RECENZIA

by competition for the occupation of the academic position "Professor", in the field of higher education 5. Technical sciences, Professional direction 5.2. Electrical engineering, electronics and automation, in the scientific specialty "High-voltage technology"

announced in the Official Gazette : no. 7/23/01/2024
with candidate: Assoc. Prof. PhD Eng. Margreta Parashkevanova Vasileva
Member of the scientific jury : Prof. PhD Eng. Valentin Genov Kolev

1. General and biographical data

The only candidate in the announced competition - Assoc. Prof. PhD Eng. Margreta Parashkevanova Vasileva was born in Veliko Tarnovo. The candidate successfully completed his higher education, 1982÷1987, as a master's degree in electrical engineering, majoring in " Electricity ", at the Faculty of Electrical Engineering of TU - Varna.

On 07.03.2005, the candidate in the competition successfully defended a dissertation work on the topic "Limiting overvoltages in 20 kV electrical networks" for the Educational and Scientific Degree Doctor in professional direction 5.4 Energy, scientific specialty "Technology of high voltages", and on On 01.06.2009, he received the scientific title of "ASSOCIANT PROFESSOR" in the scientific specialty "Technology of high voltages", and both procedures were carried out at the Higher Attestation Commission (HAC).

Margreta Vasileva begins your professional activity at Technical University-Varna since 1995 as a part-time doctoral student, since 1995 assistant, senior assistant (since 1998), chief assistant (since 1998) and from 2009 to 2019 associate professor at the Department of " Electrical Engineering " at the Faculty of Electrical Engineering at TU Varna. From 2019 to the present, he is the head of the department "Medical equipment, electronic and information technologies in health care" at the Medical University "prof. Dr. Paraskev Stoyanov" - Varna. The total working experience as a teacher is over 29 years.

Assoc. Prof. Vasileva is a distinguished teacher of structure-determining disciplines in the specialty " Electroenergetics ", a time-proven researcher with a reference for leadership and participation in 6 national scientific and educational projects submitted for participation in the competition for "professor" .

He speaks English and Russian at a very good level. He has excellent computer training, in-depth knowledge in the field of electronics and automation. Works freely with standard and specialized software products.

2. General description of the presented materials

The candidate Assoc. Ph.D. Eng. Vasileva has submitted all the documents in accordance with the requirements of Law on the development of the academic staff in

the Republic of Bulgaria, Regulations for the application of the Law on the Development of the Academic Staff in the Republic of Bulgaria and MU - Varna and Regulations for the development of the academic staff at Varna Medical University for participation in the competition , and in particular:

- Academic certificate issued by the library of MU-Varna, including:
  - The publications and citations covering the minimum national requirements;
  - Full-text publications and citations, beyond the minimum scientometric requirements;
  - List of scientific works and citations used for the acquisition of the title of "doctor", as well as for the occupation of previous academic positions (AP) (academic position associate professor);
- Google Accounts app Scholar and ORCID (as well as other scholarly network profiles, e.g. Research Gate).
- A certificate certifying the fulfillment of the minimum national requirements for academic position "Professor" from the Regulations for the Application of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the minimum requirements from the Regulations for the terms and conditions for occupying academic positions at the MU - Varna;
- General list of scientific works submitted for participation in the competition (including general characteristics and main contributions);
- List of scientific publications equivalent to a monographic work in publications that are referenced and indexed in world-renowned databases with scientific information - *indicator B4* ;
- List of scientific publications in publications that are referenced and indexed in world-famous databases with scientific information - *indicator G7* ;
- List of scientific publications in non-refereed journals with scientific review or in edited collective works - *indicator D8* ;
- List of citations with the URL of each citing publication - *indicator D12* ;
- Reference for the horary of lectures for the last four years, held at the University of Varna, in disciplines from the professional direction of the competition - *indicator J* ;

