

OPINION

by Assoc. Prof. Irina A. Radeva, PhD
Institute of Information and Communication Technologies - BAS
for a dissertation thesis for awarding the educational and scientific degree "Doctor"
in professional direction 4.6 "Informatics and Computer Science"
doctoral program " Informatics "

Titled "METHODS, ALGORITHMS AND SOFTWARE SYSTEMS FOR DECISION SUPPORT"
by Boris Atanasov Staykov

By order No. 112/09.06.2020 of the Prof. G. Angelova, DSc - Director of IICT - BAS in accordance with Art. 4, para. 2 of the Act of Development of the Academic Personnel of the Republic of Bulgaria (ADAPRB) and with a decision of the Academic Council of IICT (rec. of proceedings No. 5/03.06.2020 r.) for awarding of educational and scientific degree "doctor" in professional direction 4.6 "Informatics and Computer Science", doctoral program "Informatics" by Boris Atanasov Staykov with dissertation thesis "Models and Methods for Optimizing and Management Portfolio using Time Series" I have been appointed a member of the Scientific Jury.

As a member of the Scientific Jury I received:

1. Order No. 112/09.06.2020 of the Prof. G. Angelova, DSc - Director of IICT - BAS in accordance with Art. 4, para. 2 of the Act of Development of the Academic Personnel of the Republic of Bulgaria (ADAPRB) and with a decision of the Academic Council of IICT (rec. of proceedings No. 5/03.06.2020 r.)
2. Dissertation thesis for awarding the educational and scientific degree "Doctor".
3. Abstracts and in Bulgarian and English.
4. Copies of the publications on dissertation thesis.
5. Information for meeting minimum requirements of IICT - BAS.

When evaluating the dissertation, the terms of ADAPRB, RAADAPRB (Decree No. 26 of 13 February 2019) and the Rules for specific requirements of IICT for the application of the law are decisive.

1. According to Art. 27 (1) of ADAPRB "the dissertation work shall contain scientific or applied research results that represent an original contribution to science. The dissertation shall show that the candidate has profound theoretical knowledge in the respective subject, as well as their abilities of independent scientific research."
2. According to Art. 27 (2) of ADAPRB the dissertation work should be presented in a form and volume corresponding to the specific requirements of the primary unit. The dissertation work should contain: title page; contents; introduction; presentation; conclusion - summary of the obtained results, accompanied by declaration of originality; bibliography.

The scientific supervisor of the dissertation thesis is Prof. Vassil Vassilev, PhD and scientific advisor Assoc. Prof. Tatyana Atanasova, PhD.

Dissertation thesis is in a volume of 174 p., 43 figures, 16 tables and includes: introduction, four chapters, conclusion, publications on the dissertation thesis, list of noticed citations, summary of results achieved, declaration of originality of results, acknowledgements and bibliography including 181 sources.

The goal of the thesis is „engineering and developing decision support systems, based on certain methods for solving different classes of multicriteria optimization problems“.

To achieve this goal, six tasks are formulated:

1. Selection of methods for solving problems for multicriteria optimization, which will be used as a basis of the developed decision support systems.
2. Algorithmic and software implementation of the selected methods, which will represent the core of the developed systems.
3. Development of syntax for defining problems for multicriteria optimization and its software implementation for the purposes of the developed systems.
4. Creation a decision support system under WINDOWS operating system.
5. Creation of web-based decision support system.
6. Development of communication modules for electronic data exchange with third party systems.

The formulated goal and tasks have scientific and scientifically applied potential for development in the field of information technologies and are a direct continuation of long-term research and development of the author and teams from IICT - BAS.

The dissertation is presented in 8 publications: 1 book chapter, 2 publications in journals with SJR, Q3, 3 publications in journals and 2 publications in conference proceedings. Two of the publications are independent. The presented publications are for the period 2006 - 2019, all in English and give grounds to assume that the research and results related to the work on the dissertation thesis are presented to the scientific community. This is also evident from the number of observed citations, which are a total of 11.

Thus, the terms of ADAPRB, RAADAPRB and the Rules for specific requirements of IICT - BAS are fulfilled.

The obtained results can be briefly systematized as:

- Developed syntax for defining linear and linear-integer problems for multicriteria optimization with a software parser for the implemented decision support system.
- Designed and developed control and calculation modules for the MKO - 2.1 system under WINDOWS operating system.
- Designed and implemented common architecture of web-based system WebOptim and modules for information exchange with external systems.
- Experimental studies of the systems.

I accept that the presented results cover the scope of the set goal and objectives. All stages of preparation, development and conducted experiments with software systems are correctly documented and describe the range of possible applications, both for learning purposes and for solving experimental and research problems. The systems presented in the

dissertation thesis have the potential for further development, although this is not mentioned as guidelines for future developments.

Questions on dissertation thesis:

1. The first set task is formulated as "selection of methods" that will be the basis of the built systems ". There are actually algorithms that are chosen. What were the selection criteria?
2. The MKO - 2.1 software system also has lower versions. Is there a difference in the algorithms implemented in the current version from the previous ones?
3. Comparative analysis of the results is made between MCO - 2.1 and the university system NIMBUS. Why was the NIMBUS system chosen? By what criteria was the comparison made and what are the comments and analysis of the results obtained and shown in Table 16 (p. 145)?

Some technical and stylistic notes can be made on the dissertation and the abstract in English. There are also no guidelines for future development. According to the author, the WebOptim software system is a "natural successor of the MKO-2.1 system" and therefore it can be assumed that its development and expansion is promising for the field of decision making.

The abstracts are in Bulgarian in the volume of 35 pages and in English in the volume of 34 pages and present the dissertation.

CONCLUSION

I accept that the **dissertation thesis meets the requirements** of ADAPRB, RAADAPRB and the specific requirements in IICT-BAS and **give a positive opinion for rewarding the educational and scientific degree "Doctor" of Boris Atanasov Staykov. I propose to the respected Scientific Jury to vote for Boris Atanasov Staykov the educational and scientific degree "Doctor" in professional direction 4.6. "Informatics and Computer Science", doctoral program "Informatics".**

25.06.2020 r.

Signature:

Assoc. Prof. Irina Radeva, PhD

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