

STANDPOINT

by Prof. Andrey Ivanov Zahariev, PhD
Faculty of Mathematics and Informatics (FMI)
at University of Plovdiv "Paisii Hilendarski"
of the materials for a competition for the academic position

"Professor"

at the Department of Mathematical Analysis, at the FMI at University of Plovdiv "Paisii Hilendarski"

Field of higher education 4. Natural sciences, mathematics and informatics; Professional field 4.5. Mathematics (Differential Equations)

In the competition for "professor", announced in the State Gazette, no. 92 from 18.11.2022 and on the website of University of Plovdiv "Paisii Hilendarski" for the needs of the Department of Mathematical Analysis at FMI at University of Plovdiv "Paisii Hilendarski", as the only candidate participated Assoc. Prof. PhD Atanaska Tencheva Georgieva from the Department of Mathematical Analysis at FMI at University of Plovdiv "Paisii Hilendarski".

1. General presentation of the procedure and the candidate

By order PD-21-338 of 15.02.2023. of the Rector of University of Plovdiv "Paisii Hilendarski" I have been appointed as a member of the scientific jury of a competition for the academic position of "Professor" in University of Plovdiv in the field of higher education 4. Natural sciences, mathematics and informatics, professional field 4.5. Mathematics (Differential Equations), announced for the needs of the Department of Mathematical Analysis at FMI.

For participation in the announced competition has submitted documents only the candidate Assoc. Prof. PhD Atanaska Tencheva Georgieva, member of the Department of Mathematical Analysis at FMI at University of Plovdiv "Paisii Hilendarski". The documents were checked by a commission appointed by order RD-21-346/15.02.2023 of the Rector of University of Plovdiv "Paisii Hilendarski". According to the minutes of the commission meeting held on 21.01.2023 and signed by all members without comments, it was established that the documents meet all regulatory requirements. On this basis, the commission admits to participation in the competition the candidate Assoc. Prof. PhD Atanaska Tencheva Georgieva.

As a member of the scientific jury, I have received all the necessary documents attached to the application by Assoc. Prof. PhD Atanaska Tencheva Georgieva to the Rector of University of Plovdiv "Paisii Hilendarski" for admission to the competition. The documents are well ordered and arranged.

For the participation in the competition for the academic position "professor" the candidate are presented 23 scientific publications and 2 textbooks. The scientific publications are published in journals referenced in at least one of the world's databases as Web of Science, Scopus and Zentralblatt Math. In journals with an impact factor are published 8 papers of them, which are and do not used for acquiring the educational and scientific degree PhD, as well as for occupying the academic position of "Associate Professor". The applicant fully satisfies both the minimum requirements under the PPRRCB, as well as the additional requirements of FMI at University of

Plovdiv "Paisii Hilendarski" for occupying the academic position of "professor" in professional field 4.5 Mathematics. For clarity, the results of the analysis are given the following table:

Group of indicators	Papers presented by Assoc. Prof. PhDA. Georgieva	Number of PPRRRB points	Points of Assoc. Prof. PhDA. Georgieva
A	Dissertation for NSA "Doctor"	50	50
B4	Habilitation – scientific publications (Presented 5 publications)	100	150
G7	Scientific publications (18 publications submitted)	200	678
D11	Citations - 32	100	256
E	2 successfully defended PhD students, participation in 1 national scientific project, published 2 university textbooks	100	190

This table shows that the candidate undoubtedly exceeds the minimum requirements at any point for occupying the academic position of "professor" in professional field 4.5 Mathematics.

Assoc. Prof. PhD Atanaska Georgieva is graduated in Mathematics from the Faculty of Mathematics and Informatics at Sofia University "St. Kliment Ohridski". In 2009 she acquired a PhD degree and since 2012 she has held the academic position of Associate Professor of Mathematics 4.5 at University of Plovdiv "Paisii Hilendarski". Note that she is listed in the register of NACID as an Associate Professor with completed scientific data.

2. General characteristics of the applicant's activities

2.1. Evaluation of the educational and pedagogical activity

The pedagogical experience of Assoc. Prof. PhD Atanaska Georgieva is 27 years old. After her habilitation in 2012 she has prepared and delivered the following lecture courses to FMI students: "Mathematical Analysis"; "School course in analysis"; "Applied Mathematics"; "Ordinary differential equations" and "Partial differential equations".

The lectures and exercises held by Assoc. Prof. PhD Atanaska Georgieva are of good scientific and methodological level. She demonstrates professionalism and responsibility in his work by applying modern methods and computer technologies in his teaching activities. Assoc. Prof. PhD Atanaska Georgieva works actively with students, graduates and PhD students and has several publications with them. He regularly participates in committees for conducting State exams and thesis defenses at FMI.

Assoc. Prof. PhD Atanaska Georgieva is the author of 2 textbooks, one of which is with coauthors. They are intended for use by students studying at the Faculty of Mathematics and

Informatics of University of Plovdiv "Paisii Hilendarski".

2.2. Evaluation of scientific and applied activities.

From the presented 23 scientific publications by the candidate for participation in the competition, 22 papers are coauthored and in one of them she is sole author. Publications in journals with an impact factor are 8 articles of them, distributed by quartiles as follows: 1 in Q1; 4 in Q2; 1 in Q3 and 2 in Q4. All 23 articles are indexed in Web of Science, SCOPUS and/or Zentralblatt databases.

