Referee report

on the competition for the occupation of the academic position of "professor" in the field of higher education 4. Natural sciences, mathematics and informatics, professional field 4.5. Mathematics, scientific specialty "Mathematical modeling and application of mathematics",

declared in the State Newspaper no. 59 of 26 of July 2019 for the needs of the Parallel Algorithms Department at IICT-BAS, with the sole candidate Assoc. Prof. Dr. Pencho Genov Marinov

Reviewer: Prof. Ivan Tomov Dimov,
Institute of Information and Communication Technologies, Bulgarian Academy of Sciences

The following documents were submitted to the reviewer:

1) a curriculum vitae in the European sample;

2) copy of: diploma of educational and scientific degree "doctor"
and a Certificate of Scientific Degree, Senior Researcher "(equivalent of "Associate professor ");

3) a certificate of internship in the specialty;

4) a list of scientific publications for the competition;

5) a list of quotations for the competition and a reference from SCOPUS;

6) abstracts of the scientific publications for the competition - (a) in English and (b) in Bulgarian;

7) a reference for meeting the minimum requirements of IICT-BAS;

8) assurances and declarations for participation /leadership in scientific projects;

9) a reference to the original scientific and applied scientific contributions;

10) a declaration of absence of proven plagiarism in the law scientific works;

11) a copy of the scientific publications for participation in the competition;

12) a disc containing the materials described.

1. General characteristics of the scientific results

The candidate Assoc. Prof. Dr. Pencho Genov Marinov participates in the competition for professor with publications, whose list includes 33 scientific papers. All of these works have been published since 2003, and are after obtaining Ph.D. degree in 2001. The publications are not used in previous procedures. They are visible in SCOPUS, WoS. The table of quotations is accompanied by a table showing that the applicant has an h-index equal to 10. The presented list of 143 citations is in 4 of the papers, namely [3-6]. The same articles are used by group of indicators "В".

The grouping of IF articles by quartile is as follows: - 6 are in Q1; 10 are in Q2; 13 are in Q3; 4 are in Q4. This data indicates a good international recognition of the applicant. In this sense, the scientific problems considered and the problems solved by him in the scientific publications presented are within the professional field 4.5. Mathematics, major in Mathematical Modeling and Application of Mathematics.

2. Contributions contained in submitted works for review

The results obtained can be characterized as an examination of methods and algorithms for solving applied problems in different fields of knowledge and human activity.

The results can be structured in the following directions:

1. Development of algorithms for best approximations with rational functions and their application in fractional private derivative problems.

2. Tasks in the field of inter-criteria analysis and index matrices.

3. Tasks for processing data from brain activity records.

4. Use of the Grid Infrastructure for Plasma Behavior Modeling Problems in Fusion Reactors.

5. Space physics problem models and algorithms.

The first scientific area includes works [30], [33]. Both publications are in Quartile Q1. The applicant declares that the publications are in the framework of an ongoing project with the NSF, DN 12/1. I want to point out work [30] in which a general framework for 3D two-phase image segmentation was developed based on a limited l_2 minimization of a nonlocal regulator whose derivative of Euler-Lagrange is a discrete graph -Laplacian of a weighted graph connected to image voxels. It involves conveniently changing the base in the image area for which the optimization function is decomposed by element. Using the same type polynomial approximation techniques, it has been shown that the transformation matrix need not be explicitly calculated and its action is well approximated by a suitable matrix polynomial. The error does not depend on the size of the area, which is why the approach is applicable to high resolution data.

The second strand reflects the applicant's work in an area related to his / her collaboration with the Institute of Biophysics and Biomedical Engineering (IBFBMI-BAS). In the same institute she defended her dissertation and the doctoral thesis, which he co-directed with Prof. Krasimir Atanasov. An article [26] discusses an approach with index matrices for a new kind of transport problem. And on a project with NSF-I-02-5 is the publication [29], which is in a Q1 journal, using classical correlation analysis and intercriteria analysis.

In the third direction, it reflects the results of the applicant's work on project DN 12/6 with the NSF and was obtained in cooperation with the Institute of Neurobiology (INB-BAS). So far, the data are from the EEG records of rats with epilepsy and depression, but the applicant claims that the same treatments have produced very good results in human records - epileptic seizures are automatically located. Two papers, namely [25, 32] have been published in Q2 magazines.

The fourth strand "Using the Grid Infrastructure for Plasma Behavior Modeling Problems in Fusion Reactors" is the work [10, 11]. The time-consuming simulations of the less powerful computers of the time gave a partial answer to the question of how high-temperature plasma would not destroy the walls of the reactor.

