

Annual Report of Functional Analysis department on scientific and scientific activity for 2018

The staff of “Functional Analysis” department consists of 21 employees including 18 research associates. 7 of them doctor of sciences, professor.

- 1.Aslanov Hamidulla I. doct. ph.m.s.,prof.sen.r.a.
- 2.Aliyev Soltan A. doct. ph.m.s.,prof.sen.r.a.
- 3.Mirzoyev Sabir S. doct. ph.m.s.,prof.sen.r.a.
- 4.Huseynov Hidayet M. doct. ph.m.s.,prof.sen.r.a.
- 5.Gurbanov Veli M. doct. ph.m.s.,prof.sen.r.a.
- 6.Nabiyev Ibrahim M. doct. ph.m.s.,prof.sen.r.a.
- 7.Aliyev Araz R. doct. ph.m.s.,prof.sen.r.a.
- 8.Mukhtarov Fekhreddin Sh. c.ph.m.s.,lead.r.a.
- 9.Jabrailova Afet N. c.ph.m.s.,lead.r.a.
- 10.Ibadova Irade A. c.ph.m.s.,lead.r.a.
- 11.Latifova Aygun R. phd in math.,chief.r.a.
- 12.Vahabov Nazim G. chief.r.a.
- 13.Guliyev Namiq I. c.ph.m.s.,r.a.
- 14.Khalilov Vuqar S. phd in math.,chief.r.a.
- 15.Jafarov Ilqar J. r.a.
- 16.Alimardanova Kamilla A. c.ph.m.s.,chief. r.a.
- 17.Osmanli Jalala A. phd in math.,chief. r.a.
- 18.Safarova Aynur N.j.r.a.
- 19.Iskenderli Guller Z.sen.lab.ass.
- 20.Bayramova Aygun F.sen.lab.ass.
- 21.Guluyev Tural M.lab.ass.

I. Scientific part.

In 2018, 18 scientific works on “Studying some problems of operator algebras and probability theory” and “Spectral analysis of differential operators” were carried out.

Theme: “Studying some problems of operator algebras and probability theory.”

a)Work: “Convergence of many type branching stochastic processes ”
Executor:doct.ph.m.s., prof. sen.r.a. **S.A.Aliyev.**

Multi-type branching processes may be considered as generalization of Galton-Watson processes. In the report year, the results obtained for branching Galton-Watson processes were generalized for multitype processes.

In the report year the following book, paper and abstracts were published:

1.Aliyev S.A. Handbook of research for fluid and solid mechanics.Apple Academic Press., USA,2017,314p.

2.Aliyev S.A., Rustamov Y.I., Xalilov V.S. On estimation of parameters of branching random processes with many types of particles, Imeset 17, Bitlis Full Paper proceedings, Bitlis, Turkey 2017, p. 693-695.

3.Aliyev S.A., Akbarov S.D. The influence of the initial strains of the highly elastic plate on the forced vibration of the hydro-elastic system consisting of this plate, compressible viscous fluid, and rigid wall. Coupled Systems Mechanics. Vol.6, №4(2017), p.439-464.

4. Aliyev S.A. Limit theorems for the family of the first passage time of the parabola by a random walk described by the autoregression process of order (AR(1)) . Proceedings of the 6 th Conf. on control and optimization with industrial application, vol1,2018, Baku.p.65-67.

5.Aliyev S.A. Holder estimates for the solutions of degenerate quasilinear elliptic non-divergence equations. Bich. Lviv. un-ty, ser, prikl, matem, ta inf., 2017, вып 25, p. 64-66.

6.Aliyev S.A. Mathematical model for simulating water balances under stochastic marginal conditions, “Riyaziyyat və mexanikanın actual problemləri” Resp. conf., materialları, 2017, noyabr , s. 10-12.

7. Aliyev S.A. Mathematical model of hydraulic systems and its applications, Modern problems of mathematics and mechanics, Proceedings of the intern.conf. devoted to the 80-th anniversary of academician A.Gadjiev. Baki-2017, p.32

8. Aliyev S.A., Ibadova I.A. On convergence to continuous state space branching process. XXXI Intern. Conf РДМИ-2018, Lankaran-Baki, Abstracts, 2018, p.18.

