OPINION

by Assoc. Prof. Dr. Eng. Daniela Dimitrova Parashkevova
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on the dissertation entitled ***"Improving Energy Efficiency in Power Supply Systems"***, submitted by **M. eng. Desislava Ivanova Delcheva** for the award of the educational and scientific degree **„Doctor"** in the scientific specialty *„Elements and Devices of Automation and Computing Technology"* within the professional field **5.2 *„Electrical Engineering, Electronics and Automation".***

1. Relevance and significance of the research problem

The introduction of innovative technologies for improving energy efficiency in power supply systems requires electronization, the implementation of adjustable semiconductor drives, and the control of electrical processes in large-scale consumers such as arc furnaces, welding units, electrolysis installations, electric excavators, cranes, electric locomotives and trolleybuses, industrial lighting systems, and many others. These consumers, along with their control, monitoring, and management systems, generate serious disturbances related to voltage and current fluctuations, asymmetry, waveform distortion, and an increased likelihood of power supply interruptions of various types.

The deterioration of power quality indicators, caused by electricity consumers themselves, has a significant negative economic impact, primarily expressed in increased power and energy losses.

Electromagnetic disturbances generated by certain consumers can impair the normal operation of other users. Furthermore, such disturbances may degrade the parameters of the network itself, thereby reducing its capacity and the overall quality of the supplied electrical energy. The issue of power quality management is thus an integral part of the broader challenge of ensuring electromagnetic compatibility.

The existence of a direct relationship between power quality indicators and consumer characteristics makes it possible to conduct a quantitative assessment of electromagnetic compatibility. As a result of experimental studies, probabilistic–statistical dependencies can be established—both between individual and between multiple power quality indicators and the quantitatively defined electromagnetic compatibility.

2. Analysis of the literature used

For the development of the dissertation, 116 literary sources were consulted, of which 75 are in Cyrillic and 41 in Latin script. The sources correspond well to the subject matter of the research, with a significant portion drawn from publications of the past few years.

3. Evaluation of the candidate's abstract related to the dissertation

The structure and content of the abstract fully correspond to the subject matter developed in the dissertation. The submitted abstract has a length of 36 pages.

4. Evaluation of the candidate's publications related to the dissertation

M. eng. Desislava Delcheva has presented five publications related to the dissertation, co-authored with Assoc. prof. DSn eng. Iliyan Iliev, the candidate's scientific supervisor. These papers have been published in national scientific forums. The presented publications reflect substantial portions of the dissertation as well as its key scientific investigations.

5. Evaluation of the scientific results, contributions, and the degree of the candidate's personal involvement

The contributions of the dissertation can be classified as both scientific and applied. The doctoral candidate has formulated two scientific and two applied contributions, which are well-founded and scientifically substantiated.

The degree of the candidate's personal involvement in the development of the research topic is substantial and represents a significant share of the overall research process.

6. Opinions, critical remarks, and recommendations

The dissertation is a comprehensive and well-structured scientific work addressing the researched problem. I have no substantial criticisms.

I recommend that the doctoral candidate continue her research in this field, increase the number of independent scientific publications, and aim to publish in journals that are peer-reviewed and indexed in internationally recognized scientific databases.

7. Conclusion and evaluation of the dissertation

The dissertation entitled ***„Improving Energy Efficiency in Power Supply Systems"*** has been developed by the doctoral candidate at a high scientific level and is in full compliance with the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria.

On this basis, I propose to the members of the Scientific Jury that the educational and scientific degree **„Doctor"** be awarded to **M. eng. Desislava Ivanova Delcheva** in the field of Technical Sciences, professional field 5.2 *Electrical Engineering, Electronics and Automation*, scientific specialty *„Elements and Devices of Automation and Computing Technology"*.

03 September 2025 Member of the Scientific Jury:

Sofia /Assoc. prof. Dr. D. Parashkevova/