

**DEPARTMENT OF NON-HARMONIC ANALYSIS**  
**Institute of Mathematics and Mechanics**  
**The Ministry of Science and Education of the Republic of Azerbaijan**

**BRIEF ANNUAL REPORT ON SCIENTIFIC & ORGANIZATIONAL ACTIVITIES**  
**FOR 2023**

10 research works have been done on the topics of “Problems of the theory of approximations and frames in Banach function spaces” and “Spectral properties of differential operators in rearrangement invariant spaces and applications to the Noetherness of elliptic equations” by the employees of the Department of Non-Harmonic Analysis (DNHA) in 2023.

There are 13 employees in DNHA, including 4 Doctors of Sciences (2 of them part-timers), 5 PhD’s (1 of them part-timers), 1 researchers, 2 senior laboratory assistants and 1 laboratory assistant.

Most of the department's employees are engaged in teaching activities in higher educational institutions (Baku State University, Khazar University, Guba branch of Azerbaijan State Pedagogical University).

**21** research works have been published by the employees of DNHA in 2023, including **6** scientific articles (2 of them published abroad; SCOPUS-1). Short summaries of **15** research works by the employees of DNHA have been included in proceedings of various scientific conferences. Besides, 4 articles have been accepted and more than 10 articles have been submitted for publication in various scientific journals. A monograph in Azerbaijani “Selected Questions of Elliptic Equations” has been prepared for publication.

<b>Articles</b>	<b>Abstracts</b>
6	15

**Articles journals included in the Web of Science and SCOPUS databases:**

1. Bilal Bilalov, Yusuf Zeren, Betule Alizade and Feyza Elif Dal, Pseudosymmetric spaces as generalization of symmetric spaces. *Sahand Communications in Mathematical Analysis*. Sahand Communications in Mathematical Analysis (SCMA) Vol. 20 No. 1 (2023), 61-79
2. Yusuf Zeren, Fidan A. Alizadeh, Feyza Elif Dal. On solvability of homogeneous Riemann boundary value problems in Hardy-Orlicz classes. *Turk J Math* (2023) 47: 565 – 581
3. Bilal Bilalov, Sabina Sadigova and Vafa Alili. The method of boundary value problems in the study of the basis properties of perturbed system of exponents in Banach function spaces. *Comput. Methods Funct. Theory* (2023). <https://doi.org/10.1007/s40315-023-00488-2>
4. Aida Kh. Asgarova, Ali A. Huseynli, Vugar E. İsmailov, A Chebyshev-type Alternation Theorem for Best Approximation by a Sum of Two Algebras, *Proceedings of Edinburgh Mathematical Society*, 2023 (Published Online)

## INTERNATIONAL COOPERATION

- Aligarh Muslim University (India)
- Yildiz Technical University (Türkiye)
- Istanbul Technical University (Türkiye)
- Bashkir State Pedagogical University (Russia)
- Sterlitamak branch of Bashkir State University (Russia)
- University of Salerno (Italy)
- Balikesir University (Türkiye)
- Middle East Technical University (Türkiye)

### PLENARY REPORT

Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan	“On the Fredholmness of the Dirichlet problem for 2m-order elliptic equations in the grand Sobolev spaces”	Actual problems of physics, mathematics and astronomy III. Republic scientific conference. Nakhchivan State University, 12 May 2023
	“Modern problems of the theory of elliptic equations in Banach-Sobolev spaces”	23rd International Congress of Mechanics. Türkiye, Konya, Konya Technical University, September 4-7, 2023
<b>The regular seminar of the Institute of Mathematics and Mechanics</b>		
<b>Dr.Sc., Assos. Prof. Telman Kasumov</b>	Basis properties of eigenfunctions of ordinary differential operators defined on a finite interval	31.05.2023
<b>PhD Ali Huseynli</b>	A Chebyshev type alternation theorem for best approximation by a sum of two algebras	17.05.2023
<b>Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan</b>	On the Fredholmness of the Dirichlet problem for the 2m order elliptic equation in Grand Sobolev spaces	21.06.2023

