

OPINION

by competition for the academic position of "Associate Professor" in professional field 5.2. Electrical Engineering, Electronics and Automation, scientific course "Control of electromechanical systems",

announced in the State Gazette issue 53/20.06.2023

with candidate Jivko Stefkov Jekov, Ph.D. Eng.

Member of the scientific jury: Assoc. Prof. Vladimir Dimitrov Hristov,
Eng. Ph.D.

1. General characteristics of the research and the scientific- applied activity of the candidate

In connection with the announced competition at the Department of Automation of Production of the Faculty of Computing and Automation at TU-Varna, the only candidate Assoc. Dr. Zhivko Stefkov Zhekov has applied 10 scientific publications equivalent to a habilitation thesis in publications that are refereed and indexed in world-known databases of scientific information (340 points with a minimum number of 100 points), as of the applied works 6 are independent [B4 (4,5,6,7,9,10)], 1 abstract for PhD and 15 articles and reports (equivalent to 210 points, with a minimum required number of 200 points), 2 (80 points) are in journals that are refereed and indexed in world-renowned databases of scientific information 13 (130 points) are in non-refereed peer-reviewed journals. None of the papers is included in the list of publications attached to the degree of Doctor of Education and Science. Of the attached works, 6 are independent [D8 (1,2)] and [D9 (8, 11, 12, 13)]. Under indicator E.12 citations or reviews in scientific journals, refereed and indexed in world-known databases of scientific information, 7 citations (70 points) are presented. In addition, information is provided on 4 research projects in which the applicant has participated, one of which the applicant is the leader.

2. Estimation of the pedagogical preparation and activity of the candidate

As a lecturer in the Department of Production Automation, prof. as. Dr. Zhivko Stefkov Zhekov lectures and conducts exercises in the following disciplines. The candidate has 479 hours of lecture activity in the last 3 years, which far exceeds the requirements for the position of Associate Professor. In connection with his teaching activities, the Principal Asst. Zhekov has participated in the development of 2 handbooks (Handbook on Control of Electric Drives and Handbook on Fuzzy Control Systems). He has supervised 33 successfully defended graduates.

I consider that the mentioned pedagogical activity of the head as. Dr. Zhivko Stefkov Zhekov corresponds fully with the announced topic of the competition.

3. Basic scientific and scientific-applied contributions

The main scientific contributions are related to neural networks, as an online trained neural controller is proposed, characterized by the use of a gradient algorithm to compute its weight coefficients based on the weight coefficients of an online trained neural model of the object and the error between the task and the adjustable variable, and offline and online trained neural approximators of the inverse kinematics of robots are proposed. The scientific and applied contributions can be summarized in the following: the feasibility of applying the modular and symmetric optimum tuning methods of the controllers in a slave control system of a two-joint planar robot is analyzed. The possibility of applying the principal component method for real-time fault detection of DC motors under unnatural change of their variables and parameters is analyzed. Systems for sensorless vector control of an induction motor are proposed. Systems using the linearizing feedback method are proposed to control along a given trajectory of two-joint robots. Systems for adaptive control of AC motors - induction motor and permanent magnet synchronous motor - are proposed. The applicability of recursive methods for estimating DC motor parameters using self-tuning controllers is investigated and compared. The applied

contributions are related to: development of a control system for a two-propeller laboratory model of an aircraft, development of a two-loop DC motor control system based on a digital signal controller, development of a two-joint robot manipulator and its control system, modeling and study of a two-channel system for coordinated control of a two-motor electric drive synchronizing the operation of two axes.

I define the contributions in the works presented by the candidate as scientific, scientific and applied.

4. The significance of the contributions for the science and the practice

My overall assessment of the candidate's work is that some problems of a scientific, applied and engineering nature have been solved. The obtained results can be used in practical applications. According to the attached documents of the head. as. Zhekov, there are 7 citations of 4 of his publications in the works of other authors, all citations are in refereed journals (Scopus, Web of Science). The contributions in the candidate's scientific works are significant for the field in which he works, and their citations show that they have found appropriate evaluation by the scientific community.

The TU Varna Regulations for the implementation of the HRAWB fix a minimum number of citations equal to 50 points, and the candidate submits 70 points of citations. From this I can assume that the candidate's works and the corresponding results are known to the scientific community in the field of the competition.

5. Critical notes and recommendations

The remarks to the applicant are of a recommendatory nature. I recommend the candidate to increase his/her publication activity to refereed journals as well as participation in scientific conferences abroad.

CONCLUSION

Principal Assistant Dr. Eng. Zhivko Stefkov Zhekov has submitted all required documents and scientific papers for participation in the competition. The submitted scientific works contain a sufficient number of scientific and applied contributions, fulfilling the minimum national requirements for "associate professor" for Area 5. Technical sciences, in the professional field 5.2. Electrical engineering, electronics and automation and discipline.

On the basis of the submitted materials for the competition, their significance, the scientific, scientific and applied contributions contained in them, I find it justified to propose to the head as. Dr. Zhivko Stefkov Zhekov to take the academic position of Associate Professor in the professional field 5.2 Electrical Engineering, Electronics and Automatics in the discipline.

Date: 02.11.2023

MEMBER OF J

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