OPINION

On the applications in a competition for an academic position
"Associate Professor"
in professional field 4.5 Mathematics (Differential Equations),
in Sofia University "St. Kliment Ohridski", Faculty of Mathematics and Informatics (FMI),
announced in State Gazette no. 24 / 17.03.2023 and on the FMI and SU websites

By: **Assoc. Prof. Dr. Tzvetan Tomov Ostromsky, Institute of Information and Communication Technologies (IICT) - BAS,** in my capacity as a member of the scientific jury (external to SU) for the competition according to Order No. RD 38-245 / 12.05.2023 of the Rector of Sofia University..

The following applicants submitted documents for participation in the announced competition:
- Senior Assistant Prof. Dr. Georgi Ivanov Georgiev
- Senior Assistant Prof. Dr. Svetlin Georgiev Georgiev

I. Review of the applications, based on the materials presented

For each of the applicants, information on 8 topics is given as follows:

I.A. Georgi Ivanov Georgiev

1. Summary of the documents, submitted by G. Georgiev

The applicant submitted 8 scientific publications in full text, as well as 18 other documents (CV, lists of publications/citations, copies of diplomas, certificates, official notes and certificates from an employer, project manager, funding organization or project assignee , resumes, etc.) supporting the applicant's achievements. The documents submitted by the candidate in the competition meet the requirements of the Development of the Academic Staff in the Republic of Bulgaria Act (DASRBA), Regulations on the Implementation of the Development of Academic Staff in the Republic of Bulgaria Act (RIDASRBA) and the Rules on the Conditions and Procedure for Acquiring Science Degrees and Holding Academic Positions in Sofia University “St. Kliment Ohridski” (RCPASDHAPSU).

2. Biographical data for the applicant

Georgi Ivanov Georgiev received his secondary education at the Mathematics High School in Veliko Tarnovo in 1985 and after his 2-year regular military service at BA became a full-time student at the FMI of SU "St. Kliment Ohridski". In 1992, he got a Master's degree in mathematics from SU, in the area of Differential Equations. From 1994 to 1997 he was a full-time PhD student

in the Department of Differential Equations at FMI. In 2015 he got a PhD by defending his thesis on "Non-integrability in the Sense of Liouville of Some Higher-Order Painleve Equations".

Between 1997 and 2017 he works as an Assistant Prof. in mathematical analysis at VTU "Todor Kableshkov", Sofia. From February 2017 he is a Senior Assistant Prof. at SU "St. Kliment Ohridski", FMI, Department of Differential Equations.

3. General characteristics of the scientific works and achievements

For the competition, the candidate Georgi Ivanov Georgiev applies with a list of 8 titles, published in Bulgarian (1) and foreign (7) scientific editions and scientific forums, indexed in the global scientific databases Web of Science and/or Scopus. Five of them are journal articles referenced in Web of Science (two of them in the first quartile Q1 of Web of Science, one in Q2, one in Q4 and one without quartile but in Q3 of Scopus). The remaining 3 are papers in the AIP Conference Proceedings series indexed in Scopus (with SJR rank but no quartile). All of them were published in the last 8 years, and 4 of them - in the last 3 years, and were not used in previous procedures for acquiring a scientific title or an academic position.

The list of all publications of the applicant contains 15 titles (he currently has at least 18). A list of 9 citations is also given (No. 3 and No. 8 contain critical notes concerning the correctness of one of the theorems in the works cited).

The candidate has 9 articles visible in Web of Science (+ 5 preprints) and H-Index 2 according to this database.

The scientific works presented in the application fully comply with the requirements of the Development of the Academic Staff in the Republic of Bulgaria Act (DASRBA) and the Regulations for its implementation, as well as the Rules on the Conditions and Procedure for Acquiring Science Degrees and Holding Academic Positions in Sofia University “St. Kliment Ohridski” for holding the academic position "Associate Professor" in the scientific field and the professional direction of the competition.

4. Teaching activity assessment

Although I do not have a personal view of the candidate's educational and pedagogical activity, taking into account his long-term work as an Assistant Prof. at VTU "T. Kableshkov" and then as a Senior Assistant Prof. at FMI of SU, I have no doubt about his teaching skills and erudition.

5. Analysis of the applicant's scientific and applied scientific contributions in the materials submitted for review in the competition

The candidate's main research and scientific contributions are in the field of Hamiltonian systems and the study of their integrability.

