R E V I E W

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Concerning scientific production submitted for participation in
the competition for the academic position of "Professor"
in 5. Technical Sciences field of higher education, 5.3. "Communication and Computer Engineering"
professional field, "Communication Networks and Systems" scientific specialty,
("Signals and Systems", "Radio communication equipment")

In the competition for professor, announced in the State Gazette, issue 50 / 15.06.2021 and on the website of the Technical University - Gabrovo (TU - Gabrovo) for the needs of the Department of Communication Equipment and Technology at the Faculty of Electrical Engineering and Electronics as a candidate participates Assoc. Prof. Stanimir Mihaylov Sadinov, PhD - TU - Gabrovo.

1. Brief Biographical Information

Stanimir Mihaylov Sadinov was born in 1969. He graduated the Technical University of Gabrovo and earned his Bachelor's and Master's degrees there. In the period 1997-2000 he was a full-time doctoral student at the Technical University - Gabrovo. Since 2000 he has held the academic positions of Assistant Professor, Senior Assistant Professor and Chief Assistant Professor, and in 2009 he was elected Associate Professor in the field of "Communication Networks and Systems" in the Department of Communication Equipment and Technology at TU - Gabrovo.

2. General Description of the Submitted Materials

The candidate participates in the competition with 41 scientific publications, categorized as follows:

- 14 publications, referenced and indexed in internationally acclaimed databases with scientific information, equivalent to habilitation work;
- 13 publications, referenced and indexed in internationally acclaimed databases with scientific information;
- 10 scientific publications in non-refereed peer-reviewed journals with review or in edited collective volumes;
- 4 textbooks and teaching aids.

The publications presented for participation in the competition by number of authors, language and place of publication are divided as follows:

- 5 single-authored publications;
- 32 collaborative publications;
- 32 publications in English;
- 5 publications in Bulgarian.

3. Reflection of the Candidate's Scientific Publications among the Scientific Community (Known Citations)

17 of the submitted publications of the candidate are in journals with an impact factor or SJR values. As of the date of writing the review report, the Scopus author citation report indicates that the candidate has an "h" index of 4. The competition materials list 24 known citations of the candidate's publications in national and international publications, of which:

- 3 citations in journals with an IF;
- 19 citations in publications, referenced and indexed in internationally acclaimed databases with scientific information;
- 2 citations in editions of scientific forums in Bulgaria.

It can be concluded that the scientific community in the field of the subject matter of the present competition is familiar with the scientific production of Assoc. Prof. Stanimir Sadinov, PhD.

4. Overview of the Content and Results in the Presented Work

The scientific papers presented to me for review can be categorized in the following thematic areas:

4.1. Signals and Systems [B4.3], [B4.7], [B4.8], [B4.10], [B4.14], [Г7.3], [Г7.7], [Г7.11], [Г7.12], [Г8.5]

This category of scientific papers deals with processing, simulation, practical research and analysis of signals, teletraffic of data and systems in telecommunication networks. The subject of the thematic area covers current issues that are of great interest to research circles. Simulation models and practical research related to the processing and analysis of signals in different transmission communication systems in case of data teletraffic in telecommunication networks have been implemented. The objectives of the research are to achieve better efficiency in the utilization of the frequency spectrum, optimization of network resources and modulation schemes, thus contributing to the development of modern high-speed and breakthrough technologies such as cloud services, Internet of Things, storage. and processing of large data sets, artificial intelligence, etc.

4.2. Radio communication equipment [B4.5], [B4.6], [Г7.1], [Г7.4], [Г7.6], [Г7.8], [Г7.10], [Г7.13], [Г8.6], [Г8.9], [Г8.13]

The scientific production of the candidate in this direction is focused on the design, construction, research, monitoring and management of wireless, cellular, satellite telecommunications networks and systems. The emphasis of the candidate's research work in this area falls on broadband data transmission connected to the delivery of multimedia services in wireless computer networks and mobile cellular networks, and in

narrowband communications for sensor data transmission and telemetry related to Internet of things applications in smart cities, building automation, industrial communications, etc.

4.3. Optical and cable communication networks and systems [B4.1], [B4.2], [B4.4], [B4.9], [B4.11], [B4.12], [B4.13], [Г7.5], [Г7.9], [Г8.1], [Г8.2], [Г8.3], [Г8.4], [Г8.10], [Г8.11]

The publications in this field are related to the study of signals in cable and optical telecommunication networks and systems. Numerous computer models of single-channel and multi-channel optical communication lines for high-speed signal transmission are presented. The emphasis is mainly on the processes of modulation of the optical signals and the methods for compensation of the dispersion at large lengths of the optical lines. Solutions are proposed for optimal construction of passive optical networks, as well as for networks with optical amplifiers and regenerative sections. Attention is also paid to the analysis of the efficiency of the used transceiver optical equipment.

