O P I N I ON

by Prof. Dr. Eng. Toshko Ganchev Nenov, Technical University of Gabrovo

on the materials submitted for participation in a competition
for occupying the academic position of Associate Professor in
Higher Education Field – 5. Technical Sciences,
Professional Field – 5.2 Electrical Engineering, Electronics and Automation,
Specialty – Automated Information Processing and Control Systems (Technical Means for Automation, Design of Control Systems)

The opinion has been prepared in accordance with Order № 3-01-409/25.09.2025, issued by the Rector of the Technical University of Gabrovo (TU-Gabrovo), and based on the decision of the scientific jury for the procedure (Protocol № 1/29.09.2025).

The competition for the position of Associate Professor was announced in the State Gazette, issue 48/13.06.2025, as well as on the official website of TU-Gabrovo, for the needs of the Department of Automation, Information and Control Engineering (AICE) at the Faculty of Electrical Engineering and Electronics (EE). Chief Assistant Professor Dr. Eng. Georgi Ivanov Mihalev participated in the competition as a candidate.

1. Overview of the Content and Results of the Submitted Works

Chief Assist. Prof. Dr. Eng. Georgi Ivanov Mihalev participates in the competition with 44 scientific publications, one textbook, and one teaching manual. A certificate for an article in the Journal of Imaging (indexed with an Impact Factor) is attached to the documents; however, it is not included among the publications submitted for the competition.

The submitted scientific works are divided into two groups:

I. Scientific publications equivalent to a monographic work (group of indicators B4) - **11** papers published in editions that are referenced and indexed in world-renowned databases with scientific information. All of them are conference papers presented at international scientific conferences and are referenced and indexed in Scopus. Nine of the reports were presented at international scientific conferences held in Bulgaria, and two - in Romania. One of the publications appears in conference proceedings with an SJR index in Scopus.

II. Scientific publications other than those, equivalent to a monographic work (indicator group B8) – **33** papers published in non-refereed journals with peer review or in edited collective volumes. Of these, 8 are published in Bulgarian journals, 21 – in proceedings of international scientific conferences and symposia held in Bulgaria and 4 – in proceedings of national scientific conferences held in Bulgaria.

The total number of publications submitted for the competition can be classified as follows:

By place of publication:

- Articles in national journals – **8**;
- Reports in proceedings of international scientific conferences abroad – **2**;
- Reports in proceedings of international scientific conferences and symposia in Bulgaria - **30**;
- Reports in proceedings of national scientific conferences in Bulgaria – **4**.

By language:

- In English - **11**;
- In Bulgarian – **33**.

By number of co-authors:

• Single-author papers - **4**;

• With one co-author – **10** (in **5** of them the candidate is the first author);

• With two or more co-authors – **30** (in **9** of them the candidate is the first author).

The candidate participates in the competition with one co-authored textbook (Yordanov St., G. Mihalev "Programming and Using Computers. Lecture Notes") and one independent textbook/ one independently authored teaching manual (G. Mihalev "Designing Control Systems. Laboratory Exercise Manual).

Since there are no statements or protocols specifying the individual contributions of co-authors, I assume that all co-authors contributed equally.

The candidate has submitted 11 publications that are referenced and indexed in world-renowned databases of scientific information, as equivalent to a monographic work. These primarily concern the modeling and control of an electrohydraulic system. A nonlinear and a linearized state-space model have been developed, alongside system identification and optimization. Various regulators have been tested (PI, PID, fuzzy, robust, model-predictive, adaptive and multiparametric). The influence of the working fluid temperature on the performance of the electrohydraulic servo system in dynamic mode has also been examined.

The remaining publications are grouped into the following areas:

• Artificial intelligence and machine learning in automation;

• Automation and robotics;

• Intelligent systems for monitoring and process control.

A list of 15 citations in 9 publications is attached to the candidate's documentation. According to Scopus, excluding self-citations of all co-authors, Chief Assistant Professor Georgi Mihalev has 7 citations in 5 publications and an h-index 1.

In summary, the following conclusions can be drawn regarding the candidate's publication activity:

• The candidate meets the national minimum requirements for the academic position of Associate Professor according to the respective groups of indicators;

• The candidate also meets the scientometric criteria set by the Technical University of Gabrovo for the position of Associate Professor.

2. General Characteristics of the Candidate's Activities

2.1. Educational and pedagogical activity

In 2017, Dr. Georgi Ivanov Mihalev began his academic career at the Department of Automation and Control Engineering as a part-time lecturer. In the same year, he was appointed as a full-time Assistant Professor. In 2019, following a competitive selection process, he was promoted to the position of Chief Assistant Professor in the same department.

During his tenure as Chief Assistant Professor, the candidate has delivered lectures in the following subjects: "Technical Means of Automation", "Higher Mathematics I", "Higher Mathematics II" and "Informatics".

