

**DEPARTMENT OF NON-HARMONIC ANALYSIS**  
**Institute of Mathematics and Mechanics**  
**National Academy of Sciences of Azerbaijan**

**BRIEF SEMI-ANNUAL REPORT ON SCIENTIFIC & ORGANIZATIONAL  
ACTIVITIES FOR 2022**

12 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 symmetric spaces and applications to the Noetherness of elliptic equations” by the employees of the Department of Non-Harmonic Analysis (DNHA) in 2022.

There are 16 employees in DNHA, including 3 Doctors of Sciences (2 of them part-timers), 8 PhD’s (2 of them part-timers), 2 researchers, 2 senior laboratory assistants and 1 laboratory assistant.

**31** research works have been published by the employees of DNHA in 2022, including **9** scientific articles (6 of them published abroad; TR-8; SCOPUS-9). Short summaries of **20** research works by the employees of DNHA have been included in proceedings of various scientific conferences. Besides, 9 articles have been accepted and more than 10 articles have been submitted for publication in various scientific journals.

| <b>Monograph</b> | <b>Book Chapter</b> | <b>Articles</b> | <b>Abstracts</b> |
|------------------|---------------------|-----------------|------------------|
| 1                | 1                   | 9               | 20               |

**INTERNATIONAL COOPERATION**

- Aligarh Muslim University
- Yildiz Technical University
- Bashkir State Pedagogical University
- Sterlitamak branch of Bashkir State University

**PLENARY REPORT**

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|---|---|---|
| <b>Prof. Bilal Bilalov,<br/>Corresponding Member of<br/>the NAS of Azerbaijan</b> | “On the strong solvability in the small of elliptic equations of the m-th order in weighted grand Sobolev spaces” | International Conference on Mathematical Advances and Applications (5-th ICOMAA2022), 2022, Istanbul, Turkey (online) |
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**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 Matheamtics;
- 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.

**Journals prepared for publication by DNHA in 2022:**

- **AZERBAIJAN JOURNAL OF MATHEMATICS, VOL. 12, No 1, 2022, JANUARY**
- **AZERBAIJAN JOURNAL OF MATHEMATICS, VOL. 12, No 2, 2022, JULY**

**SUCCESSFULLY DEFENDED MASTER THESES**

| <b>Author</b>                | <b>Title</b>                            | <b>Scientific Advisor</b>  |
|------------------------------|---|--|
| Alizade Batula<br>Mahir kizi | On a generalization of symmetric spaces | Prof. Bilal Bilalov,<br>Corresponding Member of the<br>NAS of Azerbaijan |

**PROGRAMMES and GRANTS**

| Project   | Title  | Supervisor   |
|---|--|--|
| 1st Azeri-Russian International Grant Competition organized by the Science Development Foundation under the President of the Republic of Azerbaijan                   | “Methods of the theory of functions in the theory of operators”  | Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan |
| A project within the framework of the joint cooperation programme between NAS of Azerbaijan and The Scientific and Technological Research Council of Turkey (TÜBİTAK) | “Frame properties of the system of eigenfunctions of a second order discontinuous differential operator”         | Prof. Bilal Bilalov, Corresponding Member of the NAS of Azerbaijan |
| 1st Azeri-Russian International Grant Competition organized by the Science Development Foundation under the President of the Republic of Azerbaijan                   | “Methods of the theory of functions in the theory of operators”  | Telman Kasumov   |
| A project within the framework of the joint cooperation programme between NAS of Azerbaijan and The Scientific and Technological Research Council of Turkey (TÜBİTAK) | “Frame properties of the system of eigenfunctions of a second order discontinuous differential operator”         | Telman Kasumov   |
| A project within the framework of the joint cooperation programme between NAS of Azerbaijan and The Scientific and Technological Research Council of Turkey (TÜBİTAK) | “Frame properties of the system of eigenfunctions of a second order discontinuous differential operator”         | Migdad Ismaylov  |
| A project of Science Development Foundation Under the President of the Republic of Azerbaijan   | Methods of spectral theory and non-harmonic Fourier analysis in some problems of classical and quantum mechanics | Migdad Ismaylov  |
| A project within the framework of the joint cooperation programme between NAS of Azerbaijan and The Scientific and Technological Research Council of Turkey (TÜBİTAK) | “Frame properties of the system of eigenfunctions of a second order discontinuous differential operator”         | Ali Huseynli   |

