OPINION

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Concerning scientific works submitted for participation in competition for awarding the academic position of "Professor" in the field of higher education 5. Technical Sciences, professional field 5.3. Communication and Computer Engineering, scientific specialty "Communication Networks and Systems", (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 Engineering and Technology at the Faculty of Electrical Engineering and Electronics, as a candidate participates Assoc. Prof. Stanimir Mihaylov Sadinov, PhD - TU-Gabrovo.

1. An overview of the content and results of the submitted works

For participation in the competition are presented works meeting the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria and the Regulations for its implementation, as well as the Regulations for acquiring scientific degrees and holding academic positions at the Technical University - Gabrovo. These include: 14 scientific publications that are referenced and indexed in world-renowned databases (B.4), three of which have an "impact factor"; 13 scientific publications, which are referenced and indexed in world-famous databases with scientific information (Г.7), as a total of 14 publications from (B.4) and (Г.7) have "SJR factor"; 10 scientific publications in unreferred journals with scientific review or in edited collective volumes (Г.8); 2 textbooks (E.23) and 2 teaching aids (E.24) in co-authorship.

The publications are categorized in three thematic areas directly related to the competition:

1. ***„Signals and Systems"*** - includes 11 publications [B.4.3, B.4.7, B.4.8, B.4.10, B.4.14, Г.7.2, Г.7.3, Г.7.7, Г.7.11, Г.7.12, Г.8.5], related to processing, simulation, practical research and analysis of signals, teletraffic of data and systems in telecommunication networks. Simulation models and practical research related to signal processing and analysis in various transmission communication networks in case of data teletraffic in telecommunication networks and systems have been implemented. In this way, better efficiency has been achieved in the utilization of the frequency spectrum, optimization of network resources and modulation schemes, which contributes to the development of all modern and rapidly entering technologies, such as cloud services, Internet of Things, storage and processing of large data sets, artificial intelligence, etc.
2. ***„Radio communication equipment and Radio broadcasting"*** - includes 11 publications [B.4.5, B.4.6, Г.7.1, Г.7.4, Г.7.6, Г.7.8, Г.7.10, Г.7.13, Г.8.6, Г.8.7, Г.8.9], presenting communication systems developing in two directions - broadband data transmission (related to the delivery of multimedia services in wireless computer networks and in mobile cellular networks) and narrowband communications for sensor data transmission and telemetry (related to Internet of Things applications in smart cities, building automation, industrial communications, etc.). Solutions based on LoRaWAN, SDR, LTE and DVB-S technologies have been developed. Simulation and experimental laboratory models were synthesized using appropriate measuring instruments and software, and the obtained results were analyzed and led to the improvement of the radio coverage, the quality of service and the noise resistance of the communication channels.

3.***„Optical and cable communication networks“*** **-** includes 15 publications [В.4.1, В.4.2, В.4.4, В.4.9, В.4.11, В.4.12, В.4.13, Г.7.5, Г.7.9, Г.8.1, Г.8.2, Г.8.3, Г8.4, Г.8.8, Г.8.10], related to signal research 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 in this thematic area. The processes of modulation of the optical signals and the methods for compensation of the dispersion for large lengths of the optical lines are considered. Solutions are proposed for optimal construction of passive optical networks, as well as networks with optical amplifiers and regenerative sections. Based on the developed computer models, parametric analyzes were performed and optimization problems related to the choice of combinations of interdependent operating parameters (optical power output, optical fiber length, dispersion parameters, length of the amplification sections, etc.) were performed for single-channel and multi-channel operating mode.

2. General characteristics of the candidate's activity

2.1. Educational and pedagogical activity (work with students and doctoral students)

The candidate in the competition - Assoc. Prof. Sadinov, has significant teaching and research experience at the Technical University of Gabrovo. After joining the University (in 2000), he held the academic positions of "Assistant" and "Senior Assistant" until 2005. In 2006 he defended a dissertation on "Exploring the possibilities for improving the quality of signals in cable coaxial television networks" to obtain a scientific and educational degree "Doctor" in the scientific specialty "Communication Networks and Systems" and took the academic lie "Chief Assistant". Since 2009 he has held the academic position of "Associate Professor" in the scientific specialty "Communication Networks and Systems" (Radiocommunication Equipment), after a successful competition. Participates in the development of curricula and is a lecturer in the disciplines "Signals and Systems", "Radio Communication Equipment", "Television Equipment", "Broadband Mobile Networks", "Cable and Satellite Communication Networks", included in the curricula of the specialties in the faculty " Electrical Engineering and Electronics ", full-time and part-time education, educational qualification degrees (OKC)" Bachelor "and" Master ".

He is a co-author of textbooks on "Radiocommunication Equipment" and "Design of Interactive Cable Television Networks" and manuals for laboratory exercises on "Signals and Systems" and "Communication Circuits".

Over the years he has supervised more than 170 graduates of Bachelor's and Master's degrees and eight doctoral students, 4 of whom have successfully defended dissertations for the educational and scientific degree "Doctor" in the doctoral program "Communication Networks and Systems".