9. Aliyev S.A., Rustamov Y.I. The optimal irrigation under water decisions. XXXI Inter. Conf РДМИ-2018, Lankaran-Baki, Abstracts, 2018, p.62.

10. Aliyev S.A. Modeling of Bellman-Harris branching processes with random noises operators, functions and systems of mathematical physics conf., Int. conf, Baki, 2018, p.61-62

b) Work: “Completeness of eigen and associated vectors of two parameter system in Hilbert spaces.” Executor : c.ph.m.s., lead.r.a. **A.N.Jabrailova**.

In the paper the system of operators dependent on two parameters in Hilbert space, is studied. The conditions for multiple completeness of eigen and associated vectors of this system were found.

In the proof, the notion of abstract analogous of the resultant of two operator pencils determined in two different spaces, is used.

1. A.N.Jabrailova., T.B.Gasymov., G.V.Maharramova. “Spectral properties of the problem of vibration of a loaded string in Morrey type spaces.” Proceedings of the Institute of Mathematics and Mechanics, NAS of Azerbaijan, vol.44, number1, 2018, pages.116-122.

2. A.N.Jabrailova., T.B.Gasymov. “Spectral properties of the problem of vibration of a loaded string in Morrey type spaces.” International Conference Dedicated to the 90 th anniversary of academician Azad Mirzajanzade, 13-14 december, 2018, Baki, Azerbaijan.(çapa qebul olunub)

c) Work: “Growth of Resolvent and properties of clan of operators in Banach space”. Executor: chief.r.a. **N.G.Vahabov**

Spectral properties of G_1 -th operators that is first order increment of the spectrum of the resolvent in Banach space are studied.

It was proved that the spectrum of G_1 -th operators in the Hausdorff metrics generalizing the Liaske result for Hilbert space is continuous.

In future, it is planned to obtain the Krylov-Weinstein theorem on location of a spectrum for G_1 operators in Banach space known from Hermitian operators in Hilbert space. (see. the book of F.A. Iosif).

ç) Work: “ The strong law of large numbers for random walks described by first order autoregression process. ” Executor :c.ph.m.s.,lead.r.a. **I.A.Ibadova.**

The work was devoted to moments of crossing the random walk of one-dimensional autoregression processes described by nonlinear functions of the boundary and the law of large numbers was proved.

1. Fada G. Rahimov ., Irada A. Ibadova .,Aynura D. Farhadova. On strong law of large numbers for the family of first passage times for the level in random walk described by a non-linear function of autoregression process of order one (AR (1)) (məqalə -Transactions of NAS of Azerbaijan jurnalının redaksiyasına təqdim olunub.)

2. Рагимов Ф.Г., Ибадова И.А., Гашимова Т.Е.,Фархадова А.Д. Предельные теоремы для семейства моментов первого достижения парабол суммами квадратов процесса авторегрессии первого порядка.(AR (1)). (тезис-Баки Дövlət Universiteti Mexanika-riyaziyyat fakültəsi Ümummilli lider Heydər Əliyevin anadan olmasının 95-ci il dönümünə həsr olunmuş "Riyaziyyat və Mexanikanın aktual problemləri" adlı elmi konfrans 17.05.2018 səh.188-191.)

3. S.A.Aliyev, I.A.Ibadova. On convergence to continuous state space branching process XXXI International Conferensce Problems of decision making under uncertainties(PDMU-2018) Lankaran-Baku ,pp-18.

d) Work: “Studing linear boundary value problems for random walks described by first order autoregression processes” .

Executor: phd in math.,chief.r.a. **V.S.Khalilov**

In the report period, linear and nonlinear boundary value problems for a class of random walks described by a first order autoregression process was studied.

Central limit theorems for a class of the intersection moments of the random walk described by first order autoregression nonlinear function the x /boundary (level). Furthermore, in the report year, a nonlinear boundary value problem for a class of random walks described by first order autoregression process, was considered.

The law of large numbers and central limit theorem were proved for the family of the first crossing time of a parabola by a random walk.

