

REVIEW

**by Prof. Nikolay Veselinov Kyurkchiev, PhD,
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On the materials submitted for a participation in the competition for an occupation of the academic position “Associate Professor” in the Physico-technological faculty at University of Plovdiv “Paisii Hilendarski” On Research area 4. Natural Sciences, Mathematics and Informatics, Professional field 4.5. Mathematics (Mathematical Analysis), announced in Newspaper of State, No 40 from 14.05.2021 and on the web site of the University of Plovdiv “Paisii Hilendarski” for the needs of the Faculty of Physics and Technology, where **Stoil Ivanov Ivanov**, PhD, an Assistant Professor in the University of Plovdiv “Paisii Hilendarski” participates as a candidate – **the only one candidate**.

By Order No P33-3130/12.07.2021 of the Rector of the University of Plovdiv “Paisii Hilendarski” I was appointed as a member of the Scientific Jury of the competition for the occupation of the academic position “Associate Professor” in the University of Plovdiv “Paisii Hilendarski”, on Research area 4. Natural Sciences, Mathematics and Informatics, Professional field 4.5. Mathematics (Mathematical Analysis), for the needs of the Faculty of Physics and Technology.

The set of materials presented by Stoil Ivanov in electronic format complies with the Rules for the Development of the Academic Staff of Plovdiv University “Paisii Hilendarski”.

The candidate Chief Assistant Stoil Ivanov applied with 10 scientific publications and 1 textbook for university students.

The presented articles are published in: 7 journals with Impact Factor (with a total summing IF:=11.156 – according to Web of Science), 5 of them are Q1 ranked, 1 of them is Q2 ranked and 1 of them is Q3 ranked (according to Web of Science).

All other scientific articles are published in journals and works of international and national conferences.

The candidate applies with one textbook (University Publisher “Paisii Hilendarski” – Plovdiv, 2017, ISBN 978-619-202-247-1).

The presented publications are papers published after the acquisition of the academic title “chief assistant” by the applicant, which corresponds to all the requirements, conditions and criteria of the Law on the Development of the Academic Staff in the Republic of Bulgaria, Rules for applying of the mentioned above law, Rules for the conditions and order for acquiring academic degrees and academic positions at University of Plovdiv “Paisii Hilendarski” and the additional requirements of the Faculty of Mathematics and Informatics at University of Plovdiv “Paisii Hilendarski”.

APPLICANT'S KEY SCIENTIFIC AND APPLIED RESEARCH RESULTS ARE:

The candidate has grouped the scientific papers presented in the competition in several thematic areas as follows:

- Investigation of iterative methods with high order of convergence for individual approximation of simple and multiple zeros of polynomials;
- Study of iterative methods with high order of convergence for simultaneous approximation of simple or multiple zeros of a given polynomial.

I will mention only some of the main scientific and scientific-applied results of the candidate.

The articles submitted by the candidate for participation in the competition are strongly influenced by the general theory for convergence of iterative procedures of Picard's type in conical metric spaces and n -dimensional vector spaces developed by Prof. Petko Proinov, ScD.

With the instruments of this theory, in Article No. 1 (from the presented list of publications) theorems for local and semi-local convergence of the Halley method are obtained; in articles No. 2 - 6 - similar problems for the methods of Chebyshev, Schroeder, Newton, Halley and Chebyshev. Modified schemes for zeros of polynomials of known (respectively unknown) multiplicity are also considered.

Particular attention is paid to the important issue of obtaining theorems for convergence with the so-called "computer-verifiable initial conditions and error estimation".

Articles No. 7 - 9 (from the presented list of publications) examine issues related to local convergence (of the first and second type) and semi-local convergence for simultaneous finding of zeros of polynomials for the Sakurai-Torii-Shugiura method, which improved existing results of Petkovic and other authors.

The articles are accompanied by appropriate numerical examples illustrating the practical contributions of the results obtained.

The article No. 10 (from the presented list of publications) proves a first-order local convergence theorem and a semi-local convergence theorem, which specify the field of application of a new family of the type - Gander. In particular, sufficient conditions have been obtained to guarantee a convergence order $R = 5$ of this interesting family.

Modified schemes obtained using the known iterative functions of Halley and Chebyshev are also considered.

The obtained results are a contribution to the important topics developed in the last few years by the school of Prof. P. Proinov.

I have not found "**plagiarism**" in the candidate's works within the meaning of the Law on the Development of the Academic Staff in the Republic of Bulgaria.

Reflection of the scientific publications of the candidate Dr. Stoil Ivanov in the literature (known citations, impact factor)

The candidate's scientific works have wide international recognition. This is evidenced by the 72 citations (see "List of citations for participation in the competition").

Total IF of citations is: IF = 37.82, formed by 21 citations.