The candidate in the competition for the appointment of AP "Professor" - Margreta Vasileva, submits for review a total of ***33 scientific works,*** which are outside the scientific publications for the acquisition of the scientific title "Associate Professor". ***10 pieces scientific publications*** equivalent to a monographic work in publications that are referenced and indexed in world-renowned databases with scientific information (Web of Science or Scopus) - according to *indicator B4* ; ***4 scientific publications*** printed in publications referenced and indexed in world-famous databases with scientific information (Scopus and/or Web of Science) - according to *indicator G7* ; ***19 scientific publications*** in non-refereed journals with scientific review or published in edited collective works - *according to indicator G8* ; ***17 citations*** in scientific publications in referenced and indexed in world famous databases with scientific

information (Scopus , Web of Science) - *according to indicator D12* ; ***2 textbooks*** one in co-authorship and ***2 manuals for laboratory exercises and tests*** , also in co-authorship.

The submitted works are directly related to the current competition for the appointment of AP "Professor" and are in the professional direction 5.2. Electrical engineering, electronics and automation in the scientific specialty "High voltage technology". According to the reference submitted by the candidate in the competition, the scientometric indicators are shown in Table 1 .

Table 1.

A group of metrics	**Min. No. t.**	**No. t. of the candidate**	**Number of points by main indicators of a group**	
A	50	50.00	Diploma for ONS "Doctor" No. 29589 dated 07.03.2005, https://ras.nacid.bg / dissertation-preview /11978	
B	100	195 .00	B3	0
			B4	195 .00
G	200	238.35	D7	93.33
			D8	145.02
D	100	170.00	D12	170.00
E	150	203.34	E17	60
			E18	50.00
			E20	20.00
			E23	60.00
			E24	13.34
J	100	141.50	Z	141.50
Total:	***700***	***998.19***	$\sum$	***998.19***

Conclusion: *The scientific metrics indicators shown in Table 1 show that the minimum national requirements for holding the position of "Professor" have been met, as well as those of the Regulations for the development of the academic staff of the MU - Varna, as they are in accordance with the additional condition of the competition announced in Order No. R-109-95/21.03.2024 of the Rector of MU-Varna.*

3. General characteristics of the candidate's research and scientific-applied activity.

Margreta Vasileva, Assoc. Ph.D., Eng., are in the field of model studies of the occurrence and organization of overvoltages in electrical systems, research of wave processes in grounding installations of electrical power facilities and electrical safety in electrical power systems.

Publications under *indicator B4 (10 scientific publications equivalent to a monographic work in publications that are referenced and indexed in world-famous databases with scientific information)* are on a topic determined by the author "Model studies of processes of occurrence and limitation of overvoltages in electrical networks". Posts can be divided as follows:

- Model studies of the occurrence and organization of overvoltages in electrical systems - three-phase models of high-voltage electrical networks were developed in the Matlab programming environment Simulink for the study of wave processes ***(B4-4, B4-6) - In B4-04, a model study of a direct lightning strike in an overhead power line and its impact on the equipment of a 110*** kV switchgear is presented . In B4-6, the influence of reverse discharges (when increasing the potential of the pillar > $U_{50\%}$) was investigated in the MATLAB Simulink programming environment;
- Three-phase simulation models of an electrical network with a nominal voltage of 220 kV have been developed in the ATP-EMTP program environment for the study of switching and established overvoltages ***(B4-9, B4-10)*** - in B4-9 the processes in the occurrence of switching overvoltages due to operational switching and reconnection of the 220 kV overhead power line . In B4-10, emphasis is placed on the change of parameters in case of single-phase faults in the 220 kV electrical network depending on the location of the fault and the action of the relay protection by using ATP-EMTP;
- Research has been carried out on the protective characteristics and energy resistance of surge protection devices in medium voltage electrical networks. Conclusions are made and recommendations are made regarding the choice of protective devices, taking into account the influence of the network configuration and the type of overvoltages affecting them (***B4-3***) ;
- An approach is proposed for assessing the reliability of surge protection of electric substations using valve taps with different characteristics (***B4-7***);
- Simulation models were developed in the Matlab programming environment Simulink for visualizing the processes in the power systems, suitable for training students and increasing the qualification of the responsible personnel in the EEC (***B4-8***);
- Derived are dependencies for determination on resistivity and relative permittivity on soil at random and frequency and soil resistivity and frequency 50 Hz based on conducted experimental studies (***B4-5***);
- Developed are simulation models in software environment Matlab Simulink on electric network low voltage and on single phase fault current Protection for doing on more precise analysis on the electric one safety (***B4-01***);
- Done are model studies in MATLAB SIMULINK of processes in electrical networks 20 kV. Introduced are results and they are proposed recommendations for setting on fast acting relay protection and choice on energetic ability on metal oxide valve leads , for Yes no everything activate incorrect fast-acting relay protect from atmospheric surges (***B4-2***).

