

OPINION

from Prof. D.Sc. Ivan Garvanov
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on competition for academic position "Professor" in professional field 4.6 "Informatics and Computer Sciences", specialty 01.01.12 "Informatics", announced for the needs of IICT-BAS, Department "Modeling and optimization", published in press No 41/21.05.2019 with sole candidate Assoc. Prof. PhD Vladimir Vasilev Monov.

1. GENERAL DESCRIPTION OF THE PRESENTED MATERIALS

According to Order No. 181 / 19.07.2019 of the Director of IICT-BAS, Prof. Galya Angelova, I was appointed a member of the Scientific Jury, and at the first meeting held on 25.07.2019 I received the materials on the competition in electronic form.

The submitted documents for participation in the competition for occupation of the academic position "Professor" and the procedural actions carried out are in accordance with the Law for the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its implementation.

According to Art. 61 of the Rules for Implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria (RILDASRB), the candidates for the occupation of the academic position of "professor" shall be evaluated for the fulfillment of the conditions under Art. 60, para. 1 and 2 and in accordance with the information from the reports under Art. 60, para. 3 also from the RILDASRB. In connection with the implementation of the necessary indicators under Art. 60, para. 1 and 2, on the basis of the documents submitted by the applicant, I have determined that:

- copy of diploma No. 18198 of 10.12.1988 for the scientific degree "Candidate of Sciences", issued by the Higher Administrative Court, in pursuance of Art. 60, para. 1 from RILDASRB.
- a note issued by IICT-BAS certifying 36 years of service, 32 years and 09 months of which as a research associate III-II centuries, Assoc. II senior and associate professor, according to Art. 60, para. 2.
- 25 scientific publications in publications that have been referenced and indexed in world-renowned databases of scientific information satisfying Art. 60, para. 3.
- reference for a registered patent application pursuant to Art. 60, para. 4.

- Information on the fulfillment of the minimum requirements of the ICT, from which it is evident that they have been satisfied in accordance with Art. 60, para. 5.
- a declaration for lack of plagiarism proven in the law, in the scientific works, in accordance to the Art. 60, para. 6.

For the implementation of Art. 60(3), the applicant has submitted a reference for the fulfillment of the minimum national requirements, a reference for the requirements of art. 1a, para. 2, as well as a reference for scientific contributions.

2. QUANTITATIVE AND QUALITATIVE CHARACTERISTICS OF PUBLICATIONS AND CANDIDATES

Assoc. Prof. Vladimir Vassilev Monov participates in the competition for the academic position of "Professor" with 25 scientific papers, all in English, 6 of which are independent, publications with one co-author are 16 and with two co-authors are 3. All 25 publications are outside of those involved in the "PhD" and "associate professor" procedure.

For the formation of the points for group B, 11 scientific publications were published in publications that were referenced and indexed in world-famous databases of scientific information (Web of Science, Scopus), 2 of them were with Quartile: Q1 and Q2 and 2 were with Quartile : Q4. 4 of the publications have IF, with a total IF of 2.484. 9 of the publications have SJR, with a total SJR of 3,761. The total number of points in group B is 264 with the required 100 points.

To form the points for Group D, 19 scientific publications were published in publications that were referenced and indexed in world-renowned scientific databases (Web of Science, Scopus), as well as one collective monograph and one patent application, which are off the list of 25 publications submitted in the "Professor" competition. 4 of them are with Quartile: Q4. 4 of the publications have IF, with a total IF of 1.476. 10 of the publications have SJR, with a total SJR of 1,883. The total number of points in Group D is 362 with 260 points required.

The cited citations of the publications submitted for participation in the competition are 66, 35 of them in publications that are indexed and referenced in Scopus and / or Web of Science. The total number of points in Group D is 210 points out of the required 140 points.

For the formation of the points for Group E, proofs have been submitted for successfully defending a PhD student, participation in 4 national scientific or educational projects, participation in 5 international scientific or educational projects, as well as guidance of 2 national scientific or educational projects.

These activities are estimated at 230 points for Group E at 150 points required.

3. ASSESSMENT OF THE APPLICANT'S PERSONAL CONTRIBUTION

I am fully convinced that the submission of the candidate's review papers for the competition is, for the most part, his personal matter. The presence of more than one author in some of the scientific publications shows that Assoc. Prof. Vladimir Monov manages to work well in a team. A separate protocol is attached to the attached joint monograph.

