

**Report of "Differential Equations" Department
for the year of 2016**

7 of 11 collaborators of "Differential Equations" department are doctor of sciences, 3 are philosophy doctors:

doct. ph.m.s., prof. A.B.Aliyev - head of department;

doct. ph.m.s., prof. M.Bayramogly - senior research associate;

doct. ph.m.s., prof. T.S.Gadjiev - senior research associate;

doct. ph.m.s., prof. N.Suleymanov - leading research associate;

doct. of math.s., prof. A.Kh.Khanmamedov - senior research associate;

doct. of math.s., dos. B.A.Aliyev - senior research associate;

doct. of math.s., dos. N.|M.Aslanova - senior research associate;

phd. in math. A.G.Aliyeva - chief research associate;

phd. in math. Sh.A.Muradova - chief research associate;

phd. in math. N.R.Ahmedzade - research associate;

Y.M. Farhadova - senior assistant.

According to plan for 2016 nine (9) scientific research works are conducted.

Subject: "Some problems of theory of partial differential equations".

Work 1. "Existence and nonexistence of global solutions of Klein- Gordon system with nonlinear dissipation". Ex.: doct. ph.m.s., prof. A.B.Aliyev.

Papers:

1. Global existence and nonexistence of solution for Cauchy problem for a Class of Fourth Order Semi-linear Pseudo-hyperbolic Equations with Structural Damping (Akbar B. Aliev, Asif F. Pashayev) Transactions of NAS of Azerbaijan (vol. XXXVI, No 4, 2016).

2. Global existence, asymptotic behavior and blow-up of solutions for mixed problem for the coupled wave equations with damping and source terms (Akbar B. Aliev, Samira

O.Rustamova), Proceedings of the Institute of Mathematics and Mechanics, National Academy of Sciences of Azerbaijan , 2016.

3. The existence of a global attractor for one fourth order hyperbolic equation with memory operator (Akbar B. Aliyev and Sevda E. Isayeva, in press).

4. "Существование глобальных решений задачи Коши для систем полулинейных псевдо-гиперболических уравнений со структурной диссипацией (А.Б.Алиев, А.Ф.Пашаев, in press)

4. Well-posedness of initial boundary value problems on longitudinal impact on a composite linear viscoelastic bar (Akbar B. Aliev, Elkhan H. Mammadhasanov, in press).

Abstracts:

1. The global solvability Cauchy problem for the fourt order semilinear pseudohyperbolic equation with structural damping,International Workshop on Non-Harmonic Analysis and Diferential Operators,Abstracts Baku,25-27 May 2016,p.11(Aliev A.B., Pashayev A.F.).

2.Global existence, asymptotic behavior and blow-up of solutions for Cauchy problem for the coupled hyperbolic equations with damping and source terms.International Workshop on Non-Harmonic Analysis and Diferential Operators, Abstracts Baku,25-27 May 2016,p.12(Aliev A.B.,Rustamova S.O.)

3.Global existence and nonexistence of solutions for a system of nonlinear hyperbolic equations with damping, Workshop on nonlinear partial diferential equations in applied mathematics, Izmir Institute of Texnolojy, 26-28 august 2016, p.5.

4. Existence and Nonexistence of Global solutions for a class nonlinear Pseudo-Hyperbolic Equations with damping and Source Terms, Continuum Mexanics and Related problems of Analysys, VII International Jount Conference of the Georgian Mathematical union & Georgian mechanical Union, 2016, Batumi, Georgia, p. 75.

Work 2. "Investigating spectrum and trace of a clan of higher order operator coefficient differential equations". Ex.-s.: doct. ph.m.s., prof. M.Bayramogly, doct. of math.s., dos. N.|M.Aslanova.

1. M.Bayramogly, N.Aslanova. "On spectrum and trace formula for one class of singular problems" An. Stiint. Univ. Al. I. Cuza 14 pp. (in print)
2. M.Bayramogly, N.Aslanova. "On one class eigenvalue problem with eigenvalue parameter in boundary condition at one end point" FILOMAT, 11 pp. (in print)
3. M.Bayramogly, N.Aslanova. Eigen-value problem associated with fourth order differential –operator equation 12 pp. (in print)
4. M.Bayramogly, N.Aslanova. "Trace formula and eigenvalue distribution of higher order differential operator equation" 12 pp. (in print)
5. "Eigenvalue problem associated with fourth order differential operator equation" International Workshop on Non-Harmonic Analysis and Differential operators. Baku, Azerbaijan, 25-27 May 2016, pp.23, N.M.Aslanova , M.Bayramoglu, Kh. M.Aslanov
6. "The spectrum and trace of a discontinuous value problem with retarded argument." International Conference on Recent Advances in Pure and Applied Mathematics (ICRAPAM2016) May 19-23, 2016, Bodrum-Muğla, Turkey, Bayramoglu M. Bayramov A.