The candidate in the competition for employment at AP "Professor" - Associate Professor Margreta Vasileva, presents ***23 count*** scientific publications by *indicators G* as follows: ***4 issues*** - printed in editions referenced and indexed in world-renowned databases with scientific information (Scopus and/or Web of Science) - according to *indicator G7* and ***19 issues*** - in non-refereed journals with scientific review or published in yearbooks and proceedings of national and international scientific

conferences - *according to indicator G8* . This group of posts can be categorized into similar topic groups as follows:

- Research, analysis and development of overvoltages in overhead power lines and substations - ***13 items*** (***G7-1.*** , ***G7-2., G7-3., G.8-1., G.8-2., G.8- 3., G.8-4., G.8-5., G.8-10., G.8-12., G.8-14., G.8-17., G.8-19)*** – overvoltages in case of damage to the lightning protection cable in 220 kV overhead power lines were studied , statistical analysis of switching overvoltages during emergency and operational switching in 220 kV systems , simulation models of electrical networks were developed for training students in the discipline "Technique of high voltages", surge protection of a cable section in an electrical network 20 kV , a computer program was developed for the assessment of the risk of atmospheric overvoltages, a model study of the atmospheric electrical effects in a low voltage electrical network with a local photovoltaic system, risk assessment in the case of lightning strikes, the assessment of the effectiveness of lightning protection against direct lightning strikes for the territory of a wind energy park when using the lightning protection of single wind generators according to the current Bulgarian, European and international standards, research of the energy capacity of metal oxide surge aresters (MOSA) for 20 kV, model study of lightning protection at 110/20 kV substation , limitation of atmospheric overvoltages at 110 kV substation, model study of protection from incoming atmospheric overvoltages at 110 kV substation, dangerous lightning current levels for electrical substations are also determined 220 kV .
- Modeling of the development of partial discharges (h.r.) in the volume of a solid dielectric - ***1 item (G7-4.)*** ;
- Research of processes in LED drivers - ***2 pieces (G8-6. and G8-7.***) - analysis and comparative evaluation between energy-efficient LED drivers with autonomous power supply, research of some influences of the own parameters of specialized LED integrated circuits,
- Study of wave processes in grounding installations of electric power facilities (touch and leg voltages) - ***6 items*** (***G8-8., G8-11., G8-13., G8-15., G8-16. and G8-18.)*** - analysis of the method for calculating contact voltage in the presence of two-layer soil, influence of the soil structure in the design of grounding networks in a two-layer soil environment, use of a measuring device Z - METER III to determine soil resistance for sizing the grounding system of an energy facility, experimental study of soil electrical parameters for the purposes of grounding system design, modeling of the grounding system of electrical substations for the study of wave processes, regression analysis of experimental data on soil electrical parameters depending on humidity and frequency .
- Model study of the processes in current measuring transformers for the purposes of relay protection - ***1 item (G8-9.)***

