STATEMENT OF ACADEMIC OPINION

regarding the competition for the academic position of "associate professor" in high education field 5.1 Mechanical Engineering, scientific specialty "Robots and Manipulators" (Application of Service Robotics and Control Systems with Elements of Artificial Intelligence), announced in the State Gazette, No. 61/29.07.2025, for the needs of the Institute of Robotics "St. Ap. and Ev. Matey" at the Bulgarian Academy of Sciences, section "RIMIS", laboratory NRAIL, with candidate Chief Assistant Professor Dr. Eng. Georgi Tsvetanov Angelov.

Member of the scientific jury: Prof. Dr. Eng. Anatoliy Trifonov Alexandrov (according to Order No. 118/29.09.2025 of the Director of IR-BAS).

1. General characteristics of the candidate's scientific research and applied scientific activities

Chief Assistant Professor Dr. Georgi Angelov participates in the competition for the academic position of "associate professor" with 25 scientific works, including 1 monograph (B3), 10 scientific publications (G7.1 – G7.10) in publications referenced and indexed in world-renowned scientific information databases (Scopus), and 14 scientific publications (Г8.1 – Г8.14) in non-referenced peer-reviewed journals or in edited collective volumes.

The publications can be classified as follows:

- By place of publication:
  - reports in proceedings of international scientific conferences abroad – 4 [G7.4, G7.5, G7.7, G7.10];
  - articles in foreign journals and magazines – 3 items [G7.8; G8.9; G8.10];
  - articles in national journals – 15 items [G7.1; G7.2; G7.9; G8.1 - G8.8; G8.11 - G8.14];
  - reports in proceedings of international scientific conferences in Bulgaria – 2 items [G7.3, G7.6].
- By language of writing:
  - in English – 20 items [G7.1 – G7.10, G8.1 - G8.4, G8.9 – G8.14];
  - in Bulgarian – 4 [G 8.5 – G8.8].
- By number of co-authors:
  - solo – 1 [G1];
  - with one co-author – 5 [G7.2, G8.1 - G8.4];
  - with two co-authors – 4 [G7.8, G7.9, G7.10, G8.5];
  - with three or more co-authors – 14 [G7.2 – G7.5, G.7.7, G8.6 – G8.14].
- In 4 of the publications, Dr. Georgi Angelov is the first among the co-authors and the author of the published monograph.

Dr. Georgi Angelov meets and, according to certain indicators, exceeds the minimum national requirements. He defended his dissertation on the topic: "Research, modeling, and implementation of software systems for the control and communication of service and mobile robots in a TCP/IP network environment," in high education field 5.2 Electrical Engineering, Electronics, and Automation, scientific specialty "Robots and Manipulators," diploma No. 001059/15.08.2018 (indicator A – 50 points).

He has submitted a habilitation thesis – a monograph on the topic: "Modern Applied Service Robotics" (ISBN: 978-619-93266-0-2) (indicator B.3 – 100 points), 24 scientific publications (indicator D – 230 points), of which 10 scientific publications in editions referenced and indexed in world-renowned scientific information databases (Scopus) (indicator D7 - 144.3 points), 14 scientific publications in non-referenced peer-reviewed journals or in edited collective volumes (indicator D3 - 90.7 points), 7 citations (indicator D12 - 70 points).

The candidate has extensive scientific and implementation activity. According to the submitted report on scientific research activity, Chief Assistant Professor Georgi Angelov has participated in 13 contracts, acting as project manager in 5 of them and as a key expert in 2. The total

financial value of five of the projects amounts to BGN 40,314. Dr. Georgi Angelov has an h-index of 4.

2. Assessment of the candidate's activity

During the period 1996-2001, Georgi Angelov obtained a higher education degree from Sofia University "St. Kliment Ohridski," "Master degree", majoring in "Physics Engineering", specializing in "Medical Physics" and "Integral and Discrete Optoelectronics in Optical Communications", and in 2018 - the educational and scientific degree "Doctor".

Georgi Angelov has worked as technical director at DND 2000 EOOD and manager of Pixeye OOD, and since 2011 he has been manager of Robotic OOD. Since 2017, he has been an assistant professor at the St. Ap. and Ev. Matey Institute of Robotics at the Bulgarian Academy of Sciences, and since 2019, he has been a chief assistant professor and head of the National Laboratory of Robotics and Artificial Intelligence.

Chief Assistant Angelov participates in the development of a user interface and cloud software for a remote monitoring camera with the ability to transmit data via a mobile network and solar power. The product was awarded a gold medal at the International Technical Fair in Plovdiv in 2008.

Dr. Eng. G. Angelov is one of the initiators and implementers of a state educational standard, as well as a curriculum, study plan, and examination program for Bulgaria's first "Robot Programmer" major.

