

Report of the Dissertation Council of the Kazakh-British Technical University (KBTU) on the defense of a dissertation for the award of the degree of Doctor of Philosophy (PhD), Doctor in the profile for 2023 in the direction of personnel training: "8D094 - Information Technology" (in the specialties "8D06103 - Mathematical and computer modeling")

Composition of permanent members of the KBTU dissertation council for the defense of dissertations for the award of the degree of Doctor of Philosophy (PhD), doctor in the profile Specialty / Direction of personnel training: "8D06103 - Mathematical and computer modeling"

№	Full name	Academic degree, title, specialty code according to the abstract	Place of work, position	Position occupied
1	Isakhov Asylbek Abdiashimovich	PhD, 6D060100-Mathematics	JSC KBTU, Professor of the School of Applied Mathematics	Chairman of the DC
2	Rysbayuly Bolatbek	Doctor of Physical and Mathematical Sciences, Professor, 01.01.07 – Computational Mathematics	IITU, professor of the department of mathematical and computer modeling	Deputy Chairman of the DC
3	Kenzhebayev Talgatbek Saduakhasovich	candidate of physical and mathematical sciences, docent, 01.01.02 – differential equations	JSC KBTU, Associate Professor of the School of Applied Mathematics	Scientific Secretary of the DC
4	Verbovsky Victor Valerievich	Doctor of Physical and Mathematical Sciences, docent, 01.01.06 – Mathematical logic, algebra and number theory	Satbayev University, professor of the Institute of Cybernetics and Information Technologies	Member of the DC

The purpose of creating a dissertation council at KBTU for the educational program "Mathematical and computer modeling" is to provide an opportunity for doctoral students of the School of Applied Mathematics of KBTU, as well as doctoral students of other universities, to defend their dissertations in the field of MCM.

1. In 2023, 3 meetings were held, 2 of which were devoted to the defense of dissertations. At the meeting of the Dissertation Council, 2 dissertations were defended in the direction of personnel training "8D061 - Information and Communication Technologies" for the degree of Doctor of Philosophy (PhD) in the specialty 6D070500 - Mathematical and Computer Modeling. Dissertations were presented in Russian and English.
2. All members of the Council actively attended the meetings.
3. List of doctoral students who defended their dissertations in 2023 for the degree of Doctor of Philosophy (PhD)

Table 1.

№	Full name of doctoral student, organization of training	Date of defense, Chairman of the dissertation council, Reviewers	Topic	Scientific supervisors
1	Sinita Artem Vitalievich	14.04.2023, Chairman of the dissertation council, PhD, professor of KBTU Isakhov A.A. Reviewers 1. Kabanikhin Sergey Igorevich - Doctor of Physical and Mathematical Sciences, Corresponding Member of the Russian Academy of Sciences, Professor of the Laboratory of Inverse Problems of Natural Science, Institute of Computational Mathematics and Mathematical Geophysics, Siberian Branch of the Russian Academy of Sciences (Novosibirsk, Russian Federation). 2. Khompysh Khonatbek – Candidate of Physical and Mathematical Sciences, Acting Professor, Head of the Department of Mathematics, Faculty of Mechanics and Mathematics, Al-Farabi Kazakh National University. (Almaty, Republic of Kazakhstan).	Analytical expressions for a solution of inverse convective heat and moisture transfer equation in the frequency domain for layered media	1. Rysbayuly Bolatbek - a Doctor of Physical and Mathematical Sciences, professor of the department of mathematical and computer modeling, IITU 2. Antonio Capsoni – PhD, Professor at the Technical University of Milan (Italy).
2	Mashurov Farukh Arkinovich	26.05.2023, Chairman of the dissertation council, PhD, professor of KBTU Isakhov A.A. Reviewers	Special Tortkara algebras and assosymmetric algebras	I.Dzhumadildayev Askar Serkulovich – Doctor of Physical and Mathematical Sciences, Academician of

		<p>1. Khripchenko Mikola (Mykola Khrypchenko) – PhD in Mathematics, Professor, Researcher of Department of Mathematics, University of Porto (Porto, Portugal);</p> <p>2. Khudoiberdiev Abror Khakimovich – Doctor of Physical and Mathematical Sciences, Professor, Deputy Director of the Institute of Mathematics named after V.I. Romanovsky, Tashkent, Uzbekistan</p>	<p>the National Academy of Sciences of the Republic of Kazakhstan, Professor of the School of Applied Mathematics of the Kazakh-British Technical University.</p> <p>2. Shestakov Ivan Pavlovich – Doctor of Physical and Mathematical Sciences, member of the Brazilian Academy of Sciences, professor at the University of Sao Paulo, Brazil.</p>
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4. Dissertations are devoted to current problems of mathematical and computer modeling and are aimed at solving priority problems for the Republic of Kazakhstan in these areas.