1.F.H.Ragimov.,A.D.Farhadova.,V.S.Khalilov. “ Limit theorem for the first passage time of the level by the random walk described by nonlinear function of the autoregression process of order one $AR(1)$.”Uzbek Mathematical Jurnal, 2018,№2, pp 127-135 DOI:10.29229/uzmj. 2018-2-12.

2.S.A.Aliyev,Y.I.Rustamov,V.S.Khalilov. “On estimaton of parameters of branching random Processes with many Types of Particles.Imeset 17, Bitlis Full Paper Proceedings.Bitlis,Turkey 2017 p.693-695.

3.F.H.Ragimov., A.D.Farhadova.,V.S.Khalilov. “ Limit theorems for the family of the first passage time of the parabola by a random walk described by the first order autoregression process($AR(1)$)”. Riyaziyyatın və Mexanikanın aktual problemləri adlı Respublika Elmi Konfransının Materialları. 17-18 may 2018. Bakı. səh.217-218

4.Aliyev S.A, Khalilov V.S. “Modeling of Belman –Harris branching processes with random noizes.”Operators, Functions and sistems of mathematical Physics Conference. International confernce dedicated to Hamlet Isaxanlı 70 th anniversary.21-24 may 2018,Khazar University,pp.61-62.Baku, Azerbaijan.

5. F.H.Ragimov, T.E.Hashimova, A.D.Farhadova, V.S.Khalilov, L.V.Guliyeva. “Limit theorem for first passage time of the level by the random walk descorebed by nonlinear function of the avtoregression process of order on $AR(1)$ ”.

Proceedings of the 6 th International Conference on control and optimization with industrial applications jule 11-13,2018.volume2.Baki,Azerbaijan.

Theme: “Spectral analyses of differential operators ”

е) Work: “Operator-differential equations and related spectral problems.”

Executor : doct. ph.m.s.,prof.sen.r.a. **S.S. Mirzoyev.**

In the report year the solvability conditions of boundary value problems for elliptic and quasielliptic equations were found and completeness of eigen and associated elements of operator bundles was proved.

Two papers were published, and one paper was admitted for publication.

1. Мирзоев С.С, Багирова С.М. «Об одной краевой задаче в гильбертовом пространстве». Вестник БГУ, сер. физ. мат, наук, 2018, №3, с.16-23.

2. Гейдарова С.Б, Мирзоев С.С. «О разрешимости одной краевой задачи для операторно –дифференциального уравнения.» Вестник БГУ, сер. физ. мат, наук, 2018, №4, с.6-11.

3. Мирзоев С.С., Газилова А.Т. «О полноте корневых векторов одного класса квазиэллиптических пучков третьего порядка.» (Матем. замеч. çара verilib.)

ә) Work: “ Asymptotics of Green function of normal operator coefficient higher order differential operators on a semi-axis”.

Executor: doct. ph.m.s., prof. sen. r. a. **H.I. Aslanov.**

The Green functions of higher order normal operator coefficient equation were constructed and their main properties were studied.

1. H.İ. Aslanov . Investigation of the Qrin funksion and discreteness of spectrum of higher order differential equations on semi-axis. International Journal of Mathematical Analysis and Applications 2018, 4(6), p.52-58.

2. H.İ. Aslanov. “ Базисные свойства системы экспонент в весовых пространствах Лебега с переменными показателями суммируемости.” Sumqayıt Dövlət Universitetinin xəbərləri, №4, 2018. səh 32-36.

3. H.İ. Aslanov. “ Hiperbolik tip tənlik üçün bir tərs məsələnin təqribi həlli haqqında “İnformasiya sistemləri və texnologiyalar –nailiyyətlər və

perspektivlər.” Beynəlxalq elmi konfransının materialları, 15-16 noyabr 2018. Sumqayıt Dövlət Universiteti.

f) Work: “ Direct problem of scattering for one-dimensional Schrodinger equation with singular potential .”

Executor: doct.ph.m.s., prof. sen. r. a. **H.M.Huseynov.**

In the work, the existence of the lost solution for the equation $-y'' + \alpha\delta(x-a)y + q(x)y = \lambda^2 y, -\infty < x < +\infty$ was shown. Integral representations for them were obtained and introducing the scattering data, its properties were studied.