4. Assessment of the candidate's pedagogical training and activity.

Assoc. Dr. Eng. Margreta Vasileva is an established teacher with more than 29 years of teaching experience. It can be seen from the attached reference for the horary of

lectures held in the Department of "Medical Equipment, Electronic and Information Technologies in Health Care" in the Faculty of "Public Health" at the MU-Varna University, for the last four years, the candidate has been a leading teacher in the following disciplines: "High-voltage technology in medicine", "Electrotechnical materials" and "Sanitary technology" with ***a total horary of 566 study hours*** . The pedagogical training of the candidate is at a very high level. She is a recognized and well-known specialist and expert in the field of Electricity . The candidate participated in the development of the curricula and programs for the "Electrical Engineering" major at TU - Varna and majors "Biomedical Engineering and Technologies", educational qualification degree (EQD) "Bachelor" and "Electronic and Information Technologies in Health Care", EQD "Master" at MU - Varna .

The candidate is the supervisor of 5 PhD students, of which 3 have successfully defended their thesis. As can be seen from the presented certificate from the MU - Varna, one doctoral student defended after the announcement of the competition for a professorship.

Assoc. Prof. Vasileva is the chairman of many state examination committees for the specialty "Information technologies in health care and health care", EQD "master". She participated in 4 scientific juries on procedures for obtaining the title of doctor, in 4 scientific juries on procedures for filling the academic position of "principal assistant", in 6 - for filling the academic position of "associate professor" and in 1 - for filling for the academic position "professor".

He is the author of a textbook on "Electrotechnical materials", ISBN 978-619-221-337-4, MU - Varna, 2021 and co-author of a textbook on "Materials and components of computer technology", ISBN 978-619-221-325-1 , MU - Varna, 2021., as well as co-author of two manuals for laboratory exercises on "Electrotechnical materials" and "Example tests on electrotechnical materials". Assoc. Dr. Eng. Margreta Vasileva is the head of 28 graduates who successfully defended their diplomas, studied at OCS "Bachelor" and EQD "Master".

This gives me the reason to designate Assoc. Dr. Eng. Margreta Vasileva as a well-established teacher with high professional and engineering-technical qualities.

5. Basic scientific and scientific-applied contributions.

The candidate's contributions from the presented publications are ***scientific, scientific-applied*** and ***applied character*** . Publications under *indicator B4 (10 scientific publications equivalent to a monographic work in publications that are referenced and indexed in world-famous databases with scientific information)* are related to the topic "Model studies of processes of occurrence and limitation of overvoltages in electrical networks".

Scientific contributions: Three-phase models of high-voltage electrical systems were developed in the Matlab programming environment Simulink for studying wave processes and ATP-EMTP for studying atmospheric, switching and established overvoltages. (***B4-9, B4-10, G7-1, G7-2***)

Scientific-applied contribution: Research has been carried out on the protective characteristics and energy resistance of surge protection devices in low, medium and high voltage electrical systems. Conclusions are made and recommendations are made regarding the choice of protective devices, taking into account the influence of the network configuration and the type of overvoltages acting on it. (***B4-3, G8-1, G8-3***) . Overvoltage levels for a 220 kV electrical substation are determined and ways to limit them in the event of a direct lightning strike in the vicinity of the substation and in the event of switching overvoltages are proposed. An analysis was made of the various factors affecting the levels of overvoltages occurring in 220 kV substations . (***G8-19***) . An approach has been proposed to assess the reliability of the surge protection system of an electrical substation using valve taps with different operating parameters. (***B4-7***). Developed are simulation models in software environment Matlab Simulink for visualization on processes in power plants systems , suitable for training on students and promotion the qualification on the responsible one EEC staff . (***B4-8; G7-3***)

The publications under indicator D are related to various topics in the area of Electric Power . The main contributions can be classified as follows:

Scientific contributions: A dependence has been derived for determining the maximum contact voltage in an end corner cell of an earthing network for the case of a pulsed lightning current flowing at any of its points. (***G8-8***) Simulation models were developed in the Matlab programming environment Simulink of low-voltage power grid and single-phase residual current protection to perform a more precise analysis of electrical safety.

