## REVIEW

# by Prof. Dr. Vejdi Ismailov Hasanov Konstantin Preslavsky University of Shumen

on the materials submitted for participation in a competition for an occupation of the academic position "Associate Professor" **at Plovdiv University "Paisii Hilendarski"** 

in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.5. Mathematics (Mathematical analysis).

In the competition for "Associate professor", announced in SG no. 40 of 14.05.2021 and on the website of Plovdiv University "Paisii Hilendarski" for the needs of the Physico – Technological Faculty, as a candidate participates Ch. Assistant Professor Dr. Stoil Ivanov Ivanov, from Plovdiv University "Paisii Hilendarski".

## 1. General presentation of the received materials

By order № P33-3130 of 12.07.2021 of the Rector of Plovdiv University "Paisii Hilendarski" (PU) I was appointed a member of the scientific jury of a competition for the academic position of "Associate Professor" in PU in the field of higher education 4. Natural sciences, mathematics and informatics, professional field 4.5 Mathematics (Mathematical analysis), announced for the needs of the Physico-Technological Faculty.

For participation in the announced competition has submitted documents the only candidate Ch. Assistant Professor Dr. Stoil Ivanov Ivanov from Plovdiv University "Paisii Hilendarski".

As a member of the Scientific jury, I received scanned copies of the following documents:

- 1. Order of the Rector of PU P33-3130 / 12.07.2021;
- Regulations for the development of the academic staff of the Plovdiv University (RDASPU);
- Additional requirements of Faculty of Mathematics and Informatics (FMI) at Plovdiv University for holding the academic positions of "chief assistant", "associate professor" and "professor";
- 4. Application form to the Rector for admission to participate in the competition;
- 5. Curriculum vitae in European format;

- 6. Diploma for higher education with acquired master's degree from 2003;
- 7. Diploma for acquired PhD degree from 19.05.2014;
- 8. List of scientific publications and University textbooks;
- 9. List of citations;
- 10. Information on fulfillment of the minimum national requirements;
- 11. Information on fulfillment of the additional requirements of FMI;
- 12. Annotations of the materials under art. 65. from RDASPU and self-assessment of the contributions in Bulgarian;
- 13. Annotations of the materials under art. 65. from RDASPU and self-assessment of the contributions in English;
- 14. Declaration of originality and authenticity of the attached documents;
- 15. Certificate of work experience;
- 16. Information for educational work;
- 17. A copy of a university textbook;
- 18. Copies of the scientific publications (10 copies) for participation in the competition;
- 19. List of prepared reviews;
- 20. Official note for participation in projects;
- 21. List of participations in conferences and seminars.

The set of materials presented to me (with numbers 4-21 from the above list) of Ch. Assistant Professor Dr. Stoil Ivanov Ivanov is in accordance with the Regulations for the development of the academic staff of the Plovdiv University (Art. 65, para. 2). The candidate has submitted a total of 10 publications and 1 textbook for participation in the competition. From the attached list of the publications it is evident that Ch. Assistant Professor Dr. Stoil Ivanov, is the author and/or co-author of a total of 21 publications, of which 10 are submitted for this competition, 3 are submitted for acquisition of PhD degree, 2 are for the academic position "Chief Assistant Professor" and 6 are not submitted for evaluation. The presented 10 full-text publications do not repeat those for acquiring the PhD degree and for holding the academic position of "Chief Assistant Professor".

# 2. Brief biographical data

Ch. Assistant Professor Dr. Stoil Ivanov Ivanov received his higher education mainly at the Plovdiv University "Paisii Hilendarski" as: in 2002 he acquired a bachelor's degree with a professional qualification "teacher of mathematics, informatics and information technology"; the following year he completed a master's program "Applied Mathematics" with a professional qualification "Mathematician" and in 2014 after successful training in a doctoral program "Mathematical Analysis" and defence of a thesis on "Convergence of the iterative method of Halley for individual and simultaneous approximation of the zeros of a polynomial "he was awarded PhD degree.

Stoil Ivanov's teaching and research work is closely connected with the University of Plovdiv. In February 2013 he was appointed to the academic position of "Assistant Professor", and since 2015 he has held the academic position of "Chief Assistant Professor".

#### 3. General characteristics of the candidate's activity

Ch. Assistant Professor Dr. Stoil Ivanov has extensive teaching experience. He is a co-author of the textbook "Guide for solving problems in linear algebra and analytical geometry", published by the University Press of the University of Plovdiv, 2017, 184 pages. From 2013 until now Stoil Ivanov has led lectures and seminars on a number of disciplines: Mathematical analysis I and II; Mathematics I (Algebra and Differential Calculus); Mathematics II (Integral calculus and Differential equations); Mathematical methods of physics; Spaces and operators in physics; Applied functional analysis; Linear algebra and analytical geometry; Probability theory and mathematical statistics. The candidate has active extracurricular work with students from different specialties from the Physico – Technological Faculty of PU, which is expressed in advising students to participate in scientific forums, involving students in research activities and implementation of joint publications, he was the head of a successfully defended Bachelor's degree graduate and was chosen as a reviewer of theses of four graduates.

Ch. Assistant Professor Dr. Stoil Ivanov has a total of 21 publications. He participated in the competition with 10 scientific publications, which are not included in the procedures for acquiring PhD degree and for holding the academic position "Chief Assistant Professor". All 10 publications are in English, 7 of them are in prestigious scientific journals with high impact factor (IF), 3 have been reported and included in conference proceedings, one of which has an impact rank (SJR). Two of the conferences are international and have been held abroad.

