

REVIEW

by competition for an academic position

"associate professor"

in professional direction **4.5 Mathematics (Differential Equations)**

for the needs of Sofia University "St. Kliment Ohridski" (SU),

Faculty of Mathematics and Informatics (FMI),

announced in SG No. 24. from 17.03.2023 and on the websites of FMI and SU

The review was prepared by: Prof. D.Sc. Georgi Hristov Georgiev, Shumen University "Ep. Konstantin Preslavski",

(academic position, scientific degree, first name, last name, last name - place of work)

in my capacity as a member of the scientific jury in professional field 4.5 Mathematics (Differential Equations)

(professional direction/scientific field)

the competition according to Decree No. RD 38-245/12.05.2023 of the Rector of Sofia University.

The following candidates submitted documents for participation in the announced competition:

- assistant professor, Dr. Georgi Ivanov Georgiev, FMI of SU...

(academic position, scientific degree, name, surname, surname, scientific organization)

- Assistant Professor, Dr. Svetlin Georgiev Georgiev, FMI of SU...

I. General description of the presented materials

For each of the candidates, information is given on points 1 to 8:

I. Ch. assistant professor, Dr. Georgi Ivanov Georgiev,

1.1 Application data

The documents submitted by the candidate in the competition correspond to the requirements of the ŽRASRB, PPZRASRB and the Regulations for the terms and conditions for acquiring scientific degrees and occupying academic positions at SU "St. Kliment Ohridski" (PURPNSZADSU).

To participate in the competition, the candidate ch. assistant professor, Dr. Georgi Ivanov Georgiev presented a list of 8 titles in total, including 8. publications in foreign early editions with IF or SJR, with their original full texts attached.

Also featured are .16. number of other documents (in the form of official notes and certificates from an employer, project manager, funding organization or project contractor, references and testimonials, awards and other relevant evidence) supporting the applicant's achievements.

All necessary documents have been submitted.

1.2 Applicant data

Ch. assistant professor, Dr. Georgi Ivanov Georgiev graduated from the Mathematics High School in Veliko Tarnovo in 1985. After studying at the FMI of the SU in the period 1987-1992, he received a master's degree in mathematics, specializing in Differential Equations. He continues his studies as a full-time doctoral student at the SU, Department of Differential Equations. He received an educational and scientific doctorate degree in 1997, after which he worked in an academic position at two universities. As an assistant in mathematical analysis at VTU Todor Kableshkov from 1997 to 2017. From 15.02.2017 until now Dr. G.. Georgiev is the main assistant in the Department of Differential Equations at FMI of SU.

1.3 General characteristics of the scientific works and achievements of the candidate.

The presented publications are in the field of Hamiltonian systems and the study of their integrability (articles 2 to 8). In addition, the classical Dirichlet Problem in unexplored cases for the fractional Laplace equation with nonzero boundary conditions is solved. (Article 1). Non-integrability in the closed ion model (publications 2,3,4) and in the Chazy-Carzon cosmological model (publication 6) were investigated. This type of problem is also solved in the last two posts. The high scientific standard of the research results of Dr. G. Geortiev is expressed in their publication in prestigious publications. Taking into account the presented materials and the above reasons, we conclude that:

a) the scientific works fully comply with all indicators of the minimum national requirements (according to Art. 2b, Para. 2 and 3 of ZRASRB) and, accordingly, the additional requirements of SU "St. Kliment Ohridski" for occupying the academic position of "associate professor" in the scientific field and professional direction of the competition;

b) the scientific works submitted by the candidate according to indicators B do not repeat those from previous procedures for acquiring a scientific title and academic position;

c) there is no evidence of plagiarism in the scientific works submitted for the competition.

The reference from IS "The Authors" shows the subject matter of the reports presented at scientific conferences.

1.4 Characteristics and assessment of the candidate's teaching activity

I am not familiar with the applicant's academic work. It is clear from the attached reference that he always had a full workload.

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1.5 Content analysis of the applicant's scientific and applied scientific achievements contained in the materials for participation in the competition.

In Stations 1 of the list, a general approach to solving the Dirichlet problem is given, for both bounded 3D domains and their (unbounded) complements, in terms of the fractional (3D) Poisson equation. Laurent Schwarz class solutions for tempered Distributions are obtained. The article has 1 co-author and equal participation of the authors is indicated. In paper 2, a 3D system with a known Hamiltonian is studied. Papers 3 and 4 are devoted to two-dimensional systems describing charged ion systems. In paper 5, the integrability of the Chazy-Curzon space-time geodesic equations is investigated. In publication 6, the Hamiltonian system with a Dyson potential and its non-integrability are investigated

Of the 8 articles presented, 5 are with IF (of which 2 are from Q1 and 1 from Q2) ..

The remaining 3 articles are with SJR. Most of the publications are from the last 5 years and deal with new unsolved problems. 8 citations in IF articles are also listed.

