OPINION

by Prof. Dr. Mihail Mihaylov Konstantinov

Department of Mathematics

University of Architecture, Civil Engineering and Geodesy, Sofia

regarding the materials submitted for participation

in the competition for the academic position "Professor" of

Plovdiv University "Paisii Hilendarski"

Field of higher education: 4. Natural sciences, mathematics and informatics

Professional direction: 4.5 Mathematics (Differential equations)

Announcement in the State Gazette: no. 92 of 18.11.2022.

1. General presentation of the procedure and the candidate

By order RD-21-338/15.03.2023 of the Rector of PU "Paisii Hilendarski", I have been appointed as a member of the Scientific Jury for the competition for the academic position of "Professor" in the field of higher education and professional direction indicated above. The competition has been announced for the needs of the Department of "Mathematical Analysis" at the University's Faculty of Mathematics and Informatics. To participate in the competition, the only candidate, Assoc. Prof. Dr. Atanaska Tencheva Georgieva from the upper department, submitted documents.

The documents were checked by a Committee appointed according to order P33-3480/07/05/2019 of the Rector of the University. The Commission assessed that all the documents required for the competition were present and allowed the candidate to participate. To me, as a member of the Scientific Jury, the documents were provided in electronic form on 01.03.2023. As far as I can judge, these documents fully meet the requirements of the FMI at PU "Paisii Hilendarski".

The candidate graduated from the "Mathematics" major at the FMI at the "St. Kliment Ohridski" in 1991. In 2009, she defended a dissertation for the acquisition of the educational and scientific degree "Doctor" in the professional field 4.5 "Mathematics". Assoc. Prof. Atanaska Georgieva is included in the National Register of Academic Stuff as a person with recognized scientometric indicators for the acquisition of the academic position of Associate Professor.

The documents include 23 scientific publications and two textbooks. The publications are referenced in the global databases Web of Science, Scopus and Google Scholar, as well as in the reference journals Zentralblatt MATH and MatSciNet. Eight of these publications are in journals with an impact factor (JIR) and the rest in journals with an SJR rank.

The minimum requirements according to Law and the Rules for its application, as well as according to the requirements of the FMI at the PU for occupying the academic position "Professor", have been met and exceeded. In particular, under items D7 and D11, the requirements are substantially exceeded.

The candidate was the supervisor of two successfully defended doctoral students.

2. General characteristics of the candidate's activities

For the competition, the candidate has submitted 23 publications in scientific editions with impact factor and rank factor. The works are in the field of existence of solutions and properties of solutions of fuzzy integral equations, ordinary differential equations and integral equations. Some numerical methods for the approximate solution of the relevant equations are also considered. Appropriately chosen examples illustrate the theoretical results. The contributions in these works are of scientific and scientific applied character.

I have not found any illegal borrowing of other people's published results (plagiarism). I accept equal participation of the candidate in the works with other co-authors.

A list of 32 citations of the candidate's works (with auto-citations and hidden auto-citations excluded), mainly by scientists and specialists from abroad, is presented. This shows that the candidate's works are well received by our and foreign scientific colleges in the relevant field.

I have known the candidate for more than 10 years (with her we have a joint publication in a journal with an impact factor) and I have excellent impressions of her competence and possibilities for creative work in a team in some difficult mathematical areas.

The candidate has a long teaching experience. She led exercises and gave lectures on basic mathematical disciplines at the FMI of PU such as "Mathematical Analysis", "Applied Mathematics", "Ordinary Differential Equations" and others. I know that she works successfully with students and PhD students and has joint works with them. I know from experience that such an attitude is one of the strongest incentives for young people entering science.

3. Critical remarks and recommendations

I have no significant critical remarks about the candidate's work. I have found some inaccuracies and typographical errors (mainly in the books), which I have brought to the candidate's attention with a view to correcting them in possible future editions.

Regarding the book "Ordinary Differential Equations" (2023) submitted for the competition, I have the following recommendations. Chapter 6 is too short and only highlights the problems of applying computer mathematical systems in solving differential equations. It would be good if this chapter is expanded and at least one of the big computer systems for "doing mathematics" is considered in more detail. Modern students treat with some skepticism any material that does not provide (or at least does not mark) some computer scheme for attacking it. In this regard, when considering vector differential equations with constant coefficients, I recommend including material on the calculation and use of the matrix exponent in MATLAB environment (for example, with the expm command).

I know from experience that students are impressed (and get useful information) from the computer solving large problems with the help of a few clicks of the mouse. These are, for example, the following tasks: to solve a general linear vector algebraic equation with 1000 unknowns, to calculate the eigenvalues and singular values of a general square matrix of order 1000, to solve a general algebraic equation of degree 1000, to solve a general linear differential equation from order 1000 and so on. If our computer is more powerful, we can easily replace the number 1000 with 10000.

I will close these remarks with one more observation. For several months now, we have been in the conditions of a new scientific and pedagogical environment, which can be characterized as a "revolution". Dozens of freely available language platforms (or chatbots such as ChatGPT) already exist, some of which have incredible abilities to solve mathematical problems, including proving theorems. One of these chatbots has recently started working with the WolframAlpha mathematical platform. If we do not include these tools in our teaching arsenal, we run the risk that the children will soon begin to look at us with, to put it mildly, some disdain.

3. Conclusion

The documents and materials presented by the candidate Assoc. Prof. Atanaska Tencheva Georgieva, PhD, meet all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of the law, the Regulations of the PU "Paisii Hilendarski" and the additional requirements of FMI at the PU for occupying the academic position "Professor".

The candidate has submitted a sufficient number of scientific works published after the materials used in the defense of the title PhD and in acquiring the academic position "Associate Professor". The works contain original scientific and scientific-applied contributions that have received international recognition. A representative part of them has been published in international editions. The scientific and teaching qualifications of the candidate, in my opinion, are beyond any doubt.

The results achieved by the candidate in the study and research activities fully correspond to the minimum national and additional requirements of the FMI at the PU "Paisii Hilendarski".

After getting acquainted with the materials and scientific works presented in the competition, analyzing their significance and the scientific and scientific-applied contributions contained in them, I confidently give my positive assessment and recommend the Scientific Jury to issue a report-proposal to the FMI Faculty Council for the election of Associate Professor Atanaska Tencheva Georgieva, PhD, to the academic position of "Professor" at PU "Paisii Hilendarski" in the above mentioned fields of higher education and scientific specialty.

04/09/2023   **Member of the Scientific Jury:**

Sofia

                                      Prof. Dr. Mihail Konstantinov