

Evaluation statement

For the competition for the academic position of Associate Professor in field - 5 Technical sciences, in the professional field - 5.2 Electrical engineering, electronics and automation (Electrification), announced in the State Gazette, issue 87 of 19.10.2021 on behalf of Burgas Free University (BFU) 's Center of Informatics and Technical Sciences, with the candidate Assistant Professor Eng. Ginko Angelov Georgiev PhD.

Member of the scientific jury: Anatoliy Trifonov Aleksandrov, PhD, professor.

Basis for giving an opinion on the competition: Order №LS-63 / 08.12.2021 by the Rector of BFU and decision of the scientific jury of 22.12.2021.

The opinion was prepared in accordance with the Act for the Development of Academic Staff in the Republic of Bulgaria, the Regulation for Implementation of the Act for the Development of Academic Staff in the Republic of Bulgaria and in accordance with the general requirements of BFU and the additional requirements of the Center of Informatics and Technical Sciences at BFU.

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

Ginko Angelov Georgiev, Ph.D. has presented 24 scientific works, among which: a monograph, 2 scientific publications (indicator G7 – 31, 32) in publications quoted and referred in world-famous scientific data bases (Scopus) and 21 scientific publications (indicators G8 - 1, 3, 4, 10, 12-17, 19-29) in unreferred peer reviewed journals or in edited collective volumes. The 2021, 107-page long monograph is titled The Space Vector in Frequency Inverters.

Publications can be classified as follows:

- articles in digests from national scientific conferences - 2 [1, 4];
- articles in digests from international conferences and symposia in Bulgaria - 9 [10, 13-15, 25-27, 31, 32];
- articles in digests from international conferences and symposiums abroad - 3 [16, 17, 21];
- articles in newsletters and yearbooks of universities in Bulgaria - 6 [3, 12, 19, 20, 22, 23];
- articles in journals in Bulgaria - 3 issues [24, 28, 29].

The independent works of the candidate are 5 [10, 13, 14, 28, 29], one of the works is with one co-author [15], and 17 - with two or more co-authors [1, 3, 4, 12, 16, 17, 19-27, 31, 32]. In 13 of the papers the candidate is the leading author [10, 12-16, 19-21, 28, 29, 31, 32]. Six of the publications are in English [16, 17, 21, 22, 31, 32].

The candidate in the competition meets and in certain indicators even exceeds the minimum national requirements. He has defended his dissertation titled Study of Opportunities for Impact on Energy Efficiency in Marine Power Systems and on 24.09.2012 received a diploma for the educational and scientific degree Doctor of Philosophy (PhD) in specialty 02.04.15. "Electricity supply and electrical equipment of the ship" (indicator A - 50 points). He is the author of a monographic work (indicator B - 100 points).

23 publications have been presented (indicator D - 217.5 points), of which 2 publications are in journals, referenced and indexed in world-famous databases of scientific information, and 21 scientific publications in non-refereed journals with scientific review or in edited collective volumes (group of indicators G7 - 23.3 points and G8 - 194.2 points); 12 citations (indicator D - 93 points), of which in scientific publications, referenced and indexed in world-famous databases with scientific information - 6 pcs. (indicator D12 - 60 points), in monographs and collective volumes with scientific review - 6 pcs. (indicator D13 - 18 points). The candidate has authored 2 university textbooks (E24 - 40 points).

Dr. Georgiev has participated in 6 internal projects at BSU and has led one of them. He has also participated in 4 national projects, leading one of them - "Study of Devices Preventing the Occurrence of Electric Arcs in Marine and Building Energy Systems" (2021).

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

From 1992 to 1995 Dr. Georgiev was an assistant, and from 1995 to 1999 - a senior assistant in the Faculty of Engineering at the Technical University - Varna. Since 2014 he has been an assistant at the Center for Informatics and Technical Sciences at BFU. According to the presented report on teaching staff, he spent 1926 working hours from 2014 to 2021 (lectures, seminars and laboratory exercises) teaching the disciplines: Electrical Machines, Electrical Appliances, Electrical Supply, Electrical Equipment, Energy efficiency of electrical systems. He has authored two workbooks (Workbook on Seminars and Laboratory Exercises on Electrical Machines, ISBN 978-619-253-010-5, Workbook on Seminars and Laboratory Exercises on Electrical Appliances, ISBN 978-619-253-009-9), one textbook in the university e-learning platform (Energy Efficiency of Electrical Systems) and 5 training courses in the e-learning platform. He has supervised more than 25 graduates. He has participated in the development of curricula and the construction of training laboratories.

3. Main scientific and applied contributions

I accept the formulated contributions in the presented works. They have scientific and applied-scientific nature and are relevant to proving with new means significant new aspects in existing scientific problems and obtaining confirmatory facts in the field of electricity.