1.6 Critical notes and recommendations

I don't have any. I believe that the reviewed works in terms of: staging; analyzes and summaries; accuracy and completeness of results; literary awareness are at a high level. Methodical level and logical structure are also without objections.

1.7 Personal impressions of the candidate

I don't have any because I didn't know him until now.

1.8 Application Conclusion

After having familiarized myself with the materials and scientific works presented in the competition and based on the analysis of their significance and the scientific and scientific-applied contributions contained in them, I confirm that the scientific achievements meet the requirements of ZRASRB, the Regulations for its application and the relevant Regulations of SU "St. Kliment Ohridski" for the candidate to occupy the academic position of "associate professor" in the scientific field and professional direction of the competition. In particular, the candidate satisfies the minimum national requirements in the professional direction and no plagiarism has been found in the scientific works submitted for the competition.

I give my positive assessment to the application.

2. Assistant Professor, Dr. Svetlin Georgiev Georgiev, FMI of SU...

(academic position, scientific degree, name, surname, surname, scientific organization)

2.1 Application Data

The documents submitted by the candidate in the competition correspond to the requirements of the ŽRASRB, PPZRASRB and the Regulations for the terms and conditions for acquiring scientific degrees and occupying academic positions at SU "St. Kliment Ohridski" (PURPNSZADSU).

To participate in the competition, the candidate ch. assistant professor, Dr. Svetlin Georgiev Georgiev...

has presented 9 scientific publications, all in foreign publications, of which 8 are monographs and 1 study with IF. The original full editions are attached to the study and the monograph on indicator B3.

Also featured are 16. number of other documents (in the form of official notes and certificates from an employer, project manager, funding organization or project contractor, references and testimonials, awards and other relevant evidence) supporting the applicant's achievements.

All necessary documents have been submitted.

2.2 Applicant Data

Svetlin Georgiev Georgiev was born in Ruse. In 1997, he graduated from the FMI of Veliko Tarnovo University. From 1998 to 2001, he was a doctoral student at the University of Veliko Tarnovo, where in 2002 he successfully defended his dissertation on the topic "Periodic solutions of non-autonomous systems of the Lotka-Volterra type" for a PhD. In 2001 and 2002, he was an assistant professor at the University of Veliko Tarnovo, and from 200 until now he is an assistant and chief assistant at the FMI of Sofia University.

2.3 General characteristics of the candidate's scientific works and achievements.

The motivation behind the theory of time scales is to unify discrete and continuous analysis, and thus one defines a time scale as a closed subset of the real numbers. For functions defined on a time scale, one can introduce a derivative, which summarizes ordinary derivatives and forward differences, and an integral, which summarizes ordinary integrals and sums. After defining and exploring these concepts in the time scale setting, the author goes on to study Volterra's linear integral and integro-differential equations, as well as Fredholm's integral equations. For all these equations, the kernels are mostly assumed to be continuous, which simplifies the analysis and limits the results. The approach chosen by the author to find a solution is in most cases the use of iteration or the Adomian decomposition method. For the Fredholm equations, operator theory results on eigenvalues etc. of course resemble those for the continuous case." This is part of the review

of the monograph S. Georgiev. Integral Equations on Time Scales, Atlantis Press, 2016. The winning candidate, S. Georgiev, placed this publication under Indicators C and presented the table with the fulfillment of the minimum national requirements (according to Article 2b, Paragraphs 2 and 3 of the ZRASRB). In my opinion, this can also be done in the following way:

the monograph in question is from Indicator B3 and carries 100 points, (after rulebook_zrasb) and the studies T. Xiang and S. Georgiev. Noncompact-type Krasnoselskii fixed point theorems and their applications. MMAS, Vol. 39, Issue 4, 2016, pp. 833-863 is from Indicator G7 and carries 60 points.

Then, the distribution of points by groups of indicators for the second candidate is as follows: A-50, B.-0, B-100, D.300, D.64. Let me note that in both ways the minimum national requirements (according to Art. 2b, paras. 2 and 3 of the RSARB) are met.

Based on what has been written so far, we conclude:

- a) the scientific works fully comply with all the indicators of the minimum national requirements (according to Art. 2b, Para. 2 and 3 of the RSARB) and, accordingly, to the additional requirements of SU "St. Kliment Ohridski" for occupying the academic position of "associate professor" in the scientific field and professional direction of the competition;
- b) the scientific works submitted by the candidate according to indicators B do not repeat those from previous procedures for acquiring a scientific title and academic position;
- c) there is no evidence of plagiarism in the scientific works submitted for the competition.

The mentioned monograph is one of Dr. S. Georgiev's achievements for the following reasons: 1) It is included in the joint series Studies in Dynamical Systems of Atlantis Press and Springer publishing houses.

2) Springer lists 12 citations (not including self-citations) of this monograph in IF articles.

