

KONSTANTIN
PRESLAVSKY
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SHUMEN



*ШУМЕНСКИ УНИВЕРСИТЕТ
“ЕПИСКОП КОНСТАНТИН ПРЕСЛАВСКИ”*

STATEMENT

By Assoc. Prof. Stanimir Kunchev Zhelezov, PhD
Konstantin Preslavsky University of Shumen

of the dissertation of Tsvetelina Rosenova Ivanova, entitled
„Research of cryptographic function for protection of sound files”
presented for obtaining the educational and scientific degree „Doctor”, in the
professional field 4.6 „Informatics and Computer Sciences”.

Shumen
2022

This statement has been prepared in accordance with the requirements of the Act for the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation and the Regulations for the Development of the Academic Staff of the University of Shumen.

1. Brief assessment of the submitted documentation

The presented documentation is sufficient and complete to clarify the work and qualification of the doctoral student, the overall appearance of the dissertation and research papers of Tsvetelina Rosenova Ivanova. The authenticity and authenticity of the documentation presented to me is beyond doubt.

The review of the documents presented to me showed that there were no violations in the education process in the doctoral program.

2. Relevance of the dissertation

The presented dissertation is a completed research work, reflecting the need to increase the reliability of digital information and communication channels for data transmission. The dissertation is focused on the protection of a specific type of data - sound files.

I consider the topic of the dissertation completely relevant due to the constant need of improving the algorithms for information protection, which is one of the most valuable and important resources in the modern technological world.

The goal and tasks fully correspond to the essence of the researched problems in the dissertation.

3. Description of the dissertation

The dissertation has a total volume of 105 pages and consists of an introduction, 3 chapters, conclusion, bibliography from 140 sources, 18 figures, 28 tables and contributions are included.

The introduction contains presentation of the topic, defines the purpose of the dissertation, the defined tasks, describes the object and the subject of study and the methods for research.

The first chapter is introductory and reflects the current state of the problem related to information security. The basic concepts in the field of cryptography and the possibility of using cryptographic algorithms to protect sound files are discussed.

The second chapter presents models of pseudo-random generators through chaotic systems. The presented two generators are described in detail and tested for cryptographic security, through statistical tests, and all results show the achievement of the required target values.

The third chapter presents a cryptographic algorithm for protection of audio files, based on one of the pseudo-random generators of Chapter 2. The presented algorithm is analyzed by in-depth cryptographic analysis, including: visual analysis of graphical representation of sound files, correlation analysis, change rate of the sound files, signal-to-noise ratio, peak signal-to-noise ratio, encryption speed, algorithm sensitivity to encryption key.

From the presented 140 literature sources it is clear that an extensive and in-depth literature review of the problem has been made.

The abstract of the dissertation is 31 pages in volume and adequately reflects the structure and content of the dissertation manuscript and the results presented in it.

4. Contributions

In the dissertation are one scientific and five scientific-applied contributions, which I accept categorically. These contributions undoubtedly enrich the existing knowledge in the field and find application in practice.

5. Publishing activity

Six publications have been made on the dissertation, published in refereed editions, five of the publications are in English and one - in Bulgarian. It makes a good impression that 5 of the publications are indexed in SCOPUS, in publications with impact rank, and the main article on the dissertation is indexed in Web of Science, in edition with impact factor.

From the presented publications, it is clear that Tsvetelina Rosenova Ivanova fully meets the requirements and has even exceeded the minimum national requirements for obtaining the educational and scientific degree „Doctor”, in scientific area 4. „Natural sciences, Mathematics and Informatics”, in professional field 4.6 „Informatics and Computer Sciences”.

6. Critical assessments, remarks and recommendations

The manuscript is well structured, but there are some weaknesses in the exposition. The author often goes into unnecessary detail and the conclusions in the chapters are very descriptive. They could be formulated more succinctly and clearly. Contributions could be refined. There are some spelling and stylistic errors in the text.

7. Conclusion

These remarks are omissions, not weaknesses. They do not question the results obtained in the course of the dissertation research, their significance in theoretical and applied aspects.

I believe that the presented work is completely sufficient in volume and quality, meeting the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria and the Regulations for its implementation. I give a positive assessment of the presented work on "Research of encryption function for protection of sound files" and recommend to the esteemed scientific jury to award Tsvetelina Rosenova Ivanova educational and scientific degree "Doctor" in higher education 4.

Natural Sciences, Mathematics and Informatics ", Professional field 4.6" Informatics and Computer Science ".

05.05.2022

Prepared the statement:
(Assoc. Prof. Stanimir Kunchev Zhelezov, PhD)