OPINION

under procedure for the defense of a thesis for awarding the educational and scientific degree "PhD" in the scientific specialty "Computer systems and technologies", Higher education field "5. Technical sciences", Professional area "5.3. Communication and computer technology"

of Assistant Professor Toncho Ivanov Boyukov

According to the Order of the Rector of the University "Prof. Dr. Asen Zlatarov", Burgas, No. UD - 168 / 11.07.2023, I have been appointed as a member of the scientific jury in the procedure for the defense of a thesis for awarding the educational and scientific degree "PhD" in the scientific specialty "Computer Systems" and technologies", Higher education field "5. Technical sciences", Professional area "5.3. communication and computer technology" of Assistant Toncho Ivanov Boyukov. I have received all the documents of the dissertation.

Brief biographical data for the candidate

Toncho Boyukov received a master's degree in "Transport, shipping and aviation - sp. Engineering and Technologies in Transport" from "Prof. Asen Zlatarov" University, Burgas in 2016. From 2002 until now he has been working as a service engineer at AUTOTECH-G, Burgas, and since 2020 he has been an Assistant Professor at University "Prof. Asen Zlatarov".

Dissertation on "Generalized nets as a tool for modeling railway transport in Bulgaria"

The candidate has set himself the goal of applying the theory of generalized nets for modeling and monitoring the processes and management of railway transport in Bulgaria and ultimately to propose a model of the railway network in our country. This will allow the simulation of multiple situations encountered in real time and related to the management and coordination of the movement of railway trains, as well as the decision-making processes regarding the order and sequence of movement within the railway system. Modern rail transport is essential to reduce pollutant emissions. It has the ability to achieve high energy efficiency - an extremely important problem in any type of transport. Along with this, the management and control of its implementation and safety are becoming incredibly complicated, and the modeling for the purpose of research and optimization of the railway systems, which is the main goal of the dissertation work, is of indisputable relevance.

The contributions of the PhD student are as follows:

1. Definitions of four new extensions of the "Bidirectional Generalized Net" are proposed for the first time, each of these extensions is proved to be a conservative extension of the standard general network, and four variants are presented that demonstrate the algorithms for the operation of the network.

2. Two theorems are formulated which show that the operation and results of the operation of any bidirectional generalized net can be represented by the standard generalized nets.

3. With the help of the bidirectional generalized net method, a model of the Burgas railway station was developed.

4. The following are proposed: a complete generalized network model of the entire railway network of Bulgaria; model of relations between Bulgaria and its neighboring countries; model showing the connections between different types of transport in Bulgaria.

I value the contributions as scientific-applied and applied. The conclusions and plans for future research made at the end of the dissertation are an adequate and natural continuation of the results obtained in the dissertation work.

Dissertation Related Publications

The PhD student has presented 4 publications related to the dissertation work - 1 in the yearbook of the Jangjeon Mathematical Society, published in South Korea, 1 in a Proceedings of an international conference in Poland and 2 in the yearbook of the INFORMATICS section of the Union of Scientists in Bulgaria, one of which is in print. In my opinion, they are sufficiently representative and the results of the work have been made available to the scientific community.

Critical notes and recommendations

I have recommendations regarding the candidate's intentions for future research:

- to bring his research and results to program implementation;

- to take into account and comply with EU directives and regulations related to the development and management of railway transport.

Conclusion

The above mentioned gives me the reason to give a positive assessment of the dissertation work and to recommend to the respected members of the Scientific Jury to vote for awarding Assistant Professor Toncho Ivanov Boyukov the educational and scientific degree "PhD" in the scientific specialty "Computer Systems and Technologies", Higher education field "5. Technical sciences", Professional area "5.3. communication and computer technology".

Подпис заличен
Чл.2 от ЗЗЛД

28. 07. 2023

Sofia

Signature: .....

(Corresponding member of BAS, Prof. Stefan Hadjitodorov,
Section "Bioinformatics and Mathematical Modeling", IBFBMI - BAS)