2.3. Contributions and citations

Thematically, the main scientific and applied research contributions of the candidate can be divided into three directions:

2.3.1. Approximated solutions of fuzzy integral equations.

Under this heading are publications [B4.1] - [B4.5], [G7.9]-[G7.11], [G7.13]- [G7.15], [G7.17] and [G7.18]. In publications [B4.1] - [B4.5] analytical solutions of a two dimensional nonlinear fuzzy Volterra-Fredholm integral equation were found and in [G7.18] an analytical solution of a fuzzy integro-differential Volterra-Fredholm equation was obtained. To obtain the solutions methods were used as: homotopy analysis and Adomian decomposition. Sufficient conditions for the existence and uniqueness of the solution of the equations under consideration have been obtained. The similarity of the methods used has been demonstrated.

In publications [G7.9] - [G7.11], [G7.13]-[G7.15], the numerical solutions of two-dimensional fuzzy integral equations and fuzzy functional-integral equations of Hammerstein and Urison-Volterra has been studied. Iterative methods of the successive approximations using fuzzy cubature and quadrature formulae have been constructed. Sufficient conditions for the existence and uniqueness of these solutions of the studied equations and the convergence of the proposed methods are established. All the results obtained are illustrated by examples.

2.3.2. Ordinary differential equations.

Under this heading are publications [G7.1], [G7.2], [G7.6] and [G7.12]. [G7.3], [G7.4] and [G7.16]. Using the Schauder-Tikhonov theorem for the stationary point, sufficient conditions have been found in publication [G7.1] for the existence of $L_p(k)$ -equivalence between a linear and a nonlinear perturbed momentum differential equation with an unlimited linear part in arbitrary Banach space. The theoretical results obtained are illustrated by an example from the parabolic type partial momentum differential equations. In the publication [G7.2] a generalized ψ -exponential and ψ -ordinary dichotomy for homogeneous linear differential equations in Banach space are discussed. With these two generalizations of the dichotomy are not measured sufficient conditions for the existence of ψ -bounded solutions to the inhomogeneous equations. The ψ -dichotomy was also studied. In the publication [G7.6] sufficient conditions for the existence of ψ -bounded solutions to nonlinear differential equations with ψ -exponential and ψ -ordinary dichotomic linear parts in Banach space were found using the Banach fixed point principle. The publication [G7.12] is devoted of the concept of $L_p(h,k)$ -solution of a linear momentum differential equation in Banach space. Sufficient conditions have been found for the existence of such solutions. A numerical example is given to illustrate the theoretical results obtained.

The parametric robustness (roughness) for nonlinear differential equations with "maxima" has been investigated in [G7.3]. Based on the Razumichin method, sufficient conditions for parametric and uniform parametric robustness have been obtained. Explicit sufficient conditions have been found in [G7.4], for the existence of several types of non-oscillating solutions of a neutral linear system with distributed delays. The results are illustrated by examples. In the publication [G7.16] an algorithm has been proposed for finding exact polynomial solutions of a particular class of linear differential equations on the $SL(2, \mathbb{R})$ group.

2.3.3. Integral equations.

Under this heading are publications [G7.5], [G7.7] and [G7.8].

In [G7.5] and [G7.7] a generalization of linear and nonlinear integral Volterra equations of the first and second kind, when the independent variable belongs to an arbitrary non-compact metric space or to an arbitrary Hausdorff topological space, are discussed. Sufficient conditions for the existence and uniqueness of the solutions of the considered equations are obtained. Some applications of the results obtained concerning the integral inequalities are given.

A numerical method has been proposed in [G7.8], for finding a numerical solution to a perturbed linear Volterra integral equation. Sufficient conditions were found for the existence and uniqueness of a continuous solution in a finite and closed interval of the equation under study. The convergence of the numerical method has been demonstrated. All results obtained are supported by examples.

My general impression of the scientific and applied contributions of the candidate is that they are new and meaningful. It is noteworthy that the citations are mainly from foreign authors. All of them are in journals indexed in Web of Science and/or SCOPUS.

2.4. Assessment of the applicant's personal contribution

I am fully convinced of the authorship of the candidate of the publications and textbooks submitted for review. In the co-authored publications, I accept the participation of authors as equal. I haven't noticed any plagiarism.

3. Critical remarks and recommendations

I have no comments or recommendations to the candidate.

CONCLUSION

The documents and materials presented by Assoc. Prof. PhD Atanaska Tencheva Georgieva **meet all the requirements** of the Law on the Development of the Academic Staff in the Republic of Bulgaria (RASRB), the Regulations for the Implementation of the Law on the Implementation of the Law on the Development of the Academic Staff of University of Plovdiv "Paisii Hilendarski" for occupying the academic position of "professor".

The results achieved by the candidate in his academic and research activities fully comply with the additional requirements of the Faculty of Mathematics and Informatics.

After getting acquainted with the materials and scientific works presented for the competition, analysis of their significance and contained in them scientific, scientific-applied and applied

contributions, I find it justified to give my **positive assessment** and recommend to the Scientific Jury to prepare a report-proposal to the Faculty Council of the Faculty of Mathematics and Informatics for the selection of **Assoc. Prof. Dr. Atanaska Tencheva Georgieva to the academic position of "Professor"** in University of Plovdiv "Paisii Hilendarski" by: Field of higher education 4. Natural sciences, mathematics and informatics, Professional field 4.5. Mathematics (Differential Equations).

03.04.2023

Plovdiv

Signature:

/prof. Andrey Ivanov Zahariev/