STATEMENT

on the materials submitted for participation in the contest for occupation of the academic position "Associate Professor" in the Faculty of Mathematics and Informatics of Sofia University "St. Kliment Ohridski" in Area of Higher Education 4. Natural Sciences, Mathematics and Informatics, Professional Field 4.5 Mathematics (Mathematical modeling and applications in robotics and mechatronics), announced in State Gazette (SG) No 20/08.03.2024.

In the Contest for the academic position "Associate Professor" announced in State Gazette No 20/08.03.2024 and on the web site of Sofia University "St. Kliment Ohridski" (in short, henceforth abbreviated as SU) for the needs of Faculty of Mathematics and Informatics (FMI) participates a candidate:

- **Assistant Professor Dimitar Trajko Nedanovski, Ph.D. – Faculty of Mathematics and Informatics, Sofia University "St. Kliment Ohridski".**

Review Author: Professor, Kamen Krastev Delchev, Ph.D. – Faculty of Mathematics and Informatics, Sofia University "St. Kliment Ohridski" (part-time lecturer).

By Order No RD 38-204/ 30.04.2024 of the Rector of SU I was appointed as a member of the Scientific Jury of the aforementioned Contest. By a decision of this Scientific Jury from 14.05.2024 I was assigned to write a statement of the Contest.

I.   General description of the procedure and submitted documents
1. General description of the materials submitted by Dr. Dimitar Nedanovski.

Dr. Dimitar Nedanovski presented a list of a total of 9 titles, including 9 publications in international scientific journals and scientific forums. A total of 4 other documents (or groups of documents) are also presented, according to the Regulations for the terms and conditions for acquiring scientific degrees and holding academic positions at SU "St. Kliment Ohridski".

The documents submitted by the candidate in the competition correspond to the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Rules for Implementation of the ADAS in the Republic of Bulgaria (RI-ADAS in the RB) and the Rules on the Terms and Requirements for Acquisition of Scientific Degrees and Occupation of Academic Positions at Sofia University (RTR-ASD-OAP at SU).

2. Brief biographical data about the candidate Dr. Dimitar Nedanovski.

Dr. Dimitar Trajko Nedanovski graduated consecutively:

- "Bachelor of Physics" (2007) - SU "St. Kliment Ohridski", Faculty of Physics,
- "Master of Mathematics" (2009) - SU "St. Kliment Ohridski", Faculty of Mathematics and Informatics,
- "Doctor", professional field 4.1 "Physical Sciences" (theoretical and mathematical physics) (2016) - Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences.

From 2008 to 2009, the candidate worked as a part-time lecturer at the "St. Kliment Ohridski", Faculty of Mathematics and Informatics, Department of "Algebra". From 2014 to 2015 he was a researcher - Sciex at the University of Geneva, Department of Mathematics, and from 2009 he worked as a physicist at the Institute for Nuclear Research and Nuclear Energy, Bulgarian Academy of Sciences. During the period 2017-2019, he held the position of "assistant professor in mathematics", and from 2019 to the present, Dr. Dimitar Nedanovski held the position of "principal assistant professor" in the Faculty of Mathematics and Informatics of SU "St. Kliment Ohridski", Department of "Mechatronics, robotics and mechanics".

3. General characteristics of the scientific works and achievements of the candidate Dr. Dimitar Nedanovski.

The scientific works submitted for participation in the competition can be attributed to the following scientific fields: Mathematical modeling and optimization in oil refining processes - 5 publications; Mechanics and control of a walking robot - 3 publications; Renormalizations in quantum field theory - 1 publication.

The scientific works meet the minimum national requirements (under Article 2b, Paragraphs 2 and 3 of the ADASRB) 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. They fully cover and exceed the minimum national requirements (for "associate professor"), as for group B the presented articles give 120 points with a requirement - 100 points, for group D - 270 points with a requirement - 200 points, and for group D – 248 items, if required – 50 items.

The scientific works presented by the candidate do not repeat those from previous procedures for acquiring a scientific title and academic position, and no plagiarism has been proven according to the law.

