

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 2022 in the direction of personnel training: "8D061 - 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	Kenzhebeyev 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 2022, 2 meetings were held, 1 of which was devoted to the defense of dissertations. At the meeting of the Dissertation Council, 1 dissertation was 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. The dissertation was presented in Russian.
2. All members of the Council actively attended the meetings.
3. List of doctoral students who defended their dissertations in 2022 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	Rakisheva Dilyara Sovetovna , ENU named after. L.N. Gumilyov	08.04.2022, Chairman of the dissertation council, PhD, professor of KBTU Isakhov A.A. Reviewers 1.Aleksandrov Pavel Nikolaevich – Doctor of Physical and Mathematical Sciences, Professor, Center for Geoelectromagnetic Research of the Institute of Physics of the Earth named after O.Yu. Schmidt RAS (Moscow, Russia); 2.Mukhametzhanov Saltanbek Talapedenovich – Doctor of Physical and Mathematical Sciences, Professor, Al-Farabi Kazakh National University (Almaty, Republic of Kazakhstan);	Modeling simulation of electrical monitoring of dams and barriers	1.Mukanova Balgaisha Gafurovna – Doctor of Physical and Mathematical Sciences, Professor, Department of Computations and Data Science, Astana IT University (Nur-Sultan, Republic of Kazakhstan); 2.Modin Igor Nikolaevich – Doctor of Technical Sciences, Professor of the Department of Geophysical Methods for Studying the Earth's Crust, Faculty of Geology, Moscow State University. M.V. Lomonosov (Moscow, Russia).

4. The dissertations are devoted to current problems of mathematical and computer modeling and are aimed at solving priority tasks for the Republic of Kazakhstan in these areas. The connection of the dissertation topics with national state programs, as well as target republican and regional scientific and scientific-technical programs, is reflected in Table 2.

Rakisheva D.S. Dissertation topic: " Modeling simulation of electrical monitoring of dams and barriers ". In recent years, there have been many incidents related to the vulnerability of hydraulic structures. The condition of dams largely depends on the organization of periodic monitoring. Timely detection of violations in the dam body in the form of suffusion, changes in granulometric composition, increased porosity and, as a consequence, water leaks, makes it possible to prevent the breakthrough of dams and dikes. Currently, monitoring the condition of hydraulic structures plays a huge role in terms of improving the safety of dams. This can be effectively done with the help of electrical monitoring using transverse electrical exploration installations. In this paper, mathematical modeling of the electrical tomography method for a transverse installation is carried out. The model takes into account changes in the height of the upper and lower pools, changes in the geometry of the leak in the dam body and the position of the installation itself. Based on the developed mathematical model, algorithms, programs and results of numerical modeling were also obtained for the first time. Therefore, the relevance,

scientific novelty, practical significance and reliability of the obtained results of the work fully correspond to the passport of the specialty.

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

- A mathematical model of transverse electrical monitoring of dams and dikes, reducing the problem dimension from 2.5D (three-dimensional in the field and two-dimensional in the geometry of the medium) to a series of one-dimensional problems;
- A numerical method for solving systems of integral equations based on a discrete analogue of the iterated kernel of the integral equation and approximation of the relief surface shape by the RBF method;
- The ERTDam2D application program and the results of numerical calculations for electrical monitoring of dams for seven different environmental models.

All the obtained results of the dissertation are substantiated by scientific research, the reliability of which has been verified by calculations. The author received a copyright certificate for the developed application program for electrical monitoring of dams and dikes - ERTDam2D (copyright No. 11797 dated August 28, 2020). The program was created for seven different models, each of which solves a number of direct problems. There is an implementation of the results of the dissertation in the production of Scientific and Production Center GEOSCAN LLC, Moscow, Russia

The author took part in the grant project of the Ministry of Education and Science of the Republic of Kazakhstan No. 0115RK01424:

- "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. The stated goals, objectives and content of the dissertation correspond to the requirements of the Committee for Control in the Sphere of Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan, imposed on doctoral dissertations.

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	Rakisheva Dilyara Sovetovna	grant project of the Ministry of Education and Science of the Republic of Kazakhstan №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.

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 discussions, we make the following proposal: allow the

scientific novelty, practical significance and reliability of the obtained results of the work fully correspond to the passport of the specialty.

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

- A mathematical model of transverse electrical monitoring of dams and dikes, reducing the problem dimension from 2.5D (three-dimensional in the field and two-dimensional in the geometry of the medium) to a series of one-dimensional problems;
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members of the dissertation council, as well as reviewers, in case of valid reasons, to be present online at the meetings of the dissertation council.

7. Data on the reviewed dissertations for the degree of Doctor of Philosophy (PhD), Doctor of Science in the field of personnel training “8D061 – Information and Communication Technologies” are provided 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	1
Including from other training organizations	1
With a negative decision following the defense	-
Including from other training organizations	-
Total number of defended dissertations	1
Including from other training organizations	1

Chairman of the Dissertation Council of KBTU

Scientific Secretary of the Dissertation Council



Isakhov A.A.

Kenzhebeyev T.S.