5. General Description of the Candidate's Activity

5.1. Educational and Pedagogical Activity (Work with Sstudents and Postgraduate Students)

In Technical University - Gabrovo Assoc. Prof. Stanimir Sadinov, PhD has delivered lectures, seminars and laboratory classes in "Signals and Systems", "Communication Circuits", "Television Equipment", "Satellite and Terrestrial Television", "Audio and Video Systems", “Cellular Communications”, “Cable and Satellite Television Networks”, “Broadband Mobile Networks” and “Satellite Communications”. For the period 2009-2021 he supervised 118 graduates in Bachelor's degree programmes and 52 in Master's degree programmes in the preparation and defence of their research/theses. During the same period he supervised 8 doctoral students, 4 of which have defended their doctoral dissertation, 1 had completed his/her studies with the right of defence and 3 are in the process of their studies. Assoc. Prof. Stanimir Sadinov has reviewed a large number of diploma theses. He was a member and chairman of the State Examination Commissions for the defence of diploma projects for Bachelor's and Master's degrees. For the period 2010-2021 the candidate has published 2 textbooks and 2 teaching aids. All in all, it can be concluded that the teaching work and pedagogical activities of Assoc. Prof. Sadinov are diverse and meaningful.

5.2. Scientific and Applied Research Activity

Assoc. Prof. Stanimir Sadinov, PhD has participated in teams and supervised 13 successfully completed projects under operational, national and university programs. The candidate participates in the programme committees of Unitech 2021 International Scientific Conference (TU - Gabrovo), LIGHTING 2021 6th Youth Conference on Lighting having international participation, TechCO 2021National Scientific Conference (TC - Lovech). The candidate is a member of the scientific committee of Siteza, Belgrade international scientific conference (Singidunum University). He is a member of the editorial board of the Journal of Communications,

Information, Electronic and Energy Systems magazine (The Journal of CIEES). For the last 5 years Assoc. Prof. Stanimir Sadinov, PhD has participated in 13 scientific juries for awarding educational and science degree "Doctor" and academic positions "Associate Professor" and "Professor". Assoc. Prof. Sadinov is a member of the IEEE and the Union of Scientists in Bulgaria.

5.3. Development Activity

The candidate has participated in teams and supervised projects resulting in the development and deployment of modules and technologies. Assoc. Prof. Sadinov has developed and implemented in the teaching process of the Department of CET laboratory installations and software applications for research and analysis of communication networks and systems and has actively worked to improve the teaching, laboratory and research base of TU-Gabrovo.

6. Contributions (Scientific, Applied Research, Practical)

Having analysed the materials submitted for participation in the competition, I would summarize the candidate's contributions across areas of study and categorize these as follows:

6.1. Signals and Systems

- A simulation scenario for signal analysis in the latest generation of mobile cellular radio networks is proposed;
- A simulation model for error coefficient analysis in a communication channel with white noise of BPSK signal was synthesized;
- An approach for identification of Markov chains based on quantitative analysis of parametric criteria is proposed;
- A simulation model for analysis of the influence of phase noise on QAM signals is proposed;
- On the basis of artificial intelligence tools, backpropagation and hybrid algorithms of additive nerve-blurring interface for signal processing have been synthesized;
- An approach to QoS procedures for analyzing the impact of different types of noise on communication channels is proposed;
- A simulation model for identification of noise signals based on LabVIEW was synthesized;
- An algorithm for simulation modelling of a teletraffic model of voice services is proposed;
- A simulation model for analysis of OFDM signals was synthesized.

6.2. Radio communication equipment

- A LoRaWAN platform has been designed to provide access for creating and testing applications for intelligent communication in IoT with functionality for evaluating the effectiveness of the technology and quality of the provided radio coverage in urban environments;

- Demonstration models of a communication multi-channel LoRaWAN gateway and of a LoRa-based communication platform for application in intelligent control systems and for educational and research purposes have been developed, with application of systems with software-defined radio;
- Radio coverage of the LoRa / LoRaWAN network on the territory of the city of Gabrovo as part of a platform for communication and testing of applications based on the developed overall LoRaWAN architecture was studied;
- A module for receiving and retransmitting digital satellite (DVB-S / S2) signals over an IP network and for real-time monitoring of the parameters of the broadcast satellite signals has been developed;
- Parameters and characteristics of a satellite channel for transmission of digital television programs in standard DVB-S / S2 have been studied. An experimental laboratory model with the necessary measuring instruments and software was synthesized;
- Models of a wireless MIMO channel for communication in an indoor environment have been synthesized and studied, taking into account the characteristics and spatio-temporal properties of the channel, the electromagnetic propagation of the signals and the parameters of the used antennas;
- A system for testing the radio coverage on the territory of Gabrovo for VHF and UHF radio frequency band through software-defined radio has been implemented and researched.