4. EVALUATION OF THE SCIENTIFIC RESULTS AND CONTRIBUTIONS OF THE SUBMITTED TO PARTICIPATE IN THE CREATIVE PRODUCTS COMPETITION

The submitted works contain research, results and contributions in two thematic areas:

- Matrix theory and application of matrix analysis in the study of dynamic systems and processes;
- Modeling, analysis and optimization in information and communication systems.

Scientific contributions to the submitted publications relate to:

A criterion is obtained characterizing the spectral set of a convex set of square matrices.

Criteria for the reducibility of a single matrix are obtained, which is summarized also for the case of simultaneous reducibility of a pair of matrices. An approach is proposed for the construction of reduction spaces using the theoretical apparatus of polylinear algebra and in particular exterior algebra, Grassmann spaces and their vector representatives. The result obtained is applicable to the reducibility problems of matrices and linear operators in various fields, and especially in the theory of linear control systems.

Generalized Newtonian inequalities, including the elementary symmetric functions of complex variables, are proved.

Properties of the derivatives of the characteristic polynomial of nonnegative matrices have been established, representing new results in the spectral theory of this class of matrices. Many inequalities have been proved, connecting the functions of the eigenvalues and the diagonal elements of nonnegative matrices.

The relationships between the eigenvalues and the diagonal elements of square matrices with complex elements are proved.

Formal-mathematical apparatus for description and study of bi-linear matrix products has been developed. Algebraic and vector-matrix properties, spectral properties and properties of the matrix trace and the determinants of the two products are derived and proved.

A conjecture related to nonnegative matrices is justified and formulated, the proof of which would lead to the solution of a difficult problem in the field of the so-called inverse eigenvalue problems.

The problem of resource management related to the preliminary assessment of the efficiency of the process of implementation and operation of complex information systems is explored.

Methods for optimizing the topology and energy efficiency of wireless sensor networks have been developed.

The scientific contributions to the submitted publications relate to:

Systematization of models, methods and systems for control of technological grinding process in industrial ball mills is made.

A concept for developing, designing and manufacturing a prototype of a combined tactile / voice interface is proposed, facilitating and allowing visually impaired people to work with computers, regardless of the standard user interface or operating system.

Innovative nanotechnology has been developed for the renovation and replacement of the working surface of shafts used in the industrial production for the extrusion of sheet non-metallic materials (Plexiglass, PVC, packaging film, etc.).

A mechatronic rehabilitation system with intelligent functions and capabilities for both passive and active rehabilitation has been developed.

Six algorithms for optimization of production schedules in industrial enterprises have been developed.

Models of information traffic in a crossbar packet switch used in communication systems for the implementation of conflict-free execution of traffic from requests in the system have been developed.

Two types of algorithms for synthesis of conflict-free schedules in a matrix packet switch have been developed and investigated: an adaptive algorithm for determining the weight coefficients of incoming requests and an algorithm for sequentially executing the requests in the diagonal submatrices of the link matrix.

A concept and model of a software platform with a service oriented architecture for integrating heterogeneous data from intelligent sensor systems has been developed.

A prototype wireless sensor module with intelligent functions has been developed, including sensors for measuring temperature, humidity and barometric pressure, as well as a built-in module for GPS coordination. An adaptive algorithm for optimizing energy consumption is also proposed in order to increase the battery life of the module. A patent application has been registered as a result of the development.

I would appreciate the applicant's development as a contribution to the application of scientific achievements in practice.

5. CRITICAL NOTES AND RECOMMENDATIONS

I would like to recommend to PhD Vladimir Vasilev Monov, in the future, to work more with students and PhD students in order to pass on the knowledge and skills accumulated by him to the next generations of young scientists.

6. CONCLUSION

On the basis of the acclaimed scientific contributions of the candidate, as well as the fact that she fulfills all the requirements and criteria of the Law on the Development of Academic Staff in the Republic of Bulgaria and its Rules for Implementation, as well as the Regulations of BAS and the Regulations on the specific conditions for acquiring academic degrees and occupying academic positions at IICT-BAS, , I propose Assoc. Prof. Vladimir Vasilev Monov to be elected to the academic position "Professor" in the professional field 4.6 "Informatics and Computer Science", specialty: 01.01.12 "Informatics".

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prof. Ivan Garvanov