3.1. Scientific and applied contributions in the monograph:

- The so-called space vector in the theory of electrical machines has been analyzed. The main coordinate systems used to facilitate the solution of complex differential equations with variable coefficients have been analyzed.
- The methods for drawing up structural schemes for vector control of asynchronous motors and synchronous machines with permanent magnets have been demonstrated.
- Pulse width modulation is considered as a main method for realization of the stator voltage vector in vector control systems. Vector controlled electric drives are studied and the tendencies for development of electric machines are presented.

3.2. Contributions in publications

3.2.1. Contributions on the topic of Electrical Equipment [4, 10, 12, 13, 15, 20, 22, 23]

- The differential equations of the asynchronous machine were solved by the Laplace method and a method to determine the parameters of the asynchronous machine by capturing the space vector of the starting current and the inverse Laplace transform is proposed.
- Models have been created in Matlab and a simulation study of the starting mode of powerful asynchronous and laboratory frequency electric drive has been conducted.
- The possible causes of accidents of asynchronous electric drives in BDZ and NRIC have been studied. The electrical losses in induction motors in transient mode were determined.
- The possibilities for development of electric drives by increasing the number of phases in electric machines are considered. Asynchronous motors with vector control of voltage and current, with and without feedback, have been studied.
- A complex system for restoration of the power supply has been developed.

3.2.2. Contributions on the topic of Power Supply [24-27, 31, 32].

- An assessment of the reliability of electricity supply in the sectoral structure of the country was made, using the method of equivalent conversion. Recommendations for different types of reservations are given.
- The impact of electricity quality indicators on the reliability of electrical systems has been assessed. The joint operation of power transformers, capacitor banks and cable lines in the conditions of asymmetric and non-sinusoidal load is analyzed. An approach to complex estimation based on the theory of experiment planning is proposed.
- The probability of penetration of electromagnetic disturbances into the control, relay protection and monitoring systems, caused by the high multiplicity of overvoltages during the switching processes, has been confirmed.

3.2.3. Contributions to the topic of Quality of Electricity [1, 3, 14, 16, 28, 29]

- The depicting vectors of voltage and phase currents during operation of asymmetric and nonlinear load, powered by a synchronous generator, have been studied. It has been proven that the space vector is a powerful tool that can be used for fast and high-quality assessment of the processes that occur in such a power supply system.
- Electricity supply systems in Bulgarian companies have been studied. The dangers of electrical resonance according to the levels of high harmonics are shown and recommendations are made to avoid it.
- The expediency of using the space vector in combination with the method of "instantaneous power" for analysis and evaluation of the state of power supply systems and the ability to affect interference caused by asymmetry and high harmonics.

3.2.4. Contributions to the topic of Use of Energy from Renewable Sources and Energy Storage (17, 22)

- The production of hydrogen from a fuel cell using electricity obtained from a photovoltaic plant has been studied.
- A complex system for monitoring and analyzing the cycle of technological processes has been developed - production of electricity from renewable energy sources, production and storage of hydrogen and inverse conversion of energy into electricity.

- Software applications have been created for processing, storage and visualization of data received from the meteorological station of BFU and the saved greenhouse gas emissions during the operation of a photovoltaic plant. The mobile application for receiving information about the production of energy from the photovoltaic plant in real time has been developed.

4. Significance of contributions to science and practice

The contributions of the candidate are evaluated on the basis of the citations of his work, presented for the competition. A list of 12 citations has been sent, 6 of which are in scientific journals, referenced and indexed in world-famous databases with scientific information, and 6 citations in monographs and peer-reviewed collective volumes. The results achieved in the scientific works can be implemented the educational process and can be applied in the field of electric power.

All of this gives me reason to conclude that the candidate is a well-known author who has published in important scientific forums on the topic of competition.

5. Critical remarks and recommendations

It might be as well for the publications to be presented by the candidate for participation in the competition.

I believe that the contributions can be summarized.

I recommend preparing publications in scientific journals with an impact factor.

Conclusion

In conclusion, I can give a positive assessment of the overall research and pedagogical activities of Assistant Professor Ginko Angelov Georgiev, PhD, which fully meet the requirements for holding the academic position of Associate Professor. Sufficient and significant scientific and applied contributions have been received.

Based on my review of the materials provided in the competition, I find it reasonable to propose Ginko Georgiev, Ph.D, to occupy the academic position of Associate Professor in field - 5 Technical sciences, in the professional field - 5.2 Electrical engineering, electronics and automation (Electrification) at the Burgas Free University (BFU)'s Center of Informatics and Technical Sciences.

Date: 21.01.2022

Member of the scientific jury: Prof. A. Aleksandrov