

Semi-annual Report of “Differential Equations” Department for 2018

The Department consists of 14 collaborators. From the 12 scientific workers, there are 8 doctor of sciences and 3 philosophy doctors. According to the plan of 2018, 10 scientific research works are conducted on one subject in the department.

EXECUTED SCIENTIFIC WORKS

THEME: “Some problems of Theory of Partial Differential Operators”.

Work 1. “Existence and non-existence of global solutions to Cauchy problem and mixed problem for a one class Timoshenko system”. **Executer: d.ph.m.s., prof. A.B.Aliev.**

Published works:

1. **Akbar B. Aliev , Nigar A. Rzayeva,** The mixed problem for nonlinear Tymoshenko systems, Transactions of NAS of Azerbaijan, Issue Mathematics, 38 (1), 13–21 (2018) Series of Physical-Technical and Mathematical Sciences
2. **Алиев А.Б.** Задача Коши для нелинейных систем Тимошенко, **СОВРЕМЕННЫЕ МЕТОДЫ ТЕОРИИ КРАЕВЫХ ЗАДАЧ,** Материалы Международной конференции, посвященной 90-летию Владимира Александровича Ильина, **ПОНТРЯГИНСКИЕ ЧТЕНИЯ _ XXIX** (2–6 мая 2018 г.), Москва Из-во МАКС-Пресс, стр. 33
3. **Akbar B. Aliev, Asif F. Pashayev,** Global nonexistence of solutions for a system of nonlinear wave equations with p -Laplacian operators, “Riyaziyyat və mexanikanın aktual problemləri” adlı Respublika elmi konfransının Materialları (17-18 May 2018- ci il) Bakı 2018, səh.6.
4. **Akbar B. Aliev, Gulshan Kh. Shafiyeva,** Investigation of the potential well for some system Klein Gordon equations, “Riyaziyyat və mexanikanın aktual problemləri” adlı Respublika elmi konfransının Materialları (17-18 May 2018- ci il) Bakı 2018, səh.7.

Accepted works for publication:

1. **А.Б.Алиев, С.Э.Исаева.** Существование и поведение глобальных решений смешанной задачи с акустическими условиями сопряжения для нелинейных гиперболических уравнений с нелинейной диссипацией, Доклады РАН(2018)

Submitted works for publication:

- 1) **Akbar Aliev and Gunay Gadirova,** The well-posedness of the mixed problem for one system of thermoelasticity with singular coefficient,
- 2) **Akbar B. Aliyev, Sevda E. Isayeva.** Exponential stability of the nonlinear transmission acoustic problem, **Mathematical Methods in the Applied Sciences.**
- 3) **Akbar B. Aliyev.** Existence and nonexistence of global solutions for nonlinear transmission, **Turkis Journal of Mathemtics.**

Work 2. “Investigation of Some spectral properties of boundary problem that boundary condition dependentrationaly on spectral parameter”. **Executers: d.ph.m.s., prof. M.Bayramogly, d.m.s., ass.prof. N.M.Aslanova**

Published work:

1. "Some spectral properties of fourth order differential operator equation" NIGAR M. ASLANOVA, MAMED BAYRAMOGLU AND KHALIG M. ASLANOV, Operators and Matrices Volume 12, Number 1 (2018), 287–299

Accepted works for publication:

1. "<https://projecteuclid.org/euclid.rmjm/1517648421>" Eigenvalue problem associated with fourth order differential operaor equation, Rocky Mountain journal of Mathematics, Aslanova N.M., Bayramoglu M., AslanovKh.M.

2. "On one class eigenvalue problm with eigenvalue parameter at one end point" Filomat journal, **Aslanova N.M., M.Bayramoglu, AslanovKh.M.**

Work 3. “One probability method for Wiman-Valiron-type estimations of differential equations” (continuation). **Executer: d.ph.m.s., prof. N.M.Suleymanov.**

Three articles and one thesis have been published on the subject.

1. N.M.Suleymanov, D.Farajli, Vugar S. Khalilov. “*Probability method and Wiman-Valiron type estimates for differential equations*”. Transactions of NAS of Azerbaijan, 37 (4), 168-175, (2017).

2.N.M.Suleymanov, D.Farajli. “*On Wiman-Valiron Type Estimations for Evolution Equations*”. Caspian journal of applied mathematics, ecology and economics ” .(2017, V 5, № 2, page 86-93.)

