientific contributions in the dissertation work are expressed by creating generalized network OM and two-way generalized network DOM models of the railway transport in the country, the connection between the different types of transport and the points of connection with external transport nodes, based on the proposed models further in-depth scientific analysis can be carried out. The definition of DOM provides an opportunity to simplify the created models and improve their analytical capabilities.

4. Evaluation of the publication activity of the author

To present result obtained during the study on the dissertation, the author has published four scientific papers, which are co-authored as M.Sc. Engineer Boyukov is the first author in all works. Scientific works are presented in publications with a high scientific rating. The number and quality of the author's published works significantly exceed the minimum requirements.

5. Critical marks and recommendations

In the third chapter, a definition of DOM models is presented, but in the chapter itself, the models of subnets G1, G2 and G3 are described with OM models.

In terms of editing, there is a misspelling of a list of abbreviations, some syntax errors.

As a recommendation to the author, I would like to propose a simulation of the models made using the GN IDE product, adding a rate of depreciation and probability of failure to the presented models.

The aforementioned critical notes do not affect the quality of the results obtained in the development.

6. Conclusion and general evaluation of the dissertation work

The scientific work written by mag. Engineer Boyukov a high scientific research value, and the problems under consideration are of high relevance. The structure and scope of the work meets the requirements of the Law on the Development of the Scientific Staff of the Republic of Bulgaria (ZRASB) to award the educational and scientific degree of doctor, and on this basis I would like to state a **POSITIVE ASSESSMENT** of the dissertation with the following topic "Generalized networks as a tool for modeling railway transport in Bulgaria" and I PROPOSE the scientific jury to award the author the M.Sc. Eng. Toncho Ivanov Boyukov educational and scientific degree "**Doctor**" in a field with cipher 5.3 Communication and computer technology"

Date 03.08.2023 г.

Подпис заличен
Чл.2 от ЗЗЛД

opinion:..
(assoc. prof. Todor Kostadinov phd)