

REVIEW

by **Dr. Stoil Ivanov Ivanov – associate professor in University of Plovdiv “Paisii Hilendarski”**

on the materials about the application for the academic position “**Associate professor**”
in **University of Plovdiv “Paisii Hilendarski”**

Research aria: 4. Natural sciences, mathematics and informatics;

professional field: 4.5. Mathematics (*Approximation models and applications*).

In the competition for the academic position “**Associate professor**” announced in State Gazette, 96 edition, 17.11.2023 and on the website of University of Plovdiv “Paisii Hilendarski” for the needs of department “Computer technology” in Faculty of Mathematics and Informatics (FMI), the only applicant is Dr. Maria Tonkova Vasileva-Chilibinova.

1. Description of the procedure and the candidate

Due to the order № ПД-21-389 from 16.02.2024 by the Rector of University of Plovdiv, I was appointed as a member of the Scientific jury and at the first meeting I was chosen to make a short review about the present competition.

The electronic version of the documents and materials presented by Dr. Vasileva-Chilibinova are in accordance with the Regulations for the development of the academic staff of University of Plovdiv “Paisii Hilendarski”.

The application for the competition contains 12 papers including 4 with impact factor (IF-WoS), 5 with SJR (without IF) and 3 conference papers, also there are a monograph and a textbook. The provided materials not only meet, but exceed the minimal national requirements and the additional requirements of FMI for the academic position “Associate professor”, the scientific results are not included in the applicant’s Dissertation or previous competitions and fit the research aria and the professional field of the present competition. I have not detected any plagiarism.

2. General characteristics of the applicant's activities

Assessment of the educational and pedagogical activity:

Dr. Maria Tonkova Vasileva-Chilibinova was born in 1988, in 2011 graduated with a Bachelor degree in FMI at University of Plovdiv “Paisii Hilendarski” majored in “Informatics”, and in 2012 graduated with a Master degree in the same faculty majored in “Applied mathematics”. In 2016 she got PhD in “Mathematical analysis” at University of Plovdiv “Paisii Hilendarski”.

Since 2008, the applicant teaches many disciplines in the field of mathematics and informatics as part-time lecturer and assistant professor. I know Maria personally from our, more than 7 years,

collaboration as members of Prof. Proinov's scientific lab. I have only positive expressions about her scientific and teaching work. She is active, dialogic and responsive person.

Assessment of the scientific activity:

The research of the applicant is mainly in the following two directions:

- Study of high-order iteration methods for the simultaneous approximation of simple and multiple polynomial zeros;
- Approximating classes of cumulative functions of some families of probability distributions.

In paper [1], two local convergence theorems about a family of Gargantini–Farmer–Loizou type iterative methods for the simultaneous approximation of polynomial zeros with known multiplicities have been obtained. These theorems improve the result of Kyurkchiev, Andreev and Popov (Ann. Univ. Sofia Fac. Math. Mech. 78, 1984) and generalize a result of Proinov (J. Nonlinear Sci. Appl. 11, 2018). Paper [3] provides a detailed local and semilocal convergence analysis of a very known Nourein's method (1977) also called Ehrlich's method with Newton's correction. The obtained results, improve all existing results about the studied method. In [2], the authors construct an Ehrlich-type method with arbitrary correction and arbitrary convergence order and study its local and semilocal convergence. It is worth noting that the papers [2] and [3], together with the theoretical results, contain applied ones which have been used for the numerical computation of all zeros of several polynomials of different degrees.

The results on the second topic are presented in the papers [4]-[12] and in the monograph [13] which represent studies on some families of probability distributions based on inverse trigonometric functions, families of Omega-type distributions, OW–TL–GPS distributions, etc. The main attention is paid on the investigation of the saturation of the cumulative functions to the horizontal asymptote, in the terms of Hausdorff distance. The applicability of the obtained results is illustrated by many examples and the development of some dynamic modules implemented in *CAS Wolfram Mathematica*.

Contributions and citations

The applicant is a single author of three of the provided papers and the monograph while the rest of the articles are coauthored. Since there is no internal allocation statement, I consider that all authors have equal contribution to the results in any of the publications, but knowing the work of the applicant I think that her greatest contribution is to the applications, and more precise to the development and implementation of computer programs into the conducted numerical examples.

On the other hand, the applicant's contributions can be easily estimated by the provided 32 citations in Scopus and WoS including 19 in journals with IF. The results are presented before the scientific community in 12 international and national scientific forums.

3. Remarks and recommendations

I have no essential remarks or recommendations.

CONCLUSION

The documents and materials provided by Dr. Maria Tonkova Vasileva-Chilibinova meet 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 above mentioned 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".

Due to the analysis of the obtained results within the educational and research activities and the worldwide reverberation of the scientific results of **Dr. Maria Tonkova Vasileva-Chilibinova** I do give my **positive assessment** and I recommend to the honorable Scientific Jury to prepare a report-proposal to the faculty council of Faculty of Mathematics and Informatics at University of Plovdiv "Paisii Hilendarski" in order to elect Dr. Maria Tonkova Vasileva-Chilibinova for the academic position "**Associate professor**" at University of Plovdiv "Paisii Hilendarski" in research area: 4. Natural sciences, mathematics and informatics; professional field: 4.5. Mathematics (*Approximation models and applications*).

27.03.2024 г.

Signature:

(Assoc. Prof. Dr. Stoil Ivanov)