

OPINION

on the competition for the academic position of "Professor" in professional field 5.2 Electrical Engineering, Electronics and Automation, scientific specialty "Elements and Devices of Automation and Computing Technology," for the needs of the Section "Robotics in Energy" at the Institute of Robotics – Bulgarian Academy of Sciences (BAS), announced in State Gazette No. 61 / 29.07.2025, with candidate: *Assoc. Prof. D.Sc. Eng. Iliyan Hristov Iliev*
Member of the Scientific Jury: *Prof. Dr. Anatoliy Trifonov Aleksandrov*
(in accordance with Order No. 116 of 26.09.2025 of the Director of the Institute of Robotics – BAS).

1. General Characteristics of the Candidate's Research and Scientific-Applied Activity

In the competition for the academic position of "Professor," *Assoc. Prof. D.Sc. Eng. Iliyan Hristov Iliev* participates with 22 scientific works, including one monograph (B3), 2 scientific publications (G7.1, G7.2) in journals referenced and indexed in world-renowned scientific databases (Scopus), and 19 scientific papers (G8.3 – G8.21) published in peer-reviewed but non-indexed journals or edited collective volumes.

The publications can be classified as follows:

- By place of publication: Articles in national journals – 3 [G8.12, G8.15, G8.16]; Papers in proceedings of international scientific conferences held in Bulgaria – 13 [G7.1, G7.2, G8.3–G8.8, G8.11, G8.14, G8.17, G8.20, G8.21]; Papers in proceedings of university scientific volumes – 5 [G8.9, G8.10, G8.13, G8.18, G8.19].
- By language of publication: In English – 6 [G7.1, G7.2, G8.9, G8.10, G8.18, G8.19]; In Bulgarian – 15 [G8.3–G8.8, G8.11–G8.17, G8.20, G8.21].
- By number of co-authors: Single-authored – 4 [G8.4, G8.5, G8.7, G8.12]; With one co-author – 3 [G8.6, G8.15, G8.16]; With two co-authors – 7 [G7.2, G8.3, G8.8, G8.18–G8.21]; With three or more co-authors – 7 [G7.1, G8.9, G8.10, G8.11, G8.13, G8.14].

In 13 of the listed publications, *Assoc. Prof. Iliev* is the first author.

Assoc. Prof. D.Sc. Eng. Iliyan Hristov Iliev meets, and in several indicators exceeds, the minimum national requirements as well as the requirements of the Regulations for Acquisition of Academic Degrees and Occupation of Academic Positions at the Institute of Robotics – BAS. He has defended a PhD thesis entitled "*Study, Analysis and Quantitative Assessment of the Real Contribution to the Deterioration of Electric Power Quality by Industrial and Utility Consumers*," in professional field 5.2 Electrical Engineering, Electronics and Automation, scientific specialty "*Electric Power Supply and Electrical Equipment*", Diploma No. 0049 / 01.02.2016, Technical University of Gabrovo (Indicator A – 50 pts). He has also defended a D.Sc. thesis entitled "*Optimization of Electrical Energy Efficiency under Low Load Conditions and Improvement of the Quality and Reliability of Power Supply Systems*," in the same professional field, Diploma No. 001743 / 08.07.2025 (Indicator B – 100 pts). He has presented a habilitation work – a monograph ("*Optimal Highly Efficient Technical Solutions in Power Supply*," Print Factor Publishing House, Sofia, 2025, 142 pp., ISBN 978-619-7427-38-7) (Indicator V.3 – 100 pts), and 21 scientific publications (Indicator G – 202.35 pts), of which 2 publications in journals indexed in Scopus (Indicator G7 – 23.33 pts) and 19 in peer-reviewed non-indexed journals or collective volumes (Indicator G8 – 179.02 pts). He has 50 citations (Indicator D – 114 pts), including 1 in indexed journals (Scopus, Web of Science) (D12 – 10 pts), 6 in monographs or edited volumes (D13 – 18 pts), and 43 in peer-reviewed non-indexed sources (D14 – 86 pts). The candidate has a strong record of scientific-applied activity (Indicator E – 270 pts): D.Sc. degree obtained (E16 – 40 pts); Supervision of three successfully defended PhD students (E17 – 100 pts); Participation in a national scientific or educational project (E18 –

30 pts); Leadership of a national scientific or educational project (E20 – 40 pts); Two published university textbooks (E23 – 60 pts).

With 836.35 points, *Assoc. Prof. D.Sc. Eng. Iliyan Hristov Iliev* significantly exceeds the minimum national threshold of 600 points required for participation in this competition.

2. Evaluation of the Candidate's Pedagogical Preparation and Activity

Iliyan Iliev has extensive professional experience in the energy sector. From 2002 to 2016 he worked in the Energy-Mechanical Department of *Kula Ring, Electricity Distribution Pleven – Vidin Branch, Operation and Maintenance – Vidin, Electricity Distribution Sofia Region – CEZ Distribution Bulgaria JSC, National Electric Company JSC – Sofia, Energy and Water Regulatory Commission* (as a member of the SEWRC), and *Hydroenergy Group Ltd., Sofia*.

Between 2017 and 2025, he has been a lecturer at the *University of Mining and Geology "St. Ivan Rilski"* – Sofia, where he has accumulated seven years of teaching experience. He has successively held the academic positions of *Assistant Professor* and *Chief Assistant Professor*, and since 2024 has been *Associate Professor and Head of the Department of "Electric Power Supply and Electrical Equipment"* at the MEMF Faculty of the same university. Since 2025, he has also been *Head of the Laboratory "Robotic Systems in Energy"* and *Head of the Section "Robotics in Energy"* at the *Institute of Robotics "St. Apostle and Evangelist Matthew"* – BAS.