The fifth strand contains the main results of whether the contribution to the candidate's scientific metrics. The journal Advances in Space Research is in Q3 [6-9, 13,14,17, 20, 28] but it was in Q1, in Q2 there are papers [1–5]. These articles, co-authored with Prof. Ivan Kutiev, have the most citations. The international scientific projects that the applicant has worked on are exactly in this section. The applicant worked with Prof. Iv. Kutiev, originally from the "Intercosmos" era to the present day. The most extensive publications are related to the journal Space Weather and Space Climate and the collaboration with colleagues from Greece, and in particular from the Observatory of Athens. The models that have been created in this area are widely respected by the international scientific community in this field. These works also contribute to the improvement of existing ionosphere models. In particular, it is a model of the electronic temperature in the plasma, which is part of the International Reference Ionosphere (IRI) adopted by IRI), ISO (IRI), and the International Standards Organization). In addition, the 2D and 3D electron concentration distribution models in the ionosphere are operationally available through the European DIAS (IRI) system, adopted by the Digital Interactive Atmosphere System.

3. Publications and citations of publications participating in the competition

The relevance and importance of scientific and applied contributions are indisputable. They follow from the fact that the majority of publications are in reputable specialized publications with an impact factor.

Dr. Pencho Marinov has documented 143 citations of his work in Scopus / WoS. Of the publications submitted for the competition, none are independent, but in this field it is natural to work in teams. At the same time, there is no doubt about the candidate's personal involvement. In each of the collaborations, the applicant makes the necessary substantial contribution. Nevertheless, in the future, I recommend that the applicant also publish freelance

work.

4. Educational activity and participation in projects

Assoc. Prof. Pencho Marinov noted in his CV for teaching at the Faculty of Mathematics and Informatics at the University of Sofia before 1993, but I did not see in the competition documents evidence of conducting courses for students. I know that he had graduates and PhD students, but he noted only one successfully defended PhD student, namely Velichka Traneva at the Institute of Biophysics and Biomedical Engineering - BAS with a dissertation: "Three-dimensional indexed matrices and applications in the transport problem and OLAP-cube" leaders: Cr. Atanasov and P. Marinov.

He has successfully participated in a number of national and international scientific projects. He has documented participation in 9 national science projects. He was a member of a team of 9 other international scientific projects. Pencho Marinov was the leader of two national scientific projects, namely, FNI-I01 / 0006 - 2012 "Simulating the behavior of forest and field fires" and FNI-DH 12 / 6-2017 "Automatic identification of epileptic form activity by extracellular recording and computer processing".

5. Comments and recommendations

I have no particular remarks and recommendations for Pencho Marinov. I have noticed inaccuracies and errors in the documents submitted for the competition, for example, in the Author's reference: " междунадодната" instead of " международната"; " обюност " instead of " общност" etc. For example, in the phrase " Грешката не зависи от размера на домейна ", the term " домейн " instead of " област " was incorrectly used in the "Abstracts of scientific publications". I note these inaccuracies, because I am accustomed to Assoc. Prof. Marinov to be precise and I expected with greater care that he prepared his documents for the competition, since such precision is testimony to respect for the jury. I also have the following recommendation: it would be well to define the applicant's contributions in the third and fifth directions. In [30] and [33], I assume that the candidate's contributions are mainly in approximation theory and algorithms, as well as constructive function theory, but since the articles have other co-authors who successfully work in these fields explicitly indicate which contributions belong to the applicant. The inaccuracies and recommendations noted do not diminish the merits of the research of Assoc. Prof. Marinov, who is an established specialist.

6. **CONCLUSION**: Based on the aforementioned, it is clear that the candidate for the announced competition Assoc. Prof. Dr. Pencho Genov Marinov fully complies with the requirements of the ZRASRB, the Rules for the application of the ZRASRB, the Rules for the conditions and procedure for acquiring academic degrees and for occupying academic positions in the Bulgarian Academy of Sciences, as well as the Rules for the Specific Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions at the Institute of Information and Communication Technologies at the

Bulgarian Academy of Sciences.

The scientific results achieved give me grounds for proposing the selection of the candidate Assoc. Prof. Dr. Pencho Genov Marinov as a professor at IICT-BAS in the professional field 4.5. Mathematics, major in Mathematical Modeling and Application of Mathematics 59 of 26.07.2019 for the needs of the Parallel Algorithms department of IICT-BAS. Therefore, my conclusion about the occupation of the academic position "Professor" announced by the competition by Assoc. Prof. Dr. Pencho Genov Marinov is POSITIVE.

10/06/2019
Sofia

Signature:

/ Prof. Ivan Dimov /