3. N.M.Suleymanov, D.Farajli. “Об оценках типа Вимана-Валирона для степенных рядов с конечным радиусом сходимости”. JournalofContemporaryappliedMathematics. (2018, V 8, № 1, page 62-68.)

4. Н.М.Сулейманов, Д.Э.Фараджли. “Об оценках типа Вимана-Валирона для эволюционных уравнений”. Moskva Dövlət Universitetində akademik V.A.İlinin 90 illik yubileyinə həsr olunmuş konfransının materialları.(2-6 may 2018, səh. 216).

Work 4. Smoothness of solutions of degenerate elliptic equations.**Executer: prof. T.S.Gadjiev.**

1. **T.Gadjiev, M.Kerimova, Sh.Galendarova.** On solvability boundary problem in generalized weighted Morrey spaces, Mediterian Journal, 2018 (in print).

Work 5. Structural properties of linear and nonlinear Dirac operators and second and fourth order Sturm-Liouville operators. **Executers: d.m.s., prof. Z.S.Aliyev, H.Rzaeva.**

The obtained results were reflected in the following 4 papers:

Published works:

1. **Ziyatkhan S. Aliyev and Natavan A. Mustafayeva**, On bifurcation of solutions from infinity of certain nonlinear eigenvalue problems for ordinary differential equations of fourth order, *Electron. J. Differential Equations*, v. 2018 (2018), No. 98, pp. 1-19 (IF - 0.954);

2. **Ziyatkhan S. Aliyev and Rada A. Huseynova**, Global bifurcation from infinity in some nonlinearizable eigenvalue problems with indefinite weight, *Proc. IMM NAS Azerbaijan*, v. 44, No. 1, (2018), pp. 123-134;

Accepted works for publication:

3. **Ziyatkhan S. Aliyev and Shanay M. Hasanova**, Global bifurcation of positive solutions of semi-linear elliptic partial differential equations with indefinite weight, *Zeitschrift Fur Analysis and Ihre Anwendungen*, v. 37, No. 4, (2018) (IF - 0.643);

4. **Ziyatkhan S. Aliyev and Sevinc B. Guliyeva**, Spectral properties of a fourth order eigenvalue problem with spectral parameter in the boundary conditions, *Filomat*, 2018 (IF - 0.695)

Work 6. Solving a boundary problem for the second order elliptic differential operator equation when the spectral parameter included to the equation itself and boundary condition linearly. **Executer: d.m.s., ass. prof. B.A. Aliev.**

1. **Б.А.Алиев, Н.К.Курбанова, Я.Якубов.** Вопросы разрешимости одной краевой задачи для эллиптических дифференциально-операторных уравнений второго порядка со спектральным параметром в уравнении и в краевых условиях. *Диф. Урав.*, 2018, том 54, №1, с.69-87.

2. **Б.А.Алиев, Н.А.Аджалова.** Коэрцитивная разрешимость одной краевой задачи для эллиптического дифференциально-операторного уравнения второго порядка с комплексным параметром. *Azərbaycanın Ümummilli Lideri Heydər Əliyevin anadan olmasının 95-ci il dönmünə həsr olunmuş "Riyaziyyat və Mexanikanın aktual problemləri" adlı Respublika Elmi Konfransının materialları*. 17-18 may, Bakı-2018. səh. 124-126.

Work 7. Inverse problem of spectral analysis for one-dimensional Shredinger equations with infinitely increasing potential. **Executer: d.m.s., prof. A. Xanmammadov.**

1. **А.Х.Ханмамедов.** Обратная задача рассеяния для уравнения Шредингера с дополнительным квадратичным потенциалом на всей оси// *Теоретическая и Математическая Физика*, 2018, том 195, номер 1, страницы 54–63.

2. **А.Ханмамедов.** On an inverse spectral problem for a perturbed harmonic oscillator// *Azerbaijan Journal of Mathematics*, vol 8, no 2 (2018): july

Work 8. Estimates for elliptic-parabolic operators in Morrey-type spaces. **Ex.:**
ass.prof. Sh.A.Muradova.

1. **Muradova Sh.** Boundedness Of The Riesz Potential In Anisotropic Local Morrey-Type Spaces. ICOMAA-2018, May 11-13, 2018, Yildiz Technical University, Istanbul, Turkey.