He has also conducted laboratory classes in: "Programming and Use of Computers", "Applied Programming", "Design of Control Systems", "Real-Time Control Systems", "Informatics", "Higher Mathematics I", "Higher Mathematics II" and "Teaching Practice".

Additionally, he has supervised course projects in the disciplines “Technical Means of Automation” and “Design of Control Systems”, and has acted as a supervisor for graduate thesis projects.

2.2. Scientific and Applied Scientific Activities

As a student and later as a PhD student, the applicant participated as a member of the research team in 3 research projects funded by the state budget. As a lecturer in the Department of Automation, Information and Control Engineering, he participated in 7 such projects as a member of the research team.

2.3. Implementation activities

The candidate has not submitted documentation proving the implementation of his research outcomes. However, based on the information provided in his CV, it can be concluded that he maintains ties with industry, and that some of his developments are oriented toward industrial applications. Several of his publications describe the development of controllers and intelligent automated systems.

3. Contributions. Significance of the Contributions for Science and Practice

The publications submitted by Chief Assist. Prof. Georgi Mihalev, considered equivalent to a monographic work, present developments, research, and contributions in the field of modeling and control of an electrohydraulic system. These works have been presented at international scientific conferences held in Bulgaria and abroad.

In the publications submitted by Chief Assist. Prof. Georgi Mihalev, the following scientific-applied and applied contributions can be summarized:

Scientific-Applied Contributions

• Synthesis and verification of a nonlinear mathematical model of an electrohydraulic system, taking into account the influence of temperature and the change in viscosity of the hydraulic fluid on the system's dynamic behavior.

• Development of a methodology for approximating linear systems with parametric uncertainty using artificial neural networks (ANNs) to automatically generate decomposition coefficients through orthonormal Laguerre functions.

• Design of a MISO control architecture for an electrohydraulic tracking system, consisting of a conventional PID controller in the deviation control channel and a fuzzy PID controller in the disturbance channel.

• A methodology for automated calibration of an industrial camera using an industrial robot and a developed hardware-software system.

• Synthesis of a model-predictive controller for electrohydraulic system control, utilizing orthonormal Laguerre functions and an additional signal from the output.

Applied Contributions

• Design and implementation of a real-time dynamic control system for an electrohydraulic system.

• Development of a real-time monitoring system for beehive conditions.

• Design of an integrated, intelligent IoT-based system for real-time solid waste collection management.

• Development and implementation of a robotic anthropomorphic finger as part of a robotic arm.

• PC-based control system for a photovoltaic solar power plant.

• Development of an integrated machine vision-based control system for a vibrating hopper.

• Development of a real-time productivity and capacity utilization monitoring system for a light industry enterprise.

4. Assessment of the Candidate's Personal Contribution

Among the submitted publications, 4 (9.1%) are single-authored, and the candidate is the first author in 14 (32%) of the works. In total, he has a leading role in 41% of the publications. Ten of the papers were co-authored with one collaborator, and thirty with two or more co-authors.

This data confirms that the personal contribution of Chief Assist. Prof. Dr. Eng. Georgi Mihalev is substantial in the publications submitted for the competition.

5. Critical Notes and Recommendations

I would recommend that the candidate expand his publication activity in international journals, particularly those indexed with an Impact Factor, which would contribute to greater visibility and citation of his work both in Bulgaria and internationally.

6. Personal Impressions

I have known Chief Assist. Prof. Dr. Georgi Ivanov Mihalev since he enrolled as a student at the Technical University of Gabrovo in 2008. I have observed his development as a student, PhD student, Assistant Professor, and Chief Assistant Professor in the Department of Automation, Information, and Control Systems. He demonstrates an active commitment to both teaching and research and is characterized by strong motivation and dedication to his academic work.

7. Conclusion

Based on the analysis of the materials submitted for the competition, and taking into account the significance of the scientific-applied and applied contributions, I believe that Chief Assist. Prof. Dr. Eng. Georgi Ivanov Mihalev fully meets the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for its Implementation, and the Regulations for the Acquisition of Scientific Degrees and Occupation of Academic Positions at the Technical University of Gabrovo.

The candidate meets all relevant criteria, and in some indicators, significantly exceeds the minimum requirements for the academic position of **Associate Professor**.

All of the above provides a solid basis for my positive assessment of the candidate and my confident recommendation that

Chief Assist. Prof. Dr. Eng. Georgi Ivanov Mihalev
be appointed to the academic position of Associate Professor in:
Field of Higher Education - 5. Technical Sciences
Professional Field - 5.2 Electrical Engineering, Electronics and Automation
Specialty - Automated Information Processing and Control Systems.

17.10.2025 Member of the scientific jury:
/Prof. T. Nenov/