### REVIEWERSHIP FOR PEER REVIEWED INTERNATIONAL REFERRED JOURNALS

- American Mathematical Society;
- Applied Mathematics Letters (Elsevier);
- Proceedings of the Estonian Academy of Sciences ;
- Journal of Applied Mathematics and Computing (Springer);
- Zentralblatt MATH;
- British Journal of Mathematics & Computer Science;
- Sahand Communications in Mathematical Analysis;

- Wavelet and Linear Algebra;
- International Journal of Mathematical Analysis;
- Applied Mathematical Sciences;
- Asian Journal of Mathematics and Computer Research;
- Advances in Analysis;
- Turkish Journal of Mathematics;
- Kuwait Journal of Science;
- Filomat;
- Journal of Classical Analysis;
- Sarajevo Journal of Mathematics;
- Kragujevac Journal of Mathematics;
- Communications Faculty of Sciences University of Ankara Series A1 Mathematics and Statistics;
- Mathematics and Statistics;
- Mathematical Sciences;
- Iranian Journal of Mathematical Sciences and Informatics;
- Siberian Mathematical Journal;
- Mathematics;
- Mathematical Sciences;
- Mathematics and Statistics;
- Iranian Journal of Science and Technology, Transactions A: Science;
- Communications in Statistics - Theory and Methods;
- Symmetry;
- Journal of Mathematics;
- Fractals;
- International Journal of Differential Equations.

**Journals prepared for publication by DNHA in 2023:**

- **AZERBAIJAN JOURNAL OF MATHEMATICS, VOL. 13, No 1, 2023, JANUARY**
- **AZERBAIJAN JOURNAL OF MATHEMATICS, VOL. 13, No 2, 2023, JULY**

**SUCCESSFULLY DEFENDED THESES**

<b>Author</b>	<b>Title</b>	<b>Scientific Advisor</b>
Sadigova Sabina Rahib kizi	On frame properties of systems in linear topological spaces	Prof. Bilal Bilalov
Mehdiyeva Fidan Shahin kizi	solvability of the Riemann boundary value problem in non-standard Hardy spaces and application to the basicity problems	Prof. Bilal Bilalov
Feyzullayev Ilkin Qadir oglu	Basicity of eigenfunctions of a differential operator in symmetric Banach functional spaces	Dr. Telman Kasumov

<b>PROGRAMMES and GRANTS</b>		
Project	Title	Supervisor
"Karabakh is Azerbaijan". grant competition by the Azerbaijan Science Foundation! (AEF-MQM-QA-1-2021-4(41)-8/02/1-M-02, 24.11.2022)	"Application of modern mathematical methods to the assessment of the current state and dynamics of agricultural fields according to spectral images"	Dr. Aydin Shukurov
"Main Grant Competition 2023", dedicated to the 100th anniversary of national leader Heydar Aliyev (AEF-MCG-2023-1(43)-13/06/1-M-06, 11/13/2023)	"Correct solution of some nonlocal boundary value problems modeling the processes of gas dynamics and electrostatics"	Dr. Telman Kasumov

<b>PEDAGOGICAL ACTIVITIES BY DNHA EMPLOYEES</b>	
Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan	Institute of Mathematics and Mechanics (master degree, 1st and 2nd course) Yildiz Technical University
Associate Prof. Telman Kasumov	- Baku State University - Guba branch of Azerbaijan State Pedagogical University.
Associate Prof. Migdad Ismaylov	Baku State University
Associate Prof. Terlan Garayev	Khazar University
PhD Ali Huseynli	Khazar University

