

STATEMENT REPORT

by professor PhD Nikolai Manev,
the Institute of Mathematics and Informatics – BAS

on the dissertation thesis of **Tanya Todorova Marinova** entitle

“Algorithms for characterization of orthogonal arrays”

Submitted for acquiring **“Ph. D. degree”**

Area of Higher Education: **4. Natural Sciences, Mathematics and Informatics,**

Professional Field: **4.5 Mathematics**

Ph.D. program: **“Algebra, topology and applications”**

Scientific Adviser: **associate professor Maya Stoyanova**

1. General description of the procedure and the applicant

Tanya Marinova was born in 1988. She received Bachelor degree in 2011 and MS degree with subject “Discrete and algebraic structures” in 2013 both at the Faculty of Mathematics and Informatics of the Sofia University “St. Kliment Ohridski”. She started her PhD study in 2014. In the period 2010-2012 Tanya Marinova was at a part time position as assistant professor. Since 2012 she has worked in a computer company.

By order № РД 38-121 / 24.02.2021 of the Rector of the Sofia University “St. Kliment Ohridski” I was appointed as a member of the Scientific Jury. In such a capacity I received all required documents (in digital form) that concern the procedure. The documents shows that the applicant fully meets the minimal national requirements according to the Act on Development of the Academic Staff in the Republic of Bulgaria as well as the Regulations for the conditions and rules for acquiring PhD degree of the Sofia University “St. Kliment Ohridski”.

2. Approbation of the results in the dissertation

The results presented in the dissertation have been published in 6 papers, all with coauthors. Two papers have impact factor and one has impact rank. The rest papers are indexed by MathSciNet and zbMATH.

The papers have not been used for acquiring other degree or for occupying positions.

3. Assessment of the personal contribution of the applicant in joint works

According to declaration of coauthors and my personal observations I can conclude that the personal contribution of Tanya Marinova to joint papers is equipollent.

4. Impact of the results on the work of other scientists

Tanya Marinova has attached to application documents a list of 11 citations of her papers although the Act on Development of the Academic Staff in the Republic of Bulgaria does not require the existence of citations. This fact demonstrates the high level of her results.

5. Quality of the dissertation Abstract

The Abstract contains 20 pages and presents correctly the content of the chapters and the spirit of the dissertation as a whole. It underlines also the main results obtained in the thesis.

6. Description and analysis of results in the thesis

The dissertation thesis contains 117 pages and consists of Introduction, four chapters and Bibliography with 59 titles. The Introduction presents the motivations for the study as well as the main results.

Chapter 1 contains the notions and facts necessary for reading and understanding the rest of the thesis. The author's results are given in Chapters 2, 3, and 4.

Chapter 2 presents the author's study of orthogonal arrays over Z_2 . New lower bounds for indexes are obtained. In partial nonexistence of orthogonal arrays with given parameters is proved.

In Chapter 3 similar results about orthogonal arrays over Z_3 are obtained. The investigations in this case are slightly more complex but the methods are the same as used in Chapter 2.

The last chapter of the thesis carries interdisciplinarity into the presented investigations. By introducing the notion energy of an orthogonal array a possibility for investigations typical for other mathematical arrays has been opened out.

The proposed algorithms and computations are realized by Maple.

The thesis is well readable. I have no essential critical remarks.

The main contributions of Tanya Marinov are correctly and completely listed on page 9 of the thesis. They are solutions of difficult and interesting problems.

CONCLUSION

The dissertation thesis of Tanya Marinova contains theoretical results that are original contribution to the studied mathematical area. The thesis fully meets the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its application, and the Regulations for the conditions and rules for acquiring PhD degree of the Sofia University "St. Kliment Ohridski". **She possesses profound knowledge and professional skill in her mathematical area and demonstrates qualities and abilities for carrying out self-depended investigations.**

Based on the aforesaid in this report **I give positive estimation of the considered dissertation and strongly recommend the Scientific Jury to confer on Tanya Marinova the educational and scientific degree "Doctor" in area 4. Natural Sciences, Mathematics and Informatics, professional field: 4.5 Mathematics, Ph.D. program: "Algebra, topology and applications"**

8.04.2021 г.

Sofia

Signature:

Prof. N. L. Manev