His latest publication - (1) from 2023, on the existence of a global solution to the classical Dirichlet problem with nonzero boundary conditions for the fractional (3D) Poisson equation, is related to the study of the generalized Bessel equation and finding its differential group of Gallois. This is a new unexplored variant of the generalized hypergeometric equation studied in an earlier candidate publication (7).

In (2, 3, 4) the model describing trapped ionic system in the quadrapole field is examined for meromorphic integrability. The direct connection between differential and classical Galois theory is shown in this case. Classical methods of Lyapunov and Ziglin-Morales-Ruiz-Ramis are used in the proofs.

In (5), the integrability of the geodesic equations from the Chazy-Carzon cosmological model is studied. Here the approach is a bit different - a direct study of the geometry of the solutions and proving their conditional non-periodicity. The problem is that the equations of motion are not in the proper form, and no change of variables technique works.

In (6) it is shown that the Hamiltonian system with Dyson potential is analytically and formally non-integrable.

In (7), two types of equations of the fourth order with the Penleve property - polynomial type and without moving singular points are studied. They can also be considered as a Hamiltonian system. These have normal variational equations (which are generalized hypergeometric equations) and their Galois differential group is found. In this case, the generators of the Galois Group have Stokes Matrices that are computed explicitly.

In (8), non-integrability of the system describing the stationary solutions of the Bose-Einstein model (in the specific case: Bose-Fermi) is proved. It is shown that the only integrable cases are those for which the variables separate.

All listed results are undoubtedly original. Plagiarism, according to the law, has not been found in the submitted works. Five of them are independent, the remaining three are co-authored, and I have no doubt that the candidate's contribution is significant.

6. Critical remarks and recommendations

In one of the cited works (cited #3 and #8) the correctness of one of the theorems in the cited 2 works is disputed. Rather, it is about inaccuracies that G. Georgiev has corrected in a second version of his first work - visible in arXiv: https://arxiv.org/pdf/2209.13810.pdf . Since this is the paper публикацията *Non-Integrability of the Trapped Ionic System (2021),* published in the authoritative journal *Chaos, Solitons and Fractals* with a very high impact factor (7.8 for 2022), I assume that these errors/inaccuracies have no significant impact on the high value of published results. However, although formally correct, in my opinion in this case it is better not to use such citations as scientometric indicators, provided that even without them the applicant has sufficient number of citations (at least 16 are visible in Web of Science).

7. Personal impressions

I do not personally know the applicant and his previous work at SU, therefore I cannot express personal impressions about him..

8. Conclusion on the application of G. Georgiev

After getting familiar 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 DASRBA, the Regulations for its application and the relevant additional requirements of SU "St. Kliment Ohridski" (RCPASDHAPSU) 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 meets the minimum national requirements for the relevant professional field and no plagiarism has been found in the scientific works submitted for the competition.

I give my **positive** assessment to the application of G. Georgiev.

I.B. Svetlin Georgiev Georgiev

1. Summary of the documents, submitted by S. Georgiev

The applicant submitted 10 scientific publications in full text, as well as the necessary other documents (CV, lists of publications/citations, copies of diplomas, certificates, official notes and certificates from an employer, project manager, funding organization or project assignee , resumes, etc.) supporting the applicant's achievements. The documents submitted by the candidate in the competition meet the requirements of the Development of the Academic Staff in the Republic of Bulgaria Act (DASRBA), Regulations on the Implementation of the Development of Academic Staff in the Republic of Bulgaria Act (RIDASRBA) and the Rules on the Conditions and Procedure for Acquiring Science Degrees and Holding Academic Positions in Sofia University “St. Kliment Ohridski” (RCPASDHAPSU).

2. Biographical data

Svetlin Georgiev Georgiev received his higher education at Veliko Tarnovo University "St. St. Cyril and Methodius", V. Tarnovo, in 1997. In 2002 he defended his thesis on "Periodic solutions of non-autonomous systems of the Lotka-Volterra type" in Sofia University “St. Kliment Ohridski” and received a PhD in Mathematics (Differential Equations).

Afterwards he has worked as Assistant Prof., and from 2011 - as Senior Assistant Prof. at the "St. Kliment Ohridski", FMI, Department of Differential Equations. His main research interests and work are in the field of ordinary and partial differential equations.

He is actively engaged in editorial and review activities, he is a reviewer for 4 journals, in one he is the editor: Mathematical Methods in the Applied Sciences, in one - chief editor: "Cliord Analysis, Cliord Algebras and their Applications". His name appears in some scientific encyclopedias of the "Who's Who" type, as well as in annual world rankings (Top 100 Scientists for 2006, 2007, 2008; Top 100 Educators for 2009), etc. .