.3) The topic of time scales is continued in two monographs, also included in the list of publications for the competition: S. Georgiev. Variational Calculus on Time Scales, Nova Science Publishers, 2018, S. Georgiev. Fractional Dynamic Calculus and Fractional Dynamic Equations on Time Scales, Springer, 2018,

2.4 Characteristics and assessment of the candidate's teaching activity

I am not familiar with the applicant's academic work. Teaching activity of Svetlin Georgiev is: Compulsory courses, FMI, SU

1. "Differential equations and applications", special "Informatics",
2. "Equations of mathematical physics", special "Applied mathematics",
3. "Partial differential equations", spec. "Mathematics",
4. "Mathematics and informatics", special "Biology".
5. "Mathematical analysis of functions of multivariables", special "Engineering physics",

Elective courses, FMI, SU

1. "Wave images",
- . 2. "Integral equations",
3. "Tensor Calculus",
4. "Clifford's Analysis of Differential Equations",
5. "Theory of Semigroups and Applications",
6. "Introduction to Discrete Dynamical Systems and Chaos Theory"
7. "Dynamic Calculation on Time Scales".

I believe that the mentioned courses allow the candidate Dr. S. Georgiev to combine scientific and teaching work.

2.5 Content analysis of the applicant's scientific and applied scientific achievements contained in the materials for participation in the competition.

In the studies of the list of publications, the obtained results generalize, cover and complement previously known Krasnoselki-type theorems. Using the resulting fixed point theorems, the existence of solutions to a class of transport equations, the existence of global solutions to first-quadrant Darboux problems, the existence and/or uniqueness of periodic solutions to a class of differential equations, and the existence and/or existence of or the uniqueness of the solutions of a class of Volterra-type integral equations with perturbations. According to ZBL Math, there are 5 citations (no self-citations) to this study in articles with IF.

Another important achievement of the candidate is the monograph Svetlin Georgiev. Fractional Dynamic Calculus and Fractional Dynamic Equations on Time Scales, Springer, 2018. In it, some of the essential results are: a study of the Cauchy problem for fractional Riemann-Liouville delta equations. A theorem on the existence and uniqueness of the problem under consideration, as well as a theorem on the continuous dependence of the solutions on the initial conditions, have been proved. In Chapter 6, constant fractional Riemann-Liouville dynamical equations are studied. In Chapter 7, the fractional Caputo derivative is introduced. In Chapter 8, a theorem on the existence and uniqueness of the solutions of the Cauchy problem for fractional Caputo dynamic equations is proved. Springer lists 12 citations (without self-citations) of this monograph in articles with IF.

Under the general confusion S. Georgiev. Foundations of Iso-Differential Calculus. , Nova Science Publishers-NewYork presents 4 monographs focusing on the following topics: Vol. I - The theory of iso-differentiation and iso-integration, Vol. II - theory of iso-integration of iso-functions of mvo variables. curvilinear and surface iso-integrals, Vol. III - iso-differential equations, iso-differential systems, IV - linear iso-differential equations and linear periodic systems, the theory of stability.

The monograph S. Georgiev. Variational Calculus on Time Scales, Nova Science Publishers, 2018 is devoted to calculus of variations on arbitrary time scales. inclusive symplectic dynamical systems and Hamiltonian dynamical systems.

The monograph S. Georgiev. Theory of Distributions, Springer, 2015 focuses on applications of distribution theory to the theory of partial differential equations and consists of ten chapters.

2.6 Critical Notes and Recommendations

I don't have any. I believe that the submitted works in relation to:

motivation; presentation of results; literary awareness are at a high level. Methodical level and logical structure are also without objections.

2.7 Personal impressions of the candidate

I don't have any because I didn't know him until now.

2.8 Application Conclusion

After having familiarized myself with the materials and scientific works presented in the competition and based on the analysis of their significance and the scientific and scientific-applied contributions contained in them, I confirm that the scientific achievements meet the requirements of ZRASRB, the Regulations for its application and the relevant Regulations of SU "St. Kliment Ohridski" for the candidate to occupy the academic position of "associate professor" in the scientific field and professional direction of the competition. In particular, the candidate satisfies the minimum national requirements in the professional direction and no plagiarism has been found in the scientific works submitted for the competition.

I give my positive assessment to the application.

III. General Conclusion

It is not easy to choose between two worthy candidates. In light of the above, I recommend the scientific jury to propose to the competent authority for the selection of the Faculty of Mathematics and Informatics at SU "St. Kliment Ohridski" to elect Assistant Professor, **Dr. Svetlin Georgiev Georgiev**, FMI of the SU...to occupy the academic position of "associate professor:/ in the professional direction direction **4.5 Mathematics (Differential Equations)**.

.10.07. 2023

Prepared the review:

(Prof., D. Sc. Georgi Georgiev)