

OPINION

considering a competition for the academic position

"associate professor"

in professional direction PN 4.5 Mathematics (Mathematical modelling and its applications in robotics and mechatronics),

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

Faculty of Mathematics and Informatics (FMI),

announced in SG no. 20 of 08.03.2024 and on the FMI and SU websites

The opinion was prepared by: **Assoc. Prof. Dr. Alexander Aleksiev Stefanov – FMI, MRM department, PN 4.5 Mathematics,**

in my capacity as a member of the scientific jury for the competition according to Order No. RD 38-245 / 12.05.2023 of the Rector of Sofia University.

The **following candidate** has submitted documents for participation in the announced competition:

Chief Assistant Professor Dr. Dimitar Traiko Nedanovski, FMI, MRM department,
Sofia University "st. Kliment Ohridski"

I. General description of the presented materials

1. Application data

To participate in the competition, the candidate Dimitar Traiko Nedanovski submitted a list of 9 titles in total, 7 of which are in international journals, referenced and indexed in WoS and Scopus, and the remaining 2 are publications in conference proceedings, which are again indexed in WoS and Scopus. 3 other documents have also been submitted - a copy of the employment contract for the main assistant, an official note for teaching employment and a certificate of work experience in the specialty.

The documents are well prepared and clear. No spelling or punctuation errors found. The full texts of the publications are also provided.

The candidate has been cited 31 times, with no self-citations.

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

2. Applicant data

The candidate obtained a bachelor's degree in physics in 2007 at the Faculty of Physics of the University of St. Kliment Ohridski".

He graduated with a master's degree in 2009 in the master's program "Mathematics and Mathematical Physics" at the FMI of the SU "St. Kliment Ohridski", and the topic of his master's thesis is "Theory of renormalizations over configuration spaces". He defended his doctorate at the Institute for Nuclear Research and Nuclear Energy at the Bulgarian Academy of Sciences in 2016. The title of his dissertation is "Superconformal vertex algebras in four-dimensional space-time" supervised by Associate Professor Nikolay Mitov Nikolov. For the PhD, 3 publications were used, which are not included in the titles submitted for this competition.

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

The presented articles can be thematically divided into three areas:

- Mathematical modeling and optimization in oil refining processes - a number of studies related to the definition of functions that "well model and approximate" dependencies of certain quantities in oil refining processes are considered here. The ultimate goal is to create a model that gives the fluid parameters (viscosity, density, etc.) of petroleum distillation products with good accuracy. The main contribution of the candidate is mathematical modeling and data processing.
- Mechanics and Control of a Walking Robot – this topic addresses the development of an innovative walking robot based on a minimalist approach. Despite its relatively simple construction, the robot is capable of moving back and forth by walking, turning at any angle, going around obstacles and climbing stairs. Again, the candidate's main contribution is mathematical modeling – describing the robot's kinematics and building a dynamic model aimed at improving its performance.
- Renormalizations in quantum field theory - this topic is entirely theoretical and is devoted to regularization and renormalizations in quantum field theory. This topic overlaps with the topic of the doctoral dissertation and the papers presented on it, and here the candidate has a major contribution.

In short, it can be said that:

- a) the scientific works **meet the minimum national requirements** (under Article 2b, Paragraphs 2 and 3 of the ZRSARB) 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 (4.5 Mathematics);
- b) the scientific works presented by the candidate **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.

4. Characteristics and assessment of the candidate's teaching activity

The candidate leads classes at the FMI of the SU "St. Kliment Ohridski" from 2017, which includes lectures on Applied Mathematics 2 (the course is complex and includes - MAFMP, Complex Analysis, Vector and Tensor Analysis) for KI, KFE majors at the Faculty of Physics at SU. He also leads seminars on Applied Mathematics 3 (differential equations - ordinary and partial) for the same majors, as well as on Mathematics for the Molecular Biology major at the Faculty of Science, SU.

The applicant has submitted an officially issued certificate of teaching employment, from which it is evident that the applicant meets and exceeds the minimum requirements (on average 576.7 hours of lectures/seminars for the period 2017-2024 with a mandatory 360 hours).

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

The presented publications represent a significant contribution in the above-mentioned directions. The candidate clearly possesses in-depth knowledge in the field of mathematical modeling and statistics, as well as the skills needed to apply them in practice.

6. Critical notes and recommendations

I have no significant notes or recommendations for the candidate.

7. Personal impressions of the candidate

I personally know the candidate from 2013 onwards from the doctoral program in Theoretical and Mathematical Physics at Faculty of Physics, SU. Since 2017, he has been appointed to the MRM section of FMI, SU, of which I am also a member. My impressions are that he is a serious and responsible person, with a high level of professionalism and competence. I would definitely say that he is a perfectionist and tries to "polish" the solution of the tasks he is working on.

8. Conclusions on the application

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.

II. GENERAL CONCLUSION

Based on the above, I **recommend** the scientific jury to propose to the competent selection authority of the Faculty of Mathematics and Informatics at SU "St. Kliment Ohridski" to choose Chief Assistant. Prof. **Dr. Dimitar Traiko Nedanovski** for the academic position of "associate professor" in professional direction 4.5 Mathematics (Mathematical modelling and its applications in robotics and mechatronics).

26.06.2024 г.

Signature:

(Assoc. Prof. Dr. Alexander Stefanov)