He has lectured on the following courses: *Short Circuits in Electrical Systems, Installation and Operation of Electrical Equipment, Renewable Energy Sources, Power Supply of Industrial Enterprises, High Voltage Engineering, Electrical Energy Efficiency, Electrical Networks and Systems, Electricity Trading*.

He has supervised 24 successfully defended diploma theses and 3 PhD theses, authored 2 university textbooks, and acted as reviewer of diploma works, dissertations, curricula, research projects, and scientific publications. He has also developed new bachelor's and master's degree curricula for the disciplines he teaches.

The above-stated evidence provides grounds to assess the pedagogical preparation and teaching activity of *Assoc. Prof. D.Sc. Eng. Iliyan Hristov Iliev* as **very good**.

3. Main Scientific-Applied Contributions

I accept the contributions formulated in the submitted works. They possess a scientific-applied nature, proving new aspects of existing scientific problems and providing confirmatory results in the field of **electrical networks and energy efficiency**.

3.1. Contributions in the Habilitation Work – Monograph

- It is demonstrated that by applying a "dynamic approach," the prospective development of industrial facilities is taken into account, allowing for an assessment of increased annualized costs under non-rational technical solutions.
- An optimization problem has been solved to determine the optimal locations of power supply sources, minimizing distribution indices and reducing the annualized costs.
- The applicability of correlation theory for optimization of load schedules has been proven. A practically oriented methodology has been proposed, based on the principle of minimizing the dispersion component of power and energy losses.

3.2. Contributions in Publications other than the Habilitation Work

3.2.1. Contributions in the Study, Analysis and Improvement of Energy Efficiency in Electrical Networks [G8.14–G8.16, G8.18, G8.21]

- Under low-load operating conditions, it has been confirmed that operating at voltages with negative deviations is feasible due to reduced power losses.
- It is shown that, according to the criterion of "minimum annualized cost (AAC)," optimal deviation angles γ can be determined for various lengths and cross-sections of main lines.

- It has been established that induced voltages in the overhead conductors of a disconnected railway line under the influence of an adjacent energized line or nearby lower-voltage lines can reach hazardous levels. Consequently, personnel working on contact networks are exposed to electric fields exceeding permissible limits when operating at distances below 0.5 m from the contact conductor.
- The methods for design and selection of electrical networks in photovoltaic systems have been analyzed, with several practically important aspects identified concerning the selection of DC and AC cables and conductors.

3.2.2. Contributions in the Study, Analysis and Evaluation of Power Quality and Electromagnetic Compatibility (EMC) in Electrical Networks

- The possibilities for dimming LED sources and lighting systems have been analyzed, accompanied by experimental studies on LED systems controlled by DALI and ZigBee protocols, achieving significant improvement in energy efficiency. Instrumental and analytical assessments of the “shore-station-ship” system have been performed to evaluate operational compatibility.
- It has been demonstrated that EMC should be considered not only in direct relation to Power Quality (PQE) but also in connection with dependent indicators such as *reliability and stability of power supply systems (PSS), energy efficiency factors, specific energy consumption, power and energy losses, and structural and schematic characteristics of PSS* [G8.4–G8.7].
- Based on PQE analysis in mining enterprises, measures have been proposed for improvement, including optimization of operational modes, schematic modifications, and the introduction of symmetry- and filter-compensation devices [G8.10, G8.11, G8.17, G8.19].

3.2.3. Contributions in the Study of Photovoltaic System Models and their Influence on Power Supply Systems

- The growing energy deficit of fossil fuels in European countries and in Bulgaria has been analyzed, alongside preparations for new renewable energy development programmes in Europe. The sharp increase in the share of alternative and renewable sources in meeting the energy and fuel needs of Eurozone countries has been presented [G8.12].

3.2.4. Contributions in the Study of Reliability in Power Supply Systems [G8.9, G8.13]

- It has been established that organizational measures, requiring no additional technical expenditure, can ensure good economic efficiency in the power supply systems of industrial sites. Using a correlation-resonance method, the dispersion component of the group active power load schedule has been minimized, leading to reduced active power losses.

3.2.5. Contributions in the Study of Reactive Load Compensation [G8.8, G8.21]

- Through longitudinal compensation of reactive loads, the power factor has been significantly improved to values above 0.9, voltage fluctuations have been reduced by a factor of 2–3, and phase asymmetry has been reduced to below 2%.

4. Significance of the Contributions for Science and Practice

The significance of the candidate's contributions is evidenced by the 50 citations listed in the submitted documentation. In addition, he is the author of monographs in the field of energy engineering. These facts substantiate the conclusion that *Assoc. Prof. D.Sc. Eng. Iliyan Hristov Iliev* is a recognized author, publishing in reputable scientific fora within the field of the competition.

5. Critical Remarks and Recommendations

No significant shortcomings were found in the works of *Assoc. Prof. D.Sc. Eng. Iliyan Iliev*. I believe that the contributions could be further summarized. It is recommended that the candidate prepare publications in impact-factor journals and single-authored works.

CONCLUSION

In conclusion, I can provide a positive evaluation of the overall research and pedagogical activity of *Assoc. Prof. D.Sc. Eng. Iliyan Hristov Iliev*, which fully meets the requirements for holding the academic position of Professor. Sufficient and significant scientific-applied contributions have been achieved.

Based on the review of the submitted works, their significance, and the scientific-applied contributions contained therein, I find it well-founded to propose that *Assoc. Prof. D.Sc. Eng. Iliyan Hristov Iliev* be appointed to the academic position of "Professor" in professional field 5.2 Electrical Engineering, Electronics and Automation, scientific specialty "Elements and Devices of Automation and Computing Technology."

Date: 16 October 2025

MEMBER OF THE SCIENTIFIC JURY:

(Prof. A. Aleksandrov)