6.3. Optical and Cable communication Networks and Systems

- The problems in signal processing in cable television networks are analyzed and the impact of the second and third order nonlinear distortions on the channel spectra is reported;
- A model of passive optical network for delivery of interactive services has been developed, providing easy staff training, opportunity for research, introduction of new services and functionalities for management and communication;
- Models for research, analysis and evaluation of the performance of high-speed single-channel optical networks using different formats for optical modulation of signals, different schemes for variance compensation and solving optimization problems have been created;
- Simulation models of multi-channel and high-speed optical communication networks have been developed and studied with possibilities for solving optimization problems according to criteria for achieving minimum BER value or maximum Q factor and ensuring maximum network performance and efficiency at different signal input parameters;

- Methodologies based on the iterative approach for optimal planning and sizing of the length and number of amplification sections in coaxial and optical transmission networks have been developed;
- Models for modeling, research and implementation of prognostic analysis of the reliability and fault tolerance of communication networks, systems and service devices have been synthesized;
- A simulation model of an optical 8-channel OQPSK modulated DWDM system with a capacity of 40 Gbps per channel was developed, tested and analyzed and the influence of nonlinear effects was taken into account when assessing the deterioration of the system performance.

I evaluate the candidate's contributions as:

- Enhancing knowledge and systems through formulation of innovative approaches in existing scientific fields;
- Creation of modified algorithms and methods for obtaining supporting facts.

7. Assessment of the Candidate's Personal Contribution

Of the 41 scientific papers accepted for preparation of review report (37 publications, 2 textbooks and 2 teaching aids), 5 publications are single-authored, and in 18 publications Assoc. Prof. Sadinov, PhD is the lead author. No appendix has been presented for assignment of authorship in the collaborative manuscripts and I have therefore assumed equal authorship for all contributors listed. In consideration of the above, having analyzed the scientific publications submitted for review, I have no doubt for the authorship of the contributions Assoc. Prof. Stanimir Sadinov, PhD outlined in point 6 of the present review report.

8. Critical Remarks and Recommendations

Based on the analysis of the work for participation in the competition submitted for review, as well as my impressions on our joint work, I would make the following recommendations to the future work of Assoc. Prof. Stanimir Sadinov, PhD:

- To focus on publishing a monograph summarizing the conclusions and results of his research work;
- To look for opportunities for making up a team of scientists from various scientific organizations to participate in significant national and international projects.

9. Personal Impressions

I have known the candidate participating in the present competition, Assoc. Prof. Stanimir Sadinov PhD, for more than 15 years. I had worked with him on joint projects. I am familiar with his scientific work. I had worked with his colleagues, who have always given positive feedback about him, about his teaching and research work.

I would therefore reasonably conclude that I have formed an adequate and objective opinion about the candidate and his overall work.

In my opinion the amount and quality of scientific work and the professional realization of Assoc. Prof. Stanimir Sadinov PhD, comply with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its application and the requirements of the Technical University of Gabrovo for holding the academic position of "Professor".

10. Conclusion

All materials submitted for review within the competition are sufficient in terms of length and content. In terms of quantity, the submitted materials considerably exceed the minimum scientometric requirements for awarding the academic position of “Professor”. The analysis of the scientific materials for participation in the competition shows that Assoc. Prof. Stanimir Mihaylov Sadinov, PhD has performed sufficient and significant teaching, scientific and research work. He has published articles, papers and study guides. The scientific work of the candidate has the necessary applied research and practical contributions.

Upon a comprehensive assessment of the results of the candidate’s activities, I am confident that they meet the requirements for awarding the academic position of “Professor”.

In view of the above I would propose that Assoc. Prof. Stanimir Mihaylov Sadinov, PhD be selected for the academic position of “Professor” in 5. Technical Sciences field of higher education, 5.3. Communication and Computer Engineering professional field, “Communication Networks and Systems” ("Signals and Systems", "Radio Communication Equipment") scientific specialty at the Technical University of Gabrovo.

15/10/2021 Reviewer: /signature/

/Prof. Mihail Petkov Iliev, D.Sc./