Remark 1. During the preparation of my review, I have found that the list of citations is actually larger than the presented one. For example:

Publication No 4 from the presented list of publication for a participation in the procedure is cited also in the articles:

Yuming Chu, Naila Rafiq, Mudassir Shams, Saima Akram, Nazir Ahmad Mir and Humaira Kalsoom. Computer Methodologies for the Comparison of Some Efficient Derivative Free Simultaneous Iterative Methods for Finding Roots of Non-Linear Equations. Computers, Materials and Continua, 66(1):275–290, 2021. (IF 4.890).

Mudassir Shams, Naila Rafiq, Babar Ahmad and Nazir Ahmad Mir. Inverse Numerical Iterative Technique for Finding all Roots of Nonlinear Equations with Engineering Applications. J. Math., Article ID 6643514, 10 pages, 2021. (IF 0.712).

Mudassir Shams, Naila Rafiq, Nazir Ahmad Mir, Babar Ahmad, Saqib Abbasi, Mutee-Ur-Rehman Kayani. On Computer Implementation for Comparison of Inverse Numerical Schemes for Non-Linear Equations. Computer Systems Science and 2/4 Engineering, 36(3): 493–507, 2021. (IF 0.278).

Publication No 9 from the presented list of publication for a participation in the procedure is cited also in the article:

Mudassir Shams, Naila Rafiq, Babar Ahmad and Nazir Ahmad Mir. Inverse Numerical Iterative Technique for Finding all Roots of Nonlinear Equations with Engineering Applications. J. Math., Article ID 6643514, 10 pages, 2021. (IF 0.712).

Publication No 10 from the presented list of publication for a participation in the procedure is cited also in the articles:

Yuming Chu, Naila Rafiq, Mudassir Shams, Saima Akram, Nazir Ahmad Mir and Humaira Kalsoom. Computer Methodologies for the Comparison of Some Efficient Derivative Free Simultaneous Iterative Methods for Finding Roots of Non-Linear Equations. Computers, Materials and Continua, 66(1):275–290, 2021. (IF 4.890).

C.Y. Chen, A.H. Ghazali, W.J. Leong. Scaled parallel iterative method for finding real roots of nonlinear equations. Optimization, 2021. <https://doi.org/10.1080/02331934.2021.1873985> (IF 1.520).

Publication No 5 from the presented list of publication for a participation in the procedure is cited also in the article:

P.D. Proinov, M.D. Petkova, On the Convergence of a New Family of Multi-Point Ehrlich-Type Iterative Methods for Polynomial Zeros, Mathematics 9, 2021, Article No. 1640, doi:10.3390/math9141640 <https://www.mdpi.com/2227-7390/9/14/1640>; (IF 1.747)

Thus the real impact of the citations is relatively high.

All that has been said so far shows that the minimum requirements have been significantly exceeded on this criterion.

In general, the minimal national requirements for required points by groups of indicators for the academic position of "Associate Professor" have been satisfied.

From the attached Information from the division "Scientific and applied activity" at the University of Plovdiv it is evident that Chief Assistant Professor S. Ivanov has participated in 1 National Project and in 5 projects to the Research Fund at the University of Plovdiv. Participates with 9 reports at International Conferences and 6 reports at National Conferences.

The candidate has indicated a list of his participation as a reviewer - 37 in number, some of which are in reputable journals: Mathematics, Symmetry, Algorithms, JCAM. The candidate has 4 defenders.

The additional requirements of FMI at the University of Plovdiv for acquiring the academic position of "Associate Professor" are also met.

CONCLUSION

From all that has been said so far for the candidate's presented documents in the competition it is clear that he has obtained enough in quantity scientific contributions.

Taking into account the long-standing and very good teaching and lecturing activity, I am fully convinced that Assistant Professor Stoil Ivanov meets the requirements, conditions and criteria of the Law on the Development of the Academic Staff in the Republic of Bulgaria, Rules for applying of the mentioned above law, Rules for the conditions and order for acquiring academic degrees and academic positions at University of Plovdiv "Paisii Hilendarski" and the additional requirements of the Faculty of Mathematics and Informatics at University of Plovdiv "Paisii Hilendarski" to occupy the academic position "Associate Professor".

All this gives me reason to give my **positive assessment and to recommend to the Scientific Jury to prepare a report-proposal to the Honorable Scientific Faculty Council of the Faculty Mathematics and Informatics for the election of Assistant Professor Stoil Ivanov, PhD for the academic position "Associate Professor"** in the Physico-technological faculty at University of Plovdiv "Paisii Hilendarski" on Research area 4. Natural Sciences, Mathematics and Informatics, Professional field 4.5. Mathematics (Mathematical Analysis).

30.08.2021

Signature:

/ Prof. Nikolay Kyurkchiev, PhD /