The above information gives me reason to assess the work of Chief Assistant Professor Dr. Angelov as very good.

3. Main scientific and applied contributions

I accept the contributions formulated in the presented works. They are of a scientific and applied nature and are related to proving, with new means, significant new aspects of existing scientific problems and obtaining confirmatory facts in the field of electronic control and power supply systems in service robotics.

3.1. Contributions in the habilitation thesis – Monograph

- A new educational specialty in robotics has been created to train engineers and programmers capable of working with new-generation robotic systems. A state educational standard and teaching documentation (curriculum, syllabus, examination program) have been developed for Bulgaria's first major in "Robot Programming."
- A conceptual model has been developed and a practical software system for controlling service robots has been implemented for educational purposes. A methodology has been presented for building a programming environment in which trainees can work directly with robots without the need for additional applications.
- An open system for STEM education in robotics has been designed and implemented, which includes robots built on the basis of open-access modular architecture, ensuring easy configuration, expansion, and adaptation according to specific educational or practical needs. The proposed solution is highly flexible and supports the integration of additional modules, sensors, and algorithms, including those with artificial intelligence elements. The open architecture allows each user to freely experiment, expand the functionality of the robots, and create their own applications according to their specific goals.

3.2. Contributions in publications, other than those equivalent to a habilitation thesis

- *Contributions in the field of educational robotics*

- A conceptual model has been created and a practical software system and user interface for controlling service robots for training have been implemented. A methodology has been proposed for building a software framework in which students can learn directly without the need for additional application software. The ability to easily switch between different operating modes has been provided, allowing basic and advanced functionalities of robotic systems to be programmed in a we

environment. A key feature is ability to integrate robots into education in robotics, computer science, and electronics (G7.5, G7.7, G8.2, G8.12).

- Cyber-physical systems for educational purposes have been created, including service robots, teachers, and students in a network environment, introducing a new model of learning—remote, interactive, and based on real robots (G7.4, G7.5, G8.1, G8.8 - G8.11, G8.14).

- A series of educational robots, BeBot and MaxiBot, have been designed, developed, and constructed with a modular architecture and open access, which allows for easy configuration, upgrading, and adaptation to specific educational or practical needs (G7.4, G7.6 - G7.8, G8.7, G8.12).

- *Contributions in the field of applied service robotics*

- A conceptual model of a charging system for the production and storage of green hydrogen has been created, which is applicable for powering service robots (G7.1, G7.2, G7.8, G8.4, G8.13).

- A methodology for the implementation of a voice-controlled user interface using elements of artificial intelligence has been created and tested (G8.2, G8.3).

- The high-tech transport and logistics robot "Spartak" has been developed, which features innovative architecture, modern control and drive systems, leading to adaptability to a variety of working environments. The integrated ROS (Robot Operating System) offers an open and flexible environment for programming, development, and upgrading, thanks to which the robot can be easily adapted to specific tasks and integrated with external sensors and navigation systems (G7.3, G8.5, G8.6).

- *Contributions in the field of medical robotics and electrochemistry*

- An automated, computer-controlled electrochemical impedance spectrometer (EIS) has been designed and developed, which is used in the study of bilayer phospholipid membranes. The system is automated, which reduces the risk of human error and ensures high repeatability of experiments (G7.9, G7.10).

4. Significance of contributions to science and practice

The significance of the candidate's contributions is assessed based on the citations listed in the competition documents. A list of 7 citations in scientific publications, referenced and indexed in world-renowned scientific information databases, is presented, with publication G7.8 being cited 4 times. This leads me to conclude that Chief Assistant Professor Georgi Angelov, PhD, is a well-known author and has published in significant scientific forums in the field of the competition.

5. Critical remarks and recommendations

I found no significant omissions in the works of Assoc. Prof. Georgi Angelov, PhD. I believe that the contributions can be summarized. I recommend preparing publications with IF, independent publications, and conducting a teaching process.

CONCLUSION

In conclusion, I can give a positive assessment of the overall research and teaching activities of Chief Assistant Professor Dr. Eng. Georgi Angelov, which fully meet the requirements for the academic position of "associate professor". Sufficient and significant scientific and applied contributions have been made.

Based on my review of the scientific works presented, their significance, and the scientific and applied contributions they contain, I find it reasonable to propose that Chief Assistant Professor Dr. Eng. Georgi Tsvetanov Angelov to occupy the academic position of "associate professor" in professional field 5.1 Mechanical Engineering, scientific specialty "Robots and Manipulators" (Application of service robotics and control systems with elements of artificial intelligence).

Date: 03.11.2025 г.

MEMBER OF THE JURY: .....
/Prof. A. Alexandrov/