Work 3. "Viman-Valiron type estimations for a class of pseudo-differential operators". Ex.: doct. ph.m.s., prof. N.Suleymanov.

1. N.Suleymanov, D. Farajli. "Viman-Valiron type estimates for solvity differential equations". Differential Equations, pp. 1-10, 2016.
2. Н.Сулейманов, Д.Фараджли. "Оценки типа Вимана-Валирона для решения дифференциальных уравнений". BDU-da "Prof.ƏmirHəbibzadənin 100 illik yubileyinə həsr olunmuş elmi konfransın materialları", 2016, səh.197-200.

Work 4. "Existence of solutions of nonlinear elliptico-parabolic equations". Ex.: doct. ph.m.s., prof. T.S.Gadjiyev.

- 1.Т.Гаджиев. Оптимизация размещения нефтяных скважин. 2016, "Азербайджанское нефтяное хозяйство" (in print).

2. T. Hajiyev. The solvability degenerate elliptic-parabolic equations. "Вестник" Львовского Университета, 2016, çара qəbul olunub (in print).
3. Т.Гаджиев. Оптимизация размещения нефтяных скважин.2016, механика, "Вестник" Львовского Университета, (in print)
4. T. Hajiyev. The estimates of solutions of degenerate nonlinear elliptic-parabolic equations. PDMU-2016, Abstract of conference,p.61. Ukraine.
5. T. Hajiyev. Solvability of boundary problem for nonlinear degenerate elliptic equations. PDMU-2016, Abstract of conference,p.60. Ukraine.
6. T. Hajiyev. The linea degenerate elliptic-parabolic equations. PDMU-2016, Abstract of conference,p.59. Ukraine. Bu tezislərdən 1-ci və 2-ci disertantlarım ilə birgə çap olunmuşdur.
7. T. Hajiyev. The some estimates degenerate elliptic equations, 2016. Ə.Həbibzadənin 100 illiyinə həsr olunmuş konfrans.(with Zulfaliyeva)
8. T. Hajiyev. The solvability in generalaized Morrey space high order elliptic equations, 2016. Ə.Həbibzadənin 100 illiyinə həsr olunmuş konfrans.
- 9.The behaviour of solutions of nonlinear equations.4 Inter.-Sientefic conf.,Tbilisi,2016, p.34-37.
- 10.The solvability elliptic-parabolic equations,UMJ,2016, (i n press).

Work 5. "Coercive solvability of a boundary value problem for a quadratic spectral parameter second order elliptic type differential operator equations". Ex.: doct. ph.m.s., dos. B.A.Aliyev

1. B.A.Aliyev, N.K.Kurbanova. Solvability of a boundary value problem for second order differential-operator equations with a spectral parameter in both the equation and boundary conditions. Transactions of NAS of Azerbaijan, pp. 25

2. Б.А. Алиев, Н.К. Курбанова. Асимптотическое поведение собственных значений одной краевой задачи для операторного уравнения Штурма-Лиувилля. Труды Азерб.Гос. Педагогич. Универ. 2016, №1.

3. 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. "Дифференциальные уравнения", сс.27(in press)

4. Б.А. Алиев, Н.К. Курбанова, Я. Якубов. Об одной краевой задаче для эллиптических дифференциально-операторных уравнений второго порядка с квадратичным спектральным параметром. «Украинский Математический Журнал».сс.17(in press)

5. B.A.Aliyev. Solvability of a boundary value problem for second order elliptic differential-operator equations with quadratic parameter. (5-9 sentyabr 2016-cı il Gürcüstanda keçiriləcək akademik N.Musxeleşvilinin 125 illiyinə həsr olunmuş Beynəlxalq Konfrans)

6. B.A.Aliyev, N.K.Kurbanova. A boundary value problem for second order elliptic differential-operator equations with a quadratic spectral parameter, p. 14. International Workshop on Non-Harmonic Analysis and differential operators, Baku, Azerbaijan, 25-27 May, 2016.

