O P I N I O N

Authored by prof. Eng. Ivo Krastev Malakov, DSc - Technical University - Sofia
concerning materials submitted for participation in competition for awarding the academic position of “Associate professor”
in the area of higher education - 5. Technical Sciences,
in professional field 5.1. Machine engineering,
scientific major “Electronic (analog and digital) measuring transducers and instruments ”

In the competition for associate professor, announced in the State Gazette, issue 48/13.06.25 and on the official website of TU-Gabrovo for the needs of the Department of Mechanical Engineering and Instrumentation at the Faculty of Mechanical Engineering and Instrumentation, the only candidate participating is Senior Assistant Eng. Borislav Atanasov Georgiev, PhD - Department of Mechanical Engineering and Instrumentation, Faculty of Mechanical Engineering and Instrumentation at the Technical University - Gabrovo.

1. Overview of content and results in the submitted works

The works submitted for participation in the competition include 1 monograph (B.3) on the topic "Adaptive methods for controlling the dynamics of electro-hydraulic systems", 11 scientific publications in publications that are referenced and indexed in world-renowned databases of scientific information (Web of Science and/or Scopus) (Г.7), 15 scientific publications in non-refereed journals with scientific review or in edited collective volumes (Г.8) and 1 textbook - "Guide to laboratory exercises on elements of automation".

The monograph reviews the development, structure and areas of application of electro-hydraulic drives, clarifies their advantages, limitations and development trends. Based on a thorough analysis of the main nonlinearities, external influences and structural features affecting the stability and accuracy of the systems, the author has proposed approaches for their compensation through adaptive and intelligent algorithms. The monograph analyzes the possibilities for integrating various principles and algorithms for adaptive control - recursive identification, Kalman filters, hybrid models, etc., in frequency-controlled electro-hydraulic systems and evaluates the effect of their application, expressed in improving stability, accuracy and energy efficiency. Examples are presented, convincingly proving the applicability of the proposed solutions in industrial, robotic and measuring systems.

The candidate's scientific works are systematized in three thematic areas.

The publications [Г.7.2], [Г.7.3] and [Г.7.4] in the first thematic area "Mathematical models for stochastic systems and processes" are devoted to the development of mathematical models and analysis of methods for measuring the angular orientation of moving objects. In paper [Г.7.11] an integrated method for measuring angular orientation is presented, combining a simplified mechanical structure to reduce instrumental errors with a hardware-software platform for adaptive compensation of dynamic errors, in publications [Г.8.12], [Г.8.13], [Г.8.14] mathematical and simulation models for studying the dynamic indicators of electro-hydraulic systems based on MATLAB Simulink have been created, and in [Г.8.7] and [Г.8.9] methods for analysis and simulation of Kalman filter and STFT have been developed.

In the second thematic area "Optimization of electrohydraulic systems" the results of development and application of methods for increasing the efficiency [Г8.15], accuracy and reliability [Г7.7], [Г7.8] of electrohydraulic systems through improvement of structural elements, optimization of parameters and implementation of modern measurement and diagnostic approaches [Г7.10] are presented. Based on experimental and numerical analyses, solutions have been proposed for reducing energy losses, improving dynamic characteristics and extending the service life of real systems from the industry.

The publications [Г7.1], [Г8.8] and [Г7.6] in the third thematic area "Additive technologies and 3D metrology" are aimed at improving the processes in additive manufacturing through the application of modern methods for 3D metrology and statistical analysis of geometric deviations.

The candidate has also included five other publications devoted to various applied aspects of engineering design – analysis and increasing accuracy in mechanical watches [Г7.5], [Г7.9]; methods for synthesis of gears with asymmetric tooth profile [Г8.10], [Г8.11]; application of statistical methods for control and validation of the production process based on modern measuring instruments [Г8.6].

The textbook “Guide to Laboratory Exercises on Elements of Automation” is intended for students of the specialty “Mechatronics”. It covers both theoretical foundations and practical aspects of the discipline, which are presented in a methodical sequence. The manual has high practical utility for the training of students.

I believe that the works presented for participation in the competition are in topical areas relevant to science and practice, and the candidate uses modern methods and means to solve the problems and achieve the relevant goals.

2. General description of candidate’s activity

2.1. Teaching and pedagogical activity (work with students and doctoral students**)**

I assess the candidate's pedagogical training and his work as a teacher as corresponding to the level of the requested academic position on the basis of the following:

● Conducts lectures and laboratory exercises in a number of disciplines such as "Elements of Automation", "Diagnostics of Mechatronic Products", "Measurement Converters", "Sensors in Mechatronics", "Materials Recycling", "Diagnostics of Mechatronic Systems", etc., included in the curricula of specialties at the Faculty of Mechanical Engineering and Instrumentation - full-time and part-time education for the educational and qualification degrees "bachelor" and "master".