<b>Membership in organizing committees of international conferences</b>	
Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan Prof. Bilal Bilalov	6th International Conference on Mathematical Advances and Applications (6-th ICOMAA 2022), Istanbul, Turkey, 10-13 May, 2023 International Scientific Conference "Mathematical Physics, Mechanics and Their Applications", dedicated to the 75th anniversary of Academician of the Academy of Sciences of the Republic of Belarus V.Sh. Shagapov, 22-23 June, 2023, Sterlitamak, Russia The International conference "Modern Problems of Mathematics and Mechanics" dedicated to the 100th anniversary of the national leader Heydar Aliyev. April 26-28, 2023, Baku, Azerbaijan
Aydin Shukurov	6th International Conference on Mathematical Advances and Applications (6-th ICOMAA 2022), Istanbul, Turkey, 10-13 May, 2023

Ali Huseynli	6th International Conference on Mathematical Advances and Applications (6-th ICOMAA 2022), Istanbul, Turkey, 10-13 May, 2023
Aida Tagiyeva	The International conference "Modern Problems of Mathematics and Mechanics" dedicated to the 100th anniversary of the national leader Heydar Aliyev. April 26-28, 2023, Baku, Azerbaijan

<b>SOCIAL ACTIVITIES BY DNHA EMPLOYEES</b>	
Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan	<ul style="list-style-type: none"> <li>• Member of Problem Council on Physical-mathematical and technical sciences;</li> <li>• Reviewer of the Science Development Foundation under the President of the Republic of Azerbaijan;</li> <li>• President of the Actuarial Society of Azerbaijan</li> <li>• The member of the Board of the Azerbaijan Mathematical Society;</li> <li>• Editor-in-Chief of Caspian Journal of Applied Mathematics, Ecology and Economics;</li> <li>• Editor-in-Chief of Azerbaijan Journal of Mathematics;</li> <li>• Member of the Coordination Council of Sciences under the President of ANAS;</li> <li>• Chairman of the Baku State University Graduation Commission;</li> <li>• Expert on evaluation of textbooks with the Ministry of Education of the Republic of Azerbaijan;</li> <li>• Member of The Scientific Council of The Institute of Mathematics and Mechanics of Azerbaijan National Academy of Science;</li> <li>• Deputy Chairman of the Academic Seminar of The Institute of Mathematics and Mechanics of Azerbaijan National Academy of Science.</li> </ul>
Dr., Associate Prof. Telman Gasymov	<ul style="list-style-type: none"> <li>• Member of the Editorial Board of the "Azerbaijan Mathematical Journal"</li> <li>• Member of the Editorial Board of the "Caspian Journal</li> </ul>

	<p>of Applied Mathematics, Ecology and Economics"</p> <ul style="list-style-type: none"> <li>• Member of the Editorial Board of the "Journal of Contemporary Applied Mathematics" jurnalının Redaksiya Heyətinin üzvü</li> <li>• Secretary of the scientific seminar on the specialty "Mathematical Analysis" of the Council of Doctoral Dissertations at the National Academy of Sciences of ANAS.</li> </ul>
Associate Prof. Terlan Garayev	Executive Editor of Caspian Journal of Applied Mathematics, Ecology and Economics
Aida Tagiyeva	Executive Editor of Azerbaijan Journal of Mathematics, Caspian Journal of Applied Mathematics, Ecology and Economics and Journal of Contemporary Applied Mathematics

<b>SCHOLAR.GOOGLE.COM_CITATIONS</b>	
<u>Bilalov Bilal Telman oğlu</u>	108
<u>Gasymov Telman Benser oğlu</u>	6
<u>Muradov Togrul Rafael oğlu</u>	2
Ismayılov Migdad İmdad oğlu	15
<u>Shukurov Aydın Shukur oğlu</u>	3
<u>Huseynli Ali Abbas oğlu</u>	7
Garayev Tarlan Zafar oğlu	3
<u>Tagiyeva Aida Agagul kızı</u>	5
<b>Total</b>	<b>149</b>

**Prof Bilal T. Bilalov**

Head of the Department of Non-Harmonic Analysis

Corresponding Member of the National Academy of Sciences of Azerbaijan