Work 6. "Existence of almost everywhere solution of a class of second order differential equations with a nonlinear operator right side". Ex.: phd. in math. A.G.Aliyeva

1. Aliyeva A.Q. Some a priori estimates for solutions of one-dimensional mixed problem for one class of semilinear fourth order equations. The USA Journal of Applied Sciences, Cibunet Publishing, 2016, № 1, pp.15-19.

2. Алиева А.Г.Об одной задаче для одного класса полулинейных уравнений четвертого порядка. BDU-nun Xəbərləri (fizika-riyaziyyat elmləri seriyası).pp.8

Work 7. "Gradient estimates for discontinuous coefficient divergent form parabolic equations in generalized weighted Morrey spaces". Ex.: phd. in math. Sh.A.Muradova

1. Guliyev Vagif S., Muradova Shamsiyya A., Omarova Mehriban N. and Softova Lubomira G. Gradient estimates for parabolic equations in generalized weighted Morrey spaces". Acta Mathematica Sinica, English Series Aug., 2016, Vol. 32, No. 8, pp. 911–924 (Thompson Reuters, İmpakt -0.386).

2. Muradova Sh.A., Hasanov A.A. Comutators of multilinear singular integral operators on generalized local Morrey spaces. International Workshop on Non-Harmonic Analysis and differential operators, p.81, Baku, Azerbaijan, 25-27 May, 2016.

3. Muradova Sh.A., Balakishiyev A.S., Orucov N.Z. Parabolic fractional integral operators with rough kernels in parabolic local generalized Morrey spaces. Caspian Journal of Applied Mathematics, Ecology and Economics, 2016, pp.9 (in press).

Work 8. "Asymptotics of solutions of some nonlinear elliptic type equations". Ex.: phd. in math. N.R.Ahmedzade

N.R. Ahmadzade. Behavior of the solution of a nonlinear elliptic equation in unbounded domains with a complicated geometrical configuration boundary. International Workshop on "Non-harmonic Analysis and Differential Operators, May 25-27, 2016, p.2, Baku, Azerbaijan.

Work 9. "Investigating global solutions of the Cauchy problem for Volterra chains". Ex.: doct. of math.s., prof. A.Kh.Khanmamedov

1. L.L.Asadova, A.Kh.Khanmamedov. Solution of an inverse spectral problem for Sturm - Liouville discrete equations. Vestnik Bakinskogo Gos.Universiteta (in print).

2. A.Kh.Khanmamedov. Solvability of some equations connected with S -function of Sturm-Liouville equation. Proceedings of IAM (in print).

3. Задачи Коши для одной бесконечной цепочки со ступенеобразными начальными условиями//Ə.Ş.Həbibzadənin anadan olmasının 100-cü ildönümünə həsr olunmuş “ FUNKSIONAL ANALİZ VƏ ONUN TƏTBİQLƏRİ” adlı respublika elmi konfransının materialları, Bakı, 2016.

4. О глобальной разрешимости задачи Коши для одной бесконечной системы нелинейных эволюционных уравнений// Ə.Ş.Həbibzadənin anadan olmasının 100-cü ildönümünə həsr olunmuş “ FUNKSIONAL ANALİZ VƏ ONUN TƏTBİQLƏRİ” adlı respublika elmi konfransının materialları, Bakı, 2016

5. Исследование спектра дискретного оператора Дирака// Akademik M.L.Rəsulovun 100 illik yubileyinə həsr olunmuş “NƏZƏRİ VƏ TƏTBİQİ RİYAZİYYATIN AKTUAL MƏSƏLƏLƏRİ” respublika elmi konfransın materialları, Şəki, 2016, s. 156-157.

Social activity of collaborators

All collaborators of the Department participate at institute seminars.

On 09.03.2016, at the institute seminar, senior research associate of “Differential Equations” department doct.phil.math.sci., prof. Tahir Gadjiev gave a talk on “Solving boundary value problems for a class of some degenerate elliptic equations”.

Department Seminars

The seminar, “Contemporary problems of theory of differential equations”, guided by A.B.Aliyev is held every Wednesday at 12.00.

Starting with March 30, every Wednesday at 12.00 at the department seminars the lectures are given for young scientists and researchers on “Modern methods for solving nonlinear equations”.

Scientific Subject Seminar

Collaborators of the department prof. Akber Aliyev, prof. Mammad Bayramoglu, prof. Tahir Gadjiev are the members of the Subject Seminar.

Prof. Akper Aliyev, prof. Nadir Suleymanov and prof. Tahir Gadjiev are the members of the Defence Council of IMM.

