

OPINION

by **Prof. Dr. Georgi Penchev Venkov – Faculty of Applied Mathematics and Informatics (FAMI) Technical University – Sofia**

on the dissertation for acquiring the educational and academic degree "**Doctor**"

Field: Arts

Professional direction: 8.3 Music and Dance Art

Academic specialty: Music Studies and Music Art

Author of the dissertation work: **MA Ivan Kostadinov Yanakiev**

Subject of the dissertation: **The Concert System A1 = 432 Hz and the Open Fifths: An Attempt at Integral Acoustic, Psychophysiological, Cognitive and Practical research**

I present my opinion, prepared according to the requirements of:

- The Law on the Development of the Academic Staff in the Republic of Bulgaria (LASRB),
- Regulations for implementation of the LASRB
- Regulations concerning the terms and conditions for acquiring academic degrees and for holding academic positions at the Institute of Art Studies, BAS.

1. Relevance of the problems, specific goals and tasks developed in the dissertation, concrete aims and tasks

The main sphere of research of the dissertation of Ivan Yanakiev is interdisciplinary and covers the mutual intersection (synergy) of the sciences of musicology, neurophysiology, cognitive science, mathematics and computer science. The main problem considered in the work is the connection between the frequency of the concert system (or the frequency of the tone of the first octave) and the overall perception of the music. The set goals are related to the study of the historical context, which led to the establishment of the concert system A1 = 432 Hz; with the study of the theoretical formulations on the question of the systems for the organization of the tonal space; with the study of the possibility of a different perception of music and different cognitive-associative results depending on the concert system. To achieve the set goals, the following methods are used - research of literary sources, analysis of surveys conducted with musicians and non-musicians, analysis of sound recordings in kindergartens, schools and Orthodox churches during worship. The knowledge of MA Yanakiev makes a particularly good impression in the field of mathematics and informatics in the construction of mathematical models of

temperament and intonations, as well as in the preparation of software for checking the sense of synchronization and potential connection with the number F (the so-called golden ratio). I have known Ivan Yanakiev since the fall of 2017, when I conducted a series of academic seminars at the Technical University of Sofia with lecturers from the University of Pisa, Italy - Prof. Vladimir Georgiev from the Faculty of Mathematics and Informatics and Dr. Maria Laura Manka from the Faculty of Experimental and Clinical Medicine. The topics of their lectures and subsequent discussions were related to music therapy, the Mozart effect, the possible presence of a connection between consonance and dissonance and the number F. Made by MA Yanakiev competent comments and suggestions were highly appreciated by our Italian colleagues.

2. A Short Analytical Characteristic of the Dissertation

Ivan Yanakiev's dissertation has a volume of 314 pages and contains an introduction, 9 chapters, appendix and a bibliography where 131 literary sources are cited. The 70-page appendix includes the codes prepared in the course of the dissertation research, written in CSound and MatLab languages, and to each of the programs / functions is added a short commentary about the purpose and the result it gives after the its execution. As related to the dissertation Ivan Yanakiev presents 2 studies and 9 academic publications, one of which is popular science. The obtained results were reported at 13 conferences in the Bulgaria and abroad, at lectures on invitation by BAS and Sofia University "St. Kliment Ohridski". The doctoral student is a participant in 4 research projects at BAS and at the Bulgarian National Science Fund, of two of which he is a supervisor.

3. Evaluation of the Contributions of the Dissertation

I evaluate the contributions of this dissertation as follows:

- Revises and refines the definition of the terms concert system, temperament and intonation, making a clear distinction between them;
- Defines new concepts - "infra octave" and "localization of sound perception";
- Develops mathematical models of temperament and applies in practice the model in the graphical visualization of temperaments and in the generation and modeling of sound representations of the temperaments considered in the work;
- Collects and analyzes sound material from speech intonation in kindergartens and schools, as well as from Orthodox priests during worship;
- Proposes a neurophysiological hypothesis, which should be based on the results of surveys. Makes an objective analysis of the subjective impressions from the comparison of the concert system $a_1 = 432$ Hz and $a_1 = 440$ Hz, of the uniform temperament and the temperament "Open fifths"

- Offers prepared software for checking the feeling of synchronization and potential connection with the number F.

The contributions of the dissertation are significant for the modern development of music, original and in line with the new trends for interdisciplinary methods in the study of the arts. Undoubtedly, they are the individual work of Ivan Yanakiev, which is confirmed by the fact that the publications related to the dissertation are independent. In my opinion, we cannot speak about plagiarism of the presented results.

The presented abstract is in a volume of 40 pages and adequately reflects the content of the essential points of the dissertation.

CONCLUSION

Based on the analysis of the research presented in the dissertation work "The Concert System $A1 = 432$ Hz and the Open Fifths: An Attempt at Integral Acoustic, Psychophysiological, Cognitive and Practical research" and the academic indicators required by LASRB, the Regulations for its application and the Regulations on the terms and conditions for obtaining academic degrees and for holding academic positions at the Institute of Art Studies, BAS, I strongly recommend to the esteemed Scientific Jury to award MA Ivan Kostadinov Yanakiev the educational and academic degree "Doctor" in the field of higher education 8. Arts, professional field 8.3 Music and dance art, scientific specialty "Musicology and music art".

Date: 02.09.2020 Sofia

REVIEWER:

(Prof. Dr. Georgi Venkov)