Both his excellent professional qualification and his good language preparation contribute to the high level of lectures delivered to students.

● He has developed the curricula for all the disciplines in which he lectures.

● To ensure the learning process, he has published a manual for laboratory exercises on elements of automation. The published monograph can be used in the training of doctoral students and students in the field of automation, mechatronics and control of hydraulic and electromechanical systems.

● Actively participates in the renewal of the information and material base in the laboratories of the department and the faculty, which are used in the educational and research process.

2.2. Scientific and scientific-applied activity

To participate in the competition, the candidate has submitted 1 monograph and 26 scientific publications (articles in journals and reports at conferences), of which 11 are in refereed and indexed editions (1 has an “impact factor” and 2 have an SJR in the SCOPUS database), which is important evidence of the high level of the candidate’s scientific work. Of the 26 publications (articles and reports), 4 are independent, and in 10 publications Dr. Georgiev is the first author, which emphasizes his ability to formulate scientific ideas and lead their practical application. In a significant part of the remaining works, he is the second or third author.

I would like to note the systematicity and methodical planning with which the candidate’s publication activity is organized. This shows sustainability in terms of scientific development, commitment and serious interests in the field of the competition’s topic.

The publications do not repeat the articles and reports attached to the competition documentation for the acquisition of the ONS "doctor".

The list of citations for participation in the competition presents 11 issues in scientific publications, referenced and indexed in world-renowned databases of scientific information and 8 issues in non-referenced journals with scientific review. All this convincingly shows that the candidate's works are known to the scientific community in our country and abroad.

The candidate has participated in 7 international, national and university projects related to the development of intelligent measuring systems and adaptive control algorithms.

The analysis of the data in the prepared reference and the evidentiary material presented by the candidate for the fulfillment of the minimum national requirements by groups of indicators for the academic position "associate professor" in area 5. Technical sciences, professional field 5.1 Mechanical engineering shows that the requirements of the ZRASRB and PPZRAS have been met by all groups of indicators. The minimum requirements of the Regulations for acquiring scientific degrees and occupying academic positions at Technical University - Gabrovo have also been fulfilled.

2.3. Implementation activity

The documents for participation in the competition do not present evidence of implementation activity, but I believe that a number of Dr. Georgiev's scientific developments have an applied focus and potential for implementation in industry.

3. Contributions (Scientific, Scientific and applied, Applied**). Significance of contributions to science and practice.**

I accept and positively evaluate the scientific and applied contributions of the candidate, indicated in the report on the contributions prepared by him. They correspond to the professional direction and scientific specialty of the announced competition "Electronic (analog and digital) measuring converters and devices".

I believe that the scientific and applied contributions contained in the works of the candidate are relevant and significant for the development and enrichment of scientific research in the thematic areas in which he works. The presented works are also important for practice with the necessary degree of applicability. The contributions can be attributed to the groups of proving by new means significant new aspects of already existing scientific fields, problems, theories, hypotheses; creating new classifications, methods, constructions, technologies and obtaining confirmatory facts.

4. Assessment of the personal contribution of the candidate

The personal participation of the candidate can be judged by the number of independent publications - 4, in another 10 of which he is the first author, out of a total of 26 submitted for the competition. This gives me reason to claim that the contributions are the personal work of the candidate or with his leading role.

5. Critical remarks and recommendations

I have no significant comments to dispute the main scientific and applied contributions in the presented works of Senior Assistant Professor Dr. Borislav Georgiev.

I recommend that the candidate concentrate his research activities in less thematic areas and to intensify his work with young researchers and doctoral students on the topics of the established scientific school of Prof. Dr. Dimitar Dichev.

6. Personal Impressions

I do not know the candidate personally, but from the submitted scientific papers and precisely formatted documents for participation in the competition, I believe that he is a responsible, highly qualified scientist and lecturer. He enjoys authority among his students and colleagues at the university and specialists in our country and abroad.

7. Conclusion:

Based on my familiarization with the materials of the competition, my positive assessments of the candidate's research, implementation and pedagogical activities, the relevance and significance of the achieved scientific and applied contributions, I propose that Senior Assistant Professor Eng. Borislav Atanasov Georgiev, PhD, be elected as "associate professor", in the field of higher education 5. Technical sciences, professional field 5.1 Mechanical Engineering, specialty - Electronic (analog and digital) measuring transducers and devices.

Date: 27.10.2025

Jury member:
/ prof. Eng. Ivo Malakov, DSc/