Prof. Mammad Bayramoglu is the member of Expert Committee of Higher Certificate Commission.

Education

Leading research associates of the department give lectures at different higher schools of the Republic (Baku State University, Azerbaijan Technical University, Azerbaijan State Pedagogical University, Construction University, etc).

Since September 2016, one (1) master, Farhadova Yetar Muzakir kizi is training at the department.

Participation at Conferences

The department collaborators prof. Akper Aliyev, prof. M.Bayramoglu, ass.prof. Bayram Aliyev, as.prof. Nigar Aslanova, phil.doct.in.math. Nigar Ahmedzade, phil.doct.in.math. Shamsiyya Muradova have participated at **“International Workshop on Non-Harmonic Analysis and Differential operators. Baku, Azerbaijan, 25-27 May, 2016”**.

Prof. T.S.Gadjiev has participated gave a talk at PDMU-2016 Conference organized by Ukranian mathematicians.

On August 26-28, 2016, the head of department Akper Aliyev was invited to **“Workshop on Nonlinear Partial Differential Equations in Applied Mathematics”** organized by High Technologies University in Izmir city, Turkey and

gave a plenary talk on essential development stages of modern nonlinear hyperbolic equations.

On September 5-9, 2016, prof. Akper Aliyev, prof. Bahram Aliyev have participated at the VII International Conference of mathematicians of Georgian devoted to 125 years of I.G.Muskheleshvili. Prof. Akper Aliyev gave a talk on “Existence and Nonexistence of Global solutions for a class nonlinear Pseudo-Hyperbolic Equations with damping and Source Terms”.

Prof. N.M.Suleymanov, prof.A.Khanmamedov, phil.doct.in.math. A.Aliyeva have given talks in the Republican Conference “Functional Analysis and its application” devoted to 100 years of A.Sh.Habibzade (Baku, 2016), prof. A.Khanmamedov of the Republican Conference “Urgent Problems of theoretical and Applied mathematics” with a talk” (Sheki, 2016).

Defences

1. On June 30, 2015 the department’s collaborator Nigar Rahib kizi Ahmedzadeh defended her dissertation work “Quality properties of solutions of degenerating elliptic type equations” and received the ph.d diploma on February 2016. Supervisor prof. Tahir Gadjiyev.

2. On June 30, 2015 Aygun Garayeva defended her her dissertation work “Convergence of spectral expansion of Schrodinger operator in the system of eigen and associated vector-functions” and on February, 2016 has received he phil. doctor in math. diploma. Supervisor prof. Veli Kurbanov.

3. Nargul Kamandar kizi Gurbanoova has completed and represented to Defence Council her phil.doct. dissertation “Studying boundary vaue problems for second order elliptic differential equation containing an operator and spectral

parameter in boundary conditions". The dissertation work was initially discussed on November 02, 2016. Supervisor as.prof. Bahram Aliyev.

Reviews in Scientific journals

Prof. A.Aliyev, prof. M.Bayramogly, prof. N.Suleymanov, prof. T.S.Gadjiyev, as.prof. B.Aliyev, as.prof. N.Aslanova reviewed the papers in the journals

- -Proceedings of IMM;
- -Transactions of IMM;
- -Azərbaycan Riyaziyyat jurnalı;
- -Electroni journal of differential equations;
- -Turkish Journal of Mathematic;
- - Georgian Math. Journal;
- -Vyetnam Math. Journal;
- -Sahand Communications in Mathematical Analysis.

On membership in editorial boards of scientific journals

Prof. Akper B. Aliyev:

- Azerbaijan mathematics journal;
- Proceedings of IMM;
- Transactions of IMM;
- Caspian Journal of Applied Mathematics, Ecology and Economics.

Prof. Mamed Bayramogly:

-Balcanian Journal of Mathematics

-Proceedings of IMM;

- Transactions of IMM

Prof. Tahir Gadjiyev:

-Proceedings of IMM;

- Transactions of IMM.

Total amount of papers

Total amount of papers – 26; 8 of them have been published (1 in Thompson Reuters), 18 of them are in print.

Abstracts

Abstracts and proceedings of conferences – 21.

Important result

Work 2. "Investigating spectrum and trace of a clan of higher order operator coefficient differential equations". Ex.-s.: doct. ph.m.s., prof. M.Bayramogly, doct. of math.s., dos. N.|M.Aslanova.

Head of department

prof. A.B.Aliyev