The publications and citations submitted for evaluation satisfy and to some criteria significantly exceed the minimum national requirements and the additional requirements of the FMI at PU for professional field 4.5. Mathematics. The following is a comparative characteristic by group of indicators of the minimum national and additional requirements of FMI:

- Group "A" Presence of acquired PhD degree 50 points.
- Group "B" Availability of habilitation work (requirement min. number of points 100). The candidate has submitted two publications with a total number of points - 120 (one in Q1 - 75 points and the second in Q3 - 45 points).

- Group "Γ" Availability of scientific publications in publications that are referenced and indexed in world databases of scientific information (Web of Science and Scopus), etc. (requirement min. number of points 200). The candidate has submitted 6 publications with a total number of points 390 (4 in Q1 4x75 points, 1 in Q2 60 points and 1with SJR in Scopus 30 points).
- Group "Д" Citation in referenced and indexed in world databases with scientific information (Web of Science and Scopus) (requirement min. number of points 50). The candidate has submitted a list of 38 citations, with which he accumulates 304 points.
- 10 publications are presented for evaluation with minimum faculty requirements 8.
- •7 publications are presented in scientific journals with IF and one in conference proceedings with SJR, with a requirement of 5 in journals, 3 of which are with IF.
- A list of 72 pieces is presented. citations of which 38 are in referenced and indexed editions when evidence of at least 5 citations is required.
- One textbook is presented, as required.
- The candidate has stated and submitted a list of 37 scientific publications and 4 diploma theses, which he has reviewed. He has participated in 6 research and educational projects, one of which is a national project at the NSF. In addition, he has participated in a number of international and national scientific forums.

In general, the publications presented in the competition are dedicated to iterative methods for finding zeros of an algebraic polynomial. In the literature, two approaches are used in iterative solution of polynomial equations - finding the roots separately (individual approximation) or simultaneously (simultaneous approximation). In the presented publications for the competition, iterative methods of second and mostly higher order both for individual approximation and for simultaneous approximation of simple and / or multiple zeros of polynomials are studied. The contributions of the authors and in particular of Dr. Ivanov in the proposed publications are:

- Proving new theorems or improving existing for local and semi-local convergence of wellknown methods (Chebyshev method of the third order for multiples of zeros when the multiplicity is known [2], Method of Sakurai, Torii and Sugiura of the fourth order for simultaneous approximation of simple zeros [7,8,9]
- Construction of families of iterative methods for simultaneous approximation of simple zeros (with cubic convergence, which includes the methods of Dochev-Byrnev-Tanabe and Ehrlich [5] as a special cases, Gander-type methods that have a fifth order of convergence

[10]). Convergence theorems are proved, as well as a priori and a posteriori error estimates;

• Modification of the methods of Halley [1], Chebyshev [4] and Schröder [3,6] for application of simultaneous approximation. In [1] the Halley method is for simple roots, while in [4] the methods of Newton, Halley and Chebyshev for simultaneous approximation with multiple zeros at a certain multiplicity are further developed and local convergence is proved, and in [3, 6], a modification of the Schröder's method for simultaneous approximation of simple and multiple zeros at unknown multiplicity was studied. The results in the last cited articles are motivated by the work of Batra, who modified Newton's classical method for applying a simultaneous approximation.

<u>Remark:</u> The list of publications submitted by the candidate is used for the above and further citations.

The requirement for habilitation work in the minimum national requirements is fulfilled through two publications: one is a separate article in a journal from Q1 [5], the second [1] is co-authored with P. Proinov - supervisor of Stoil Ivanov as a PhD student.

Besides the quantitative fulfillment of the minimum national and additional faculty requirements, the high level of the research is evidenced by the level of the publications, where they were published and the response they received in the impressive number of citing articles. Of the 7 publications presented with IF, 5 are in Q1 (first quartile on WoS), 1 in Q2 and 1 in Q3. In addition, recognition and evaluation of the candidate's work is his joint work with M. Petkovic, who is an undisputed authority in the field. The works of Dr. Ivanov have received a response in 72 citing publications (excluding auto-citations), of which 38 are in referenced and indexed editions. More than half of the citing publications are from foreign scholars.

# 4. Assessment of the candidate's personal contribution

Of the presented 10 scientific publications of the candidate, 2 are independent and 8 are coauthored. Of the collective articles, 4 are with one co-author - P. Proinov, 1 with two others - P. Proinov and M. Petkovic and 3 are co-authored with students V. Kyncheva and V. Yotov. In all collective articles, I accept that authors have equal contributions. I believe that the literature used is correctly cited and I have not found any signs of plagiarism in the works of the candidate.

#### 5. Critical remarks and recommendations

It is noteworthy that publication [9] contains more general results than those in the reports [7,8], which is not inadmissible in principle. In this situation, it appears that the reports [7,8] are

intended to partially approbation the results obtained in [9]. Their status could have been better clarified by the candidate in the annotation presented. I want to emphasize that this note in no way belittles the results obtained from Ch. Assistant Professor Dr. Stoil Ivanov and does not change the coverage of the minimum national and additional faculty requirements.

## CONCLUSION

The documents and materials submitted by Ch. Assistant Professor Dr. Stoil Ivanov Ivanov meets all the requirements and criteria of the Law on the Development of Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for implementation of the LDASRB, the relevant Rules of PU "Paisii Hilendarski" and the Specific requirements of Faculty of Mathematics and Informatics of PU.

After the analysis of the achieved results in the educational and research activity, the received international response of the scientific results of Ch. Assistant Professor Dr. Stoil Ivanov Ivanov give me a reason to give my positive assessment and to recommend to the honourable Scientific Jury to prepare a report-proposal for the election of Ch. Assistant Professor Dr. Stoil Ivanov Ivanov for the academic position of "Associate Professor" at the Plovdiv University "Paisii Hilendarski" in the professional field 4.5. Mathematics (Mathematical analysis).

30.08.2021 г.

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Prof. Vejdi Hasanov, PhD