Sinitsa Artem Vitalievich. The topic of the dissertation is "Analytical expressions for solving inverse problems for the convective equation of heat and moisture transfer in multilayer media". The theory of inverse problems is one of the most advanced methods in the approach to non-destructive testing analysis, which allows studying the state of a dynamic system without stopping operation. However, the lack of analytical solutions in this theory is due to the main problem associated with inverse problems, namely, the incorrectness of the formulation of inverse problems. In this regard, most numerical studies also come down to increasing technical difficulties in terms of maintaining the stability of the solution, as well as the required level of accuracy and convergence rate. In the presented study, the author considers the layered medium from the point of view of the analysis of convective heat and moisture transfer with the methods of the inverse problem theory, which is ultimately used to study the ecological state of soils, determine the properties and types of rocks, and, as shown in the work, is applied directly to determine the states of artificial structures. In fact, the use of a multi-physical model leads to the possibility of finding relationships between different identification problems. It becomes possible to determine a set of parameters, a geometric region, a boundary or initial conditions by applying the methodology of inverse problems, while the presented example with a multi-layered region considered as soil demonstrates some typical features of the proposed methodology, as well as its practical relevance and significance.

The following new and reliable scientific results were obtained in the work:

1. Analytical expressions were obtained and an algorithm for calculating the inverse problem of multiphysical processes of thermoelastic deformation and heat and moisture transfer was developed.
2. The methodology was expanded with respect to the quasi-linearized dimensional reduction of the thermoelastic stress analysis model along with exact expressions for studying the mathematical model in explicit form.
3. The properties of transformed operators in the frequency domain were discovered in terms of identifying the zeros of characteristic polynomials with respect to the attenuation parameter and

further constructing the decomposition of the transformation for deriving transcendental equations with eigenvalues.

All the obtained results of the dissertation are substantiated by scientific research, the reliability of which was verified by calculations. The conclusion and findings of the dissertation directly follow from the obtained results.

The high degree of novelty of the scientific results of the dissertation and conclusions is confirmed by publications in highly rated scientific publications from the Web of Science and Scopus information databases.

Mashurov Farukh Arkinovich. The topic of the dissertation is "Special Tortkara algebras and asymmetric algebras". The relevance of the research topic presented in the dissertation is due to several aspects.

First, non-associative algebras play an important role in various fields of mathematics and physics. The study of new types of non-associative algebras, such as pre-Lie, Novikov, asymmetric, bicommutative and Zinbil algebras, is a relevant and interesting area of research. The work pays attention to Zinbil and asymmetric algebras and their properties.

Second, the analysis and classification of finite-dimensional algebras arising from given varieties of polynomial identities is a classical problem in the theory of non-associative algebras. The classification of algebras within these varieties is a complex task requiring a symbolic solution of systems of polynomial equations. This is an important area of research, and its relevance is emphasized by the fact that the varieties of associative, alternative, Lie, Novikov, Jordan, Leibniz, Zinbil are well studied and widely used in various mathematical models.

Thirdly, the use of computer methods and computer algebra for the analysis and classification of non-associative algebras is an important aspect of the study. Solving systems of polynomial equations for classifying algebras can be a complex and cumbersome process, especially with a large algebra dimension. Computer methods and computer algebra play an important role in the study of non-associative algebras and the classification of algebras. They allow one to effectively solve systems of polynomial equations, conduct numerical experiments, and find new structures and patterns. Computer classifications and methods help to speed up and simplify the research process, as well as increase the reliability of the results.

The following new and reliable scientific results were obtained in the work:

The dissertation research is a significant contribution to the development of the theory of non-associative algebras, especially in the field of free Zinbihl and Tortcar algebras, as well as asymmetric algebras. The study led to obtaining several new and reliable scientific results, which are of great importance for the development of the corresponding algebraic theories and their practical application.

The first significant result of the study is finding a criterion for determining the Lie elements in a free Zinbihl algebra. Using this criterion, a basis for special Tortcar algebras was constructed. This opens up new possibilities for analyzing and understanding the structure of these algebras.

Another important result of the study is demonstrating the existence of an exceptional homomorphic image of a free special Tortcar algebra with three generators. It is proved that any homomorphic image of a free special Tortcar algebra with two generators is special, and that there is no special identity with two generators. These results expand our understanding of special Tortcar algebras and their structure.

The third important result of the study is related to asymmetric algebras. It was shown that if an asymmetric algebra of finite class is given, then the commutator ideal is nilpotent of nilpotent index less than or equal to the class of the given algebra. This expands our knowledge of nilpotent asymmetric algebras and their properties.

