To

the Chair of the Scientific Jury,

according to Order № 257/18.12.2018

of the Director of the Institute for

Information and Communication Technologies

of Bulgarian Academy of Sciences

OPINION

by professor **Maria Slavova**, PhD, on the dissertation thesis "Intelligent Methods of Analysis of Rehabilitation Processes" of **Bistra Zaharieva** for acquiring the educational and science degree **doctor** by the doctoral programme: „Application of the Principles and Methods of Cybernetics in Different Spheres of Science" in scientific sphere 5. Technical sciences, professional division 5.2. "Electrical Engineering, Electronics and Automation" at the Institute for Information and Communication Technologies (IICT) of Bulgarian Academy of Sciences

The submitted for consideration dissertation thesis "Intelligent Methods of Analysis of Rehabilitation Processes" contains 148 pages, 8 figures, 15 tables. The Study is structured in introduction, four chapters, conclusion and bibliography. There is an additional list of abbreviations and citations.

The subject of the dissertation work is using the means of the modern paradigms from the sphere of the intelligent systems to develop highly effective intelligent methods for analysis of rehabilitation processes. The dissertation contributes to the contemporary gathering of the existing cybernetics methods in the perspectives of the rehabilitation processes by bringing forward pragmatic

grounds for the potential improvement of the results of the intelligent methods and the rehabilitation science and practice. The made proposals for application of the intelligent methods as models for the future development of the rehabilitation processes and the proposals for reconsidering the ethical aspects of their application have undoubtful value.

The dissertation is based on experimental and comparative studies, the disciplined methodology of the critical analyses and a logical structure.

The introduction is devoted to aim, the tasks, the methods and the plan of action of the study. Chapter 1 carries out a review of the intelligent methods for analysis of complex processes, Chapter 2 deals with the analysis of rehabilitation processes in case of ankylosing spondylitis and chronic degenerative illness of the knee joint, Chapter 3 shows the experimental results of the application of the intelligent methods in rehabilitation processes of specified groups and Chapter 4 discusses the ethical norms about applying intelligent methods to rehabilitation processes. The conclusion consists of the summary of the obtained results and the guidelines for future research. The bibliography contains 155 sources - 133 of them in English and 22 - in Bulgarian.

The sscientific and practically applicable results of the dissertation might be presented as follows:

- systematization of the existing intelligent methods for analysis of rehabilitation processes;
- recommendation methodology for analysis of rehabilitation processes with patients having socially important diseases;
- generalized net models of rehabilitation processes of patients with musculoskeletal complaints, as well as of patients with proximal humeral fractures;

- intelligent methods for analysis of rehabilitation processes of patients with ankylosing spondylitis - Behterev's disease, to achieve higher efficiency of the rehabilitation processes;

- intelligent methods for analysis of rehabilitation processes of patients with chronic degenerative illness of the knee joint-gonartrosis to achieve higher efficiency of the rehabilitation processes;

- proposals de lege ferenda of amendments of the ethical acts on using data related to the physical condition of patients in hospitals.

The contributions of the dissertation include experimental results from the application of the Inter Criteria Analysis of the rehabilitation process data and a generalized net model of physical evaluation with a patient of musculoskeletal complaints. Of contribution character is also the generalized net model of diagnostic evaluation of proximal humerus fractures that could be used by practitioners for diagnosis of patients of humerus fracture.

The dissertation formulates proposals for amendments of the Professional Ethical Code of doctors in Bulgaria. Some reasons are numbered for the adoption of a future Ethical Code in applying intellig 1t methods of analysis of rehabilitation processes.

The dissertation meets all requirements of Institute for Information and Communication Technologies of the Bulgarian Academy of Sciences for acquiring of the educational and science degree 'doctor', as well as the national requirements of Law on Development of the Scientific Staff of the Republic of Bulgaria and the Regulation of the Council of Ministers № 122 of 29.07.2018 on the application of the law.

On the base of the above stated I consider that the presented dissertation thesis "Intelligent Methods of Analysis of Rehabilitat n Processes" has all the necessary qualities aand answers the expectation of scientific contribution of a dissertation study and therefore I give my **positive opinion** for conferring of the educational and science degree **'doctor'** to **Bistra Zaharieva and I suggest**

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that the Scientific jury to vote unanimously that the educational and scientific degree 'doctor' of the doctoral programme „Application of the Principles and Methods of Cybernetics in Different Spheres of Science" be given to Bistra Zaharieva.

03.02.2019
Sofia

Prof. Maria Slavova, PhD