

## OPINION

by: Assoc. Prof. Nikolay Stoimenov, Ph.D.,

on a dissertation for obtaining an educational and scientific degree  
“Doctor (Ph.D.)”

member of the scientific jury by Order No.25/31.01.2022. of the Director of IICT

**Author of the Dissertation thesis:** mas. eng. Miglena Marinova Paneva  
**Thesis of the Dissertation:** „Innovative methods for technological diagnostics  
of automatic machines and lines“  
**Professional Field:** 5.2. „Electrotechnics, Electronics and Automation“  
**Doctoral Program:** „Automated information processing  
and management systems“  
**Scientific Supervisor:** Prof. Dimitar Karastoyanov, Ph.D.

### 1. General characteristics of the dissertation.

The dissertation thesis, presented to me for an opinion by mas. eng. Miglena Marinova Paneva has a volume of 153 pages, divided into 5 chapters, conclusions, and a declaration of originality. In the literature review, 163 sources were cited, including Internet addresses.

### 2. Relevance of the problem developed in the dissertation in scientific and scientific-applied terms.

The dissertation is in a modern and perspective field for diagnostics of machines and lines. The topic is widely discussed worldwide, and various practical and theoretical solutions are proposed and developed. Numerous studies in the world are known. This topic is rarely discussed in our country, in recent years attention has been paid to the systems for early monitoring of processes with complete temporary diagnosis in case of impaired efficiency. Research in this field requires a synergistic approach and serious knowledge of technological processes related to metalworking, materials science, mechanical and digital measuring instruments, knowledge of information and communication technologies, automation, control systems and more.

### 3. Degree of knowledge of the state of the problem and creative interpretation of the reference sources.

The introduction of the dissertation, the literature review of 163 reference sources, and the description of the used scientific equipment show in-depth detailed knowledge of the subject by the author. The identified and analyzed problems, as well as modern solutions for integrating

new technologies in the modern diagnostics of automatic machines and lines, have been developed with precision and detail.

The goals and tasks of the dissertation are formulated with arguments after analysis and systematization in the field of diagnostics for automatic machines and lines.

**4. Correspondence of the chosen research methodology and the set goal and tasks of the dissertation with the achieved contributions.**

In the dissertation, the researched existing methods and means for modern diagnostics of automatic lines create an opportunity for the application of methods for improving their quality and efficiency. The proposed innovative approaches include the improvement of existing diagnostic methods and techniques. The complex use of the existing methods and tools for diagnostics, the influence of ICT on them and the conducted experiments show that the doctoral student has successfully performed the chosen methodology following the set goals and the achieved scientific and applied contributions.

**5. Scientific and scientific-applied contributions of the dissertation.**

I accept and appreciate the positively formulated contributions of the author, which are mainly oriented to scientific and applied nature.

The dissertation and the abstract are described as follows:

1. After a detailed review, critical analysis and systematization of methods and tools for technical diagnostic procedures are made.
2. Existing problems and solutions concerning the modern diagnostics of automatic machines and lines are discussed and the influence of ICT on the methods for technical diagnostics is studied.
3. Innovative approaches for diagnostics of automatic machines and lines are proposed.
4. Methods have been developed for: technical diagnostics (testing) through a test body of plastic deformation and tensile strength, graphs of carbon steel at tensile strength, a transformation from hot-rolled to cold-rolled sheet, creation of high-strength cold-rolled steel for precision electric welds pipes.
5. Methods have been developed for: the design of a new type of innovative test body holder, innovative measurement of geometric characteristics by 3D computed tomography, and analysis of the characteristics of the test body before and after punch sharpening.
6. Methods have been developed for: spectral analysis of a metal test body, machining, and research of the hardness and roughness of working rolls, testing of the roughness of low-carbon steel after cold rolling.
7. Experimental developments and simulations of different methods in an industrial environment are made.
8. The results are analyzed and tested

It is noteworthy that the results were analyzed and tested in the production – enterprise for pipe details in Lovech.

## 6. Evaluation of the dissertation publications.

In connection with the dissertation 7 publications and a utility model have been made by the Ph.D. student, as in 4 of the publications she is an independent author, in 3 of them, she is the first author. The materials have been published in conferences and journals as follows:

- 1 at a conference in world indexed and referenced databases with SJR rank;
- 4 at international scientific and technical conferences;
- 1 at a scientific and technical conference in Bulgaria;
- 1 in an academic journal in English.

The publications reflect, present, and promote parts of the dissertation. It can be concluded that the results have become known to the scientific community.

## 7. Opinions, recommendations, and remarks.

In addition to the 7 publications presented here, she is a co-author of more than 20. The dissertation is developed in detail and precision, characterized by completeness and depth. Existing problems and solutions in the modern diagnostics of automatic lines are discussed, and innovative approaches for their diagnostics are proposed. Methodologies aimed at increasing the control, quality, efficiency and productivity of pipes have been developed.

The researched area gives the potential for further development. As a recommendation for future research, I would suggest to the author to increase the publishing activity abroad (in even more serious scientific publications).

The dissertation contains spelling, minor stylistic, and technical inaccuracies, which I shared with the doctoral student. The mistakes and inaccuracies do not belittle the dissertation.

## CONCLUSION

The author has made a precise and in-depth study in a new and promising area. All the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation, as well as the specific conditions for obtaining scientific degrees and holding academic positions at the Institute of Information and Communication Technologies, in terms of scope, volume, abstract and quality of the dissertation are met. My assessment is positive. The results obtained prove the depth, and capacity of the candidate to conduct independent research and studies.

On the above grounds, I propose to the honorable Scientific Jury to award mag. eng. Miglena Marinova Paneva with the educational and scientific degree "Ph. D." in scientific field 5. "Technical Sciences", professional field 5.2. "Electrotechnics, Electronics and Automation", doctoral program "Automated information processing and management systems".

14.04.2022.

Sofia

НА ОСНОВАНИЕ

ЗЗЛА