In addition, the study led to the construction of an algebraic classification of nilpotent asymmetric algebras of various dimensions. Nilpotent 4-dimensional asymmetric algebras, as well as nilpotent 5- and 6-dimensional asymmetric algebras with one generator were classified. This provides a systematic approach to the classification and understanding of the structure of these algebras of various dimensions.

All the results of the dissertation are substantiated by scientific research, the reliability of which is determined by the proofs of theorems. The conclusion and findings of the dissertation directly follow from the results obtained.

The high scientific level of the research conducted by the dissertators is evidenced by the publication of their results in journals with a non-zero impact factor included in the Thomson Reuters and Scopus databases, in the materials of foreign international scientific congresses and conferences. Publications of applicants also widely cover republican journals in the field of mathematics, mechanics, mathematical and computer modeling, included in the list of publications recommended by the Committee for Control of Education and Science of the Republic of Kazakhstan for publishing the works of applicants.

Table 2. Relationship between the topics of defended dissertations and national state programs and targeted republican and regional scientific and scientific-technical programs

№	Full name of the doctoral student	Scientific programs
1	Sinitsa Artem Vitalievich	grant project of the Ministry of Education and Science of the Republic of Kazakhstan No. 0115PK01424 “Development of the method of integral equations for studying the structures of inhomogeneous media” under the program “International Cooperation in the Field of Science” of the Ministry of Education and Science of the Republic of Kazakhstan for 2015-2017.
2	Mashurov Farukh Arkinovich	<p>2023-2024 Internal Research Grant of Suleyman Demirel University, Structural problems in a mutation of algebras, Head: F. Mashurov, Suleyman Demirel University, Kaskelen, Kazakhstan.</p> <p>2022-2024 Grant of the Ministry of Education and Science of Kazakhstan, Defining identities for varieties of nonassociative algebras, (N AP14870282), Head: Prof. N. Ismailov, Astana IT University, Astana, Kazakhstan.</p> <p>2020-2022 Grant of the Ministry of Education and Science of Kazakhstan, Nonassociative algebras and their polynomial identities, (N AP08052405), Head: Prof. N. Ismailov, IMMM, Almaty, Kazakhstan.</p> <p>2020-2022 Grant of the Ministry of Education and Science of Kazakhstan, Irregular sets in Dynamical Systems, (N AP08051987), Head: Prof. Sh. Kadyrov, Suleyman Demirel University, Kaskelen, Kazakhstan.</p> <p>2020-2021 Grant of the Ministry of Information and Social Development of Kazakhstan, Structural problems of special algebras under (anti)commutators", Head: F. Mashurov, Suleyman Demirel University, Kaskelen, Kazakhstan.</p> <p>2018-2020 Grant of the Ministry of Education and Science of Kazakhstan, Cohomological and structural problems of non-associative algebras, (N AP05131123), Head: Prof. A. Dzhumadildaev, IMMM, Almaty, Kazakhstan.</p>

5. The dissertations were reviewed by leading scientists working in the relevant fields of mathematics, mathematical and computer modeling, all of whom have at least 5 works in the field of research of the reviewed dissertations. They conducted a thorough analysis of the dissertations, reflecting in the reviews the relevance of the research topics and their connection with national programs, the compliance of the obtained results with the "Rules for awarding academic degrees and passports of the corresponding specialties of scientific workers", the validity and reliability of

the scientific results and conclusions, the degree of their novelty, an assessment of the internal unity of the obtained results and their focus on solving the relevant current problem, theoretical and applied task. Much attention was paid to the publications of the applicants: the reviewers especially emphasized the presence of articles in journals with a high impact factor and the participation of applicants in international scientific conferences. There are no low-quality reviews.

6. Proposals for further improvement of the system of training scientific personnel.

Having analyzed the work of the dissertation council for three years, as well as the participation of the members of the dissertation council in the discussions, we make the following proposal: to allow the members of the dissertation council, as well as reviewers, in case of valid reasons, to attend the meetings of the dissertation council online.

7. Data on the dissertations reviewed for the degree of Doctor of Philosophy (PhD), Doctor of Science in the field of training personnel "8D061 - Information and Communication Technologies" are given in Table 3.

Table 3.

	8D06103 – Mathematical and computer modeling
Dissertations withdrawn from consideration	-
Including those removed by the dissertation council	-
Dissertations that received negative reviews from reviewers	-
With a positive decision following the defense	2
Including from other training organizations	-
With a negative decision following the defense	-
Including from other training organizations	-
Total number of defended dissertations	2
Including from other training organizations	-

Chairman of the Dissertation Council of KBTU

Scientific Secretary of the Dissertation Council



Isakhov A.A.

Kenzhebeyev T.S.