3. General characteristics of the scientific works and achievements

For the competition, the candidate Svetlin Georgiev Georgiev applies with a list of 10 titles (9 monographs and 1 article), referenced and/or indexed in the global scientific databases Web of Science and/or Scopus. All the monographs are his own work, and the article is co-authored by 2 scientists. The article is indexed (with IF 1.017) and is in the Q2 quartile of Web of Science for the corresponding year of publication (it is currently in Q1, but according to the rules it should be considered a Q2 publication, which is enough to gain the necessary points in the corresponding group). All 10 works are published in the period from 2014 to 2018, which surely means that they were not used in previous procedures for acquiring a scientific title and academic position (the last one for the candidate was from 2011).

The list of all publications of the applicant contains 64 titles (15 monographs/books and 49 articles). A list of 8 citations (all in SJR publications published in the last 5 years) is also presented. A check in Web of Science shows that his total citation count is at least 79 in that database alone.

The candidate has 57 articles visible in Web of Science (+ 5 preprints) and H-Index 6 according to this database.

The scientific works presented in the application fully comply with the requirements of the Development of the Academic Staff in the Republic of Bulgaria Act (DASRBA) and the Regulations for its implementation, as well as the Rules on the Conditions and Procedure for Acquiring Science Degrees and Holding Academic Positions in Sofia University “St. Kliment Ohridski” for holding the academic position "Associate Professor" in the scientific field and the professional direction of the competition.

4. Teaching activity assessment

Although I do not have a personal view of the candidate's educational and pedagogical activity, taking into account his long-term work as an Assistant Prof. and then as a Senior Assistant Prof. at FMI of SU, I have no doubt about his teaching skills and erudition.

5. Analysis of the applicant's scientific and applied scientific contributions in the materials submitted for review in the competition

Ever since his student years, Svetlin Georgiev has been engaged in the study of some classes of ordinary differential equations, for the existence of positive periodic solutions. He later applied the methodology to some classes of partial differential equations.

In the monograph "Integral Equations on Time Scales", Atlantis Press, 2016, presented for the habilitation thesis, some modern studies of integral equations on time scales are presented. The book contains 9 chapters, 402 pages and is generally an overview in this scientific area. It is difficult for me to assess the scientific achievements in it, but as a teaching tool it is undoubtedly useful. It has a large number of citations (18 without self-citations).

In the other publication from this group (B) - *T. Xiang and S. Georgiev, "Noncompact-type Krasnoselskii fixed point theorems and their applications", MMAS, Vol. 39, Issue 4, 2016, pp. 833-863,* some versions of fixed point theorems of a sum of two operators, one of which may not be continuous or compact, are considered. These results generalize or supplement previously known Krasnoselki-type theorems. Using the obtained more general fixed point theorems, the existence (and/or uniqueness) of solutions to some classes of problems (for transport equations, for global solutions of Darboux problems, for periodic solutions of a class of differential equations and for some integral Volterra equations with perturbations).

Plagiarism, according to the law, has not been found in the submitted works. In the only co-authored paper I have no doubt that the candidate's contribution is significant.

6. Critical remarks and recommendations

The applicant's Statement for original scientific contributions lacks specifics about his scientific and applied scientific achievements. However, due to his strong scientometric indicators, I am inclined to accept that it is rather a matter of omissions in the preparation of the documents for the competition than a matter of a lack of sufficient scientific contributions. Anyway it would be good if the candidate S. Georgiev would provide more clarity and exactness in his claims for scientific contributions in his presentation at the final meeting of the jury for the competition or before.

7. Personal impressions

I do not personally know the applicant and his previous work at SU, therefore I cannot express personal impressions about him..

8. Conclusion on the application of S. Georgiev

After getting familiar 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 DASRBA, the Regulations for its application and the relevant additional requirements of SU "St. Kliment Ohridski" (RCPASDHAPSU) 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 meets the minimum national requirements for the relevant professional field and no plagiarism has been found in the scientific works submitted for the competition.

I give my **positive** assessment to the application of S. Georgiev.

II. GENERAL CONCLUSION

Based on the above, as well as on the basis of a comparison between the scientometric indicators of the two worthy candidates for the position (and since I have no personal impressions of either of them), **I recommend (with the recommendation made in item 6 to S. Georgiev)** to 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 **Svetlin Georgiev Georgiev** to adopt the academic position "Associate Professor" in professional direction 4.5 Mathematics.

10.07.2023 г. Prepared by:

/Assoc. Prof. Dr. Tzvetan Ostromsky /