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| A project of Science Development Foundation Under the President of the Republic of Azerbaijan   | Methods of spectral theory and non-harmonic Fourier analysis in some problems of classical and quantum mechanics | Ali Huseynli   |
| A project within the framework of the joint cooperation programme between NAS of Azerbaijan and The Scientific and Technological Research Council of Turkey (TÜBİTAK) | “Frame properties of the system of eigenfunctions of a second order discontinuous differential operator”         | Aydin Shukurov |
| A project within the framework of the joint cooperation programme between NAS of Azerbaijan and The Scientific and Technological Research Council of Turkey (TÜBİTAK) | “Frame properties of the system of eigenfunctions of a second order discontinuous differential operator”         | Aida Guliyeva  |

#### **PEDAGOGICAL ACTIVITIES BY DNHA EMPLOYEES**

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| Prof. Bilal Bilalov,<br>Corresponding Member of the NAS<br>of Azerbaijan | Institute of Mathematics and Mechanics of the<br>NAS of Azerbaijan (master degree, 1st and 2nd<br>course) |
| Associate Prof. Telman Kasumov   | Baku State University   |
| Associate Prof. Migdad Ismaylov  | Baku State University   |
| Associate Prof. Terlan Garayev   | Khazar University   |
| PhD Ali Huseynli   | Khazar University   |

#### **Membership in organizing committees of international conferences**

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| Prof. Bilal Bilalov,<br>Corresponding Member of<br>the NAS of Azerbaijan<br>Prof. Bilal Bilalov, | 5th International Conference on Mathematical Advances<br>and Applications (5-th ICOMAA 2022), Istanbul,<br>Turkey, 11-14 May, 2022  |
|  | International Conference "Modern Problems of<br>Mathematics and Mechanics", dedicated to the 110th<br>anniversary of Academician Ibragim Ibragimov. June 29<br>- July 1, 2022 |
| Telman Kasumov   | 5th International Conference on Mathematical Advances<br>and Applications (5-th ICOMAA 2022), Istanbul,<br>Turkey, 11-14 May, 2022  |
| Aydin Shukurov   | 5th International Conference on Mathematical Advances<br>and Applications (5-th ICOMAA 2022), Istanbul,<br>Turkey, 11-14 May, 2022  |

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| Migdad Ismaylov | 5th International Conference on Mathematical Advances and Applications (5-th ICOMAA 2022), Istanbul, Turkey, 11-14 May, 2022   |
| Ali Huseynli    | 5th International Conference on Mathematical Advances and Applications (5-th ICOMAA 2022), Istanbul, Turkey, 11-14 May, 2022   |
| Aida Tagiyeva   | International Conference "Modern Problems of Mathematics and Mechanics", dedicated to the 110th anniversary of Academician Ibragim Ibragimov. June 29 - July 1, 2022 |

### Workshops

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| Prof. Bilal Bilalov,<br>Corresponding Member of the NAS of<br>Azerbaijan | 1 <sup>st</sup> INTERNATIONAL WORKSHOP ON<br>FUNCTIONAL ANALYSIS AND<br>APPLICATIONS (13-15 Yanvar, 2022)<br><br>2 <sup>nd</sup> INTERNATIONAL WORKSHOP ON<br>FUNCTIONAL ANALYSIS AND<br>APPLICATIONS (24-26 May, 2022) |
| Associate Prof. Migdad Ismaylov  | 2 <sup>nd</sup> INTERNATIONAL WORKSHOP ON<br>FUNCTIONAL ANALYSIS AND<br>APPLICATIONS (24-26 May, 2022)  |

| <b>SOCIAL ACTIVITIES BY DNHA EMPLOYEES</b>                               |  |
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| Prof. Bilal Bilalov,<br>Corresponding Member of<br>the NAS of Azerbaijan | <ul style="list-style-type: none"> <li>• Member of the Editorial Board of Azerbaijan National Encyclopedia;</li> <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> </ul> |

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|  | <ul style="list-style-type: none"> <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.<br>Telman Gasymov | Member of the Editorial Board of the Azerbaijan Journal of Mathematics.   |
| Associate Prof. Terlan<br>Garayev      | Executive Editor of Caspian Journal of Applied Mathematics, Ecology and Economics   |
| Aida Guliyeva                          | Executive Editor of Azerbaijan Journal of Mathematics, Caspian Journal of Applied Mathematics, Ecology and Economics and Journal of Contemporary Applied Mathematics  |

**Prof Bilal T. Bilalov**

Head of the Department of Non-Harmonic Analysis

Corresponding Member of the National Academy of Sciences of Azerbaijan