Scientific-applied contributions: A computer program was developed to determine the risk of lightning damage taking into account all additional components of all types of risks. Two additional modules have been developed to evaluate the effectiveness of protection against direct lightning strikes in wind farms parks . (***G8-2, G8-4, G8-5)*** A simulation model of a solid dielectric with partial discharges developing in its volume was developed in the Matlab program environment Simulink and a variant model study of partial discharges in different dielectric media is presented. Recommendations related to different magnitudes of applied voltage and different sizes of air inclusion are derived. (***G7-4***) Model studies were done in MATLAB SIMULINK of processes in 20 kV electrical networks under the influence of atmospheric overvoltages. Suggested recommendations for setting up fast-acting relay protections and selecting the energy capability of metal oxide valve taps. (***B4-2***) Model studies of processes in LED drivers and integrated circuits were made. Results are presented and recommendations related to their functional performance and efficiency with different LED connection methods are presented. (***G8-6, G8-7***) A replacement scheme of a metal oxide valve drain has been developed for the study of thermal processes under the influence of atmospheric overvoltages. Model studies have been done in MATLAB and conclusions have been formulated regarding the energy resistance of the investigated valve outlet. (***G8-10***).

6. Significance of contributions to science and practice.

The significance of the contributions of the candidate in the competition - Assoc. Dr. Eng. Margreta Vasileva, for education, scientific research and innovation is indisputable. The importance can be judged by the presented scientific reports, with which he participated in prestigious international and national scientific forums with international participation and the scientific publications referenced and indexed in the world-famous databases with scientific information - Scopus and Web of Science, as well as those in non-refereed journals with scientific review or in edited collective works - materials from national and international scientific conferences, in the country and abroad.

I define the candidate's contributions to science and engineering practice as significant and representing a good basis for further in-depth scientific research and achievements in the scientific field of the competition. The candidate has published a significant number of scientific works with scientific and applied contributions to science, innovation and education.

Therefore, the candidate's contributions in the declared scientific field are significant, and the information contained in them is useful, sought after and needed by other authors and specialists, and most importantly - the names of the candidate and his co-authors have long been well known in the scientific community literature and in engineering practice.

7. Critical notes and recommendations.

I have no remarks of an editorial or scientific-technical nature regarding the works submitted for review. I recommend greater precision when using terminology such as imitations , etc. It is obvious that the candidate has covered several important scientific topics in the field of Electric Power . I recommend that the candidate direct his monograph writing efforts both in the field of the competition and in the fields where he works and experiments.

8. Personal impressions and opinion of the review.

I have known the candidate in the competition for more than 20 years and have personal impressions of the candidate's work. She is highly regarded as a professional, both as a teacher and researcher and is a well-known researcher with competence, established criteria, great activity and enterprise, with a wide range of professional and scientific interests. It can be confidently claimed that it has a well-recognized signature in education, research, industry and implementation (innovation) by actively maintaining scientific contacts and being a sought-after partner in new engineering and innovation projects.

CONCLUSION

The scientific works presented in the competition contain significant results, for which I give a positive assessment. Sufficient scientific, scientific-applied and applied contributions have been received. The minimum requirements have been met, the scientific -metric indicators have been met and Associate Professor Dr. Eng. Margreta Vasileva meets all the conditions and requirements of Law on the development of the

academic staff in the Republic of Bulgaria, Regulations for the application of the Law on the Development of the Academic Staff in the Republic of Bulgaria and MU - Varna and Regulations for the development of the academic staff at MU-Varna.

Based on this, I find it reasonable to propose ***Assoc. Prof. Dr. Eng. Margreta Parashkevanova Vasileva to occupy the academic position of "PROFESSOR"*** in professional direction 5.2. Electrical engineering, electronics and automation in the scientific specialty "High-voltage technology".

Date: 21.5.2024 г.

REVIEWER:

Prof. PhD. Eng. Valentin Kolev