4. Characteristics and evaluation of Dr. Dimitar Nedanovski's teaching activity

The assessment of the candidate's educational and pedagogical activity is definitely positive. According to the submitted reference, the candidate reports significant teaching activity:

- Lectures – a total of 14 semesters (12 - Applied Mathematics 2, specialty Computer Engineering, specialty Communications and Physical Electronics, Faculty of Physics of SU; 2 - Applied Mathematics 4, specialty Communications and Physical Electronics, Faculty of Physics of SU),

- Exercises - a total of 28 semesters (4 - Analytical Mechanics, specialty Applied Mathematics, Faculty of Mathematics and Informatics of SU; 14 - Mathematics, specialty Molecular Biology, Faculty of Biology of SU; 10 - Applied Mathematics 3, specialty Computer Engineering, specialty Communications and physical electronics, Faculty of Physics of SU).

5. Detailed analysis of the scientific and applied achievements of Dr. Dimitar Nedanovski contained in the materials submitted for participation in the competition

The scientific contributions in the 9 publications presented for the competition (file - 10B.SelectedPublicationsList.pdf) are distributed in the following three areas:

(A) Mathematical Modeling and Optimization in Oil Refinery Processes - Publications 1, 3, 4, 5, 6.

(B) Mechanics and Control of a Walking Robot - Publications 2, 8, 9.

(C) Renormalizations in Quantum Field Theory - Publication 7.

Contributions under direction (A) are expressed in the proposal and research of functions that "well model and approximate" real processes and phenomena occurring in the processing of oil and oil derivatives.

For example, in publication 6 of the file "10B.SelectedPublicationsList.pdf", four nonlinear regression techniques for gas oil viscosity modeling were investigated and four models with relatively high viscosity calculation accuracy were developed.

According to the applicant, no better models have been described in the literature known to the authors regarding the predicted results.

A guarantee for the high level of scientific publications in direction (A) is the relatively high impact factor of the journals in which they are published (publ. 1 – IF 7.4, 3, 4, 5 – IF 3.2, 6 – IF 3.3).

Contributions in direction (B), reflected in publications 2, 8 and 9, concern an innovative design of a walking robot with a minimum number of degrees of freedom (2 degrees), providing a maximum functional volume of movements. A model of the robot's dynamics is created and original control algorithms optimizing the motion parameters are proposed (publ. 2). The candidate's contribution in Publications 9 and 8 is to research on robot kinematics and dynamics, and his contribution to Publication 2 is a theoretical study of proposed laws of motion. The high impact factor of publication 2 – IF 3.9 should be noted.

The contributions in direction (B) reported in publication 7 concern a recursive analytic renormalization procedure in coordinate space for massless quantum fields.

The 9 publications presented for the competition were cited 31 times in scientific works referenced in SCOPUS.

6. Critical remarks and recommendations of Dr. Dimitar Nedanovski's candidacy

I have no critical remarks about the candidate.

7. Personal impressions for the candidate Dr. Dimitar Nedanovski

I have known Dr. Dimitar Nedanovski since 2018, when I started leading the course in "Mathematics" for the "Molecular Biology" specialty at the "Faculty of Biology" of SU, and Dr. Nedanovski, with high professionalism and great responsibility, led the exercises to this, a relatively large course, of about 100 students. The system of evaluating students in the course is mixed, including preparation and personal verification of the solutions to mathematical problems for two control papers and two exams, which significantly burdens the work of the Assistant Professor of the course. I must note that I value extremely highly the joint teaching activity with Assistant Professor Nedanovski and I hope he will become the holder of this course.

8. Conclusion on Dr. Dimitar Nedanovski's candidacy

After having familiarized myself with the materials and scientific works of the candidate 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 ADASRB, the Regulations for its application and the relevant Regulations of the 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.

II.   GENERAL CONCLUSION

Based on the above, **I recommend the scientific jury to propose to the Faculty Council of the Faculty of Mathematics and Informatics at Sofia University "St. Kliment Ohridski" to elect Assistant Professor Dr. Dimitar Trajko Nedanovski to occupy the academic position of "associate professor" in professional direction 4.5. Mathematics (Mathematical modeling and applications in robotics and mechatronics).**

Date: 14.06.2023   Signature: ....

                                                                         /Prof. Kamen Delchev/