Work 9. Investigation of the multidimensional mixed problem set for one class third order differential equation with right-hand side non-linear operator. **Executer: d.ph.m. ass.prof. A.G.Aliyeva.**

1. **S.Aliyev, A.Aliyeva, G.Abdullayeva.** The study of mixed problem for one class third order differential equations. Advances in Differential Equations, 2018.

Work 10. Solvability of Dirichlet problem for Laplace equation in the Weighted Morrey-type spaces. **Executer: d.ph.m. N.R.Ahmedzade.**

1. **N.R. Ahmadzade, Z.A. Kasumov,** On the Dirichlet problem for the Laplace equation with boundary value from the Morrey space. EURASIAN MATHEMATICAL JOURNAL .

2. **Bilalov B.T., Gasymov T.B., Ahmadzade N.R.** On basicity of eigenfunctions of one discontinuous spectral problem. INTERNATIONAL CONFERENCE on MATHEMATICAL ADVANCES and APPLICATIONS (ICOMAA2018) .

3. **N.R. Ahmadzade, Z.A. Kasumov,** On the Dirichlet problem for the Laplace equation with boundary value from the Morrey space. INTERNATIONAL CONFERENCE on MATHEMATICAL ADVANCES and APPLICATIONS (ICOMAA2018) .

4. **Bilalov B.T., Gasymov T.B., Ahmadzade N.R.** On basicity of eigenfunctions of one discontinuous spectral problem with eigenparameter dependent discontinuity condition in weighted Lebesgue spaces.

SOCIAL ACTIVITY OF COLLABORATORS OF THE “DIFFERENTIAL EQUATIONS” DEPARTMENT

Prof. AkperAliev, prof. Mammed Bayramogly, prof. Nadir Suleymanov and prof. Tahir Gadjiev are the members of Dissertation Council of IMM and they regularly participate in the meetings of the Council.

Prof. MammadBayramogly, prof. Tahir Gadjiev and ass.prof.Nigar Aslanova are members of the Specializedseminar on the Council.

Collaborators of the department are the members of Editorial Boards of the following journals of the Institute:

- Proceedings of IMM - prof. Akper Aliev, prof. Mammad Bayramogly, prof. Tahir Gadjiev, prof. Ziyatkhan Aliyev;

- Transactions of IMM - prof. AkperAliev, prof. Mammad Bayramogly, prof. Tahir Gadjiev;

- Azərbaycan Riyaziyyat Jurnalı - prof. AkperAliev, prof. Ziyatkhan Aliyev;

- Caspian Journal of Applied Mathematics, Ecology and Economics - prof. Akper Aliev, prof. Mammad Bayramogly, prof. Ziyatkhan Aliyev, prof. Agil Xanmammadov, ass.prof. Nigar Aslanova.

All collaborators actively participated in the Institute's general works, including the Institute seminar.

Every Wednesday, at 12.00, the scientific seminar on "Modern problems of theory of differential equations" guided by A.B. Aliev, is conducted. All collaborators of department, including doctoral and post-graduate students participated in the seminar. During this period, several scientific works and dissertations were discussed at the department.

On March 16, 2018, to get a scientific name "doctor of mathematical sciences", doctorate of the department Musa Almammadov successfully defended his dissertation work entitled "The structure of the spectrum of multi-parameter problems and the investigation of the traces of duplicate differential operators" at the Dissertation Council of Institute. On May 11, 2018 the post-graduate student of the department Humay Sh. Rzayeva (supervisor: prof. Ziyatkhan Aliyev) successfully defended dissertation work entitled "The Local and Global Structure of Solutions of eigenvalue problems for Some Differential Operators" at the Dissertation Council of Institute to get a doctor of sciences in mathematics.

On June 7, 2018, the master of the department, Yetar Farkhadova (supervisor: prof. Akper Aliev), defended his dissertation work entitled "Asymptotic of solutions of a mixed problem for one class dissipative Tymoshenko system"

2 (two) projects submitted by the Department to the Grant Project "Science and Integration of Education", announced by the Science Development Fund in 2017, have won: 1) project leader: prof. Akper Aliev (50 000 man), 2) project leader: ass.prof. Nigar Aslanova (40 000 man).

Total – 20

Article - 11

Thesis- 9

Head of Department

prof. Akbar B. Aliev