2.2. Scientific and scientific-applied activity

The scientific publications of the candidate submitted for participation in the competition are 37, of which 27 [B.4.1-B.4.14, B.7.1-B.7.13] are in referenced and indexed editions noted in the SCOPUS and WoS databases - 3 [B.4.1, B.4.8, B.4.14] in magazines with "impact factor" and 14 [B.4.2, B.4.4, B.4.7, B.4.13, Г.7.1, Г.7.2, Г.7.3, Г.7.4, Г.7.5, Г.7.6 Г.7.7, Г.7.10, Г.7.11, Г.7.12, Г.7.13] in SJR Factor magazines. Of these, 5 publications [B.4.10, Г.8.1, Г.8.2, Г.8.3, Г.8.4] are independent and 32 - co-authored, with the candidate being the first author in 13 [B.4.1, B.4.2, B.4.3, B.4.4, B.4.5, B.4.7, B.4.11, B.4.13, B.4.14, Г.7.13, Г.8.5, Г.8.6, Г.8.9] publications. Thirty-one of the presented publications are in English and six in Bulgarian. 2 textbooks and 2 teaching aids have been co-authored.

For participation in the competition are presented 24 citations - 20 issues in scientific journals, referenced and indexed in world-famous databases with scientific information (Д.12) and 4 - in unreferred journals with scientific review (Д.14). After a reference in the SCOPUS databases regarding the citations, Assoc. Prof. Sadinov has a "Hirsch factor" - h=4.

Assoc. Prof. Sadinov has participated in 13 research and educational projects. Four of these projects are international, and in two of them the candidate in the competition is a coordinator, in

one he was an expert and in one - a member of the research team. He has participated in 9 national and university projects - in 4 of them as a leader and in 5 - as a member of the team.

2.3. Implementation activity

The candidate's activity in this field is directly related to his teaching and research work. The successful management of a large number of graduates (bachelors and masters) and doctoral students leads to the realization of experimental productions and research stands, which have enriched the laboratory base of the Department of Communication Engineering and Technology. The participation and management of research or educational projects are also proof of the implementation of various innovative ideas and practical models on the territory of TU-Gabrovo, the Municipality of Gabrovo and the business in the region.

3. Contributions (scientific, scientific-applied, applied).

The candidate has submitted an author's report on the contributions, which includes 3 scientific fields and 23 summarized contributions in them. According to their significance, the contributions can be classified into:

- *Scientific contributions,* which include the developed analytical models, algorithms and innovative approaches related to signal processing, analysis and research, data teletraffic and systems in telecommunication networks.

- *Scientific and applied contributions* – they include the contributions related to the creation of simulation models for the study of signals and systems of the latest generation mobile cellular networks, in digital television networks, in digital modulations and in communication channels between them. The developed and researched simulation models of signals in single-channel and multi-channel high-speed optical communication networks are used to solve optimization problems according to different criteria (achieving different variance compensation schemes and taking into account the influence of nonlinear effects in assessing system performance degradation).

- *Applied contributions* - these include the developed and researched demonstration models of a radiocommunication multi-channel LoRaWAN gateway and platform, radio communication module for reception and retransmission of digital satellites (DVB-S/S2), experimental system for testing radio coverage and practical model of passive optical network (PON) for delivery of interactive services.

I believe that the scientific, scientific-applied and applied contributions contained in the works of the candidate are relevant and important for the development and enrichment of research in the field of communication networks and systems. The presented works are also important for the practice.

4. Assessment of the candidate's personal contribution

The evaluation of the personal contribution of the candidate - Assoc. Prof. Sadinov, in terms of the results achieved from the educational, pedagogical, scientific and applied research activities is entirely positive. The large number of co-authors from and outside the country is a testament to the ability to work in a team. The personal participation of the candidate can be judged by the number of individual publications (5 copies), as well as by the number of publications (13 copies) in which he is the first author. All this gives me reason to say that the contributions are the personal work of the candidate or are achieved with his leading role.

5. Critical remarks and recommendations

I have no significant remarks with which to challenge the main scientific, scientific-applied and applied contributions in the presented works of Assoc. Prof. Sadinov.

I recommend the candidate to concentrate his research activity in less thematic areas and to publish the results in impact factor journals, as well as to develop his expert and implementation activity.

6. Personal impressions

I know Assoc. Prof. Stanimir Mihaylov Sadinov, PhD both personally and professionally and I am aware of his scientific and teaching growth. He is a highly qualified and erudite specialist, an established lecturer, enjoying authority among his colleagues in the department, faculty and university.

I believe that the information provided about the scientific and teaching work of the candidate meets the requirements for the academic position of "professor" and meets the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of the Law on Academic Staff Development. Republic of Bulgaria and the Regulations for acquiring scientific degrees and holding academic positions at the Technical University - Gabrovo.

7. Conclusion:

In view of the above, I propose Assoc. Prof. Stanimir Mihaylov Sadinov, PhD to be awarded the academic position of "Professor" in the field of higher education - 5. Technical sciences, professional field - 5.3. Communication and computer engineering, specialty - "Communication networks and systems" (Signals and systems, Radio communication equipment).

18.10.2021 Member of the scientific jury: /signature/

/Prof. A. Aleksandrov, PhD/