1. И.М.Гусейнов. «Обратная задача рассеяния для уравнения Шредингера с дополнительным квадратичным потенциалом.» Теоретическая и математическая физика 2018 т.195, №1. с.54-63.

2. И.М.Гусейнов. « Востановление операторов Штурма-Лиувилля на отрезке.» В книге « Математические Моделирование процессов и систем.» (Коллективная монография). Часть I, 4-7 октября 2018, г. Уфа. с.167-182.

3. И.М.Гусейнов. «Обратная задача для оператора Штурма-Лиувилля с бесконечно растущим потенциалом» УМЖ 2018 №10. с.102-108 (impakt faktorlu, Thomson siyahısında)

4. И.М.Гусейнов. «ОЗР для уравнения Шредингера с дополнительным потенциалом.» (AMEA məruzələri 2018 №1 səh 22-24)

g) Work: “Convergence of spectral expansion of second order ordinary differential operator in eigen functions.” Executor: doct.ph.m.s., prof. sen. r. a. **V.M.Gurbanov**

This year, convergence of the spectral expansion in eigen functions of even order ordinary differential operator was researched. An ordinary differential operator

$$Lu = u^{(2m)} + P_2(x)u^{(2m-2)} + \dots + P_{2m}(x)$$

with summable coefficient on the interval $G(0,1)$ was considered. Regular convergence of spectral expansions of the functions contained in the

$W_p(G) = p > 1$ Sobolev classes in the system of complete orthonormal eigen functions generated by this operator on the interval $\bar{G} = [0,1]$ was studied and sufficient conditions were found.

The obtained results were submitted for publication in the form of a paper and abstract.

1.Kurbanov V.M., Abbasova Y.G. “Convergence of spectral expansion of absolutely continuous vector-function in root vectors of third order differential operator with matrix coefficients.”(Proceedings of the Institute Mathematics and Mechanics, National Academy of Sciences of Azerbaijan Volume 44, Number 1, 2018.p.155-165)

2.Kurbanov V.M., Shahbazov R.İ. “Absolute convergence of orthogonal expansion in eigenfunctions of odd order differential operator.”Azerbaijan Journal of Mathematics, vol.8,№2,2018.p.152-162.

3.Kurbanov V.M., Abdullayeva A.M. Bessel property and basicity of the system of root vector-functions of Dirac operator with summable coefficient. Operators and Matrices.Volume 12, number 4 (2018). p. 943-954. (impakt faktorlu,Thomson siyahısında var)

<http://dx.doi.org/10.7153/oam-2018-12-57>

4.Kurbanov V.M., Abdullayeva A.M. “Theorem on Local Equiconvergence for Dirac Operator.”(International Conference on Mathematical Advances and Applications, May 11-13, 2018, İstanbul/Turkey <http://icomma2018.com/> pp.157)

5.Гусейнов И.М., Исмаилова А.И., Курбанов В.М., Набиев И.М.

«Восстановление операторов Штурма-Лиувилля на отрезке.» В книге

«Математические Моделирование процессов и систем».(Коллективная монография).Часть I, 4-7 октября 2018, г. Уфа. с.167-182.

<http://mmpsbsu.com/>

6.Курбанов В.М., Буксаева Л.З. “Неравенство Рисса для разрывного оператора Дирака.”(Azerbaijanın Ümummilli Lideri Heydər Əliyevin anadan olmasının 95-ci il dönümünə həsr olunmuş “Riyaziyyat və Mexanikanın Aktual

Problemləri” adlı Respublika elmi konfransının materialları, Bakı, 17-18 may, 2018.səh.158-159)

7.Курбанов В.М. “Абсолютная и равномерная сходимость биортогонального ряда, отвечающего обыкновенному дифференциальному оператору”.

Понтрягинские Чтения-XXIX Материалы Международной Конференции посвященной 90-летию Владимира Александровича Ильина, Москва (2-6 май 2018) с. 142-143.

8.Kurbanov V.M.,Abbasova Y. “Componentwise equiconvergence theorem for trihd order differential operator.” ICOMAA 2018.Turkey .p. 152

ğ) Work: “ Solving inverse problems with respect to two spectrum for the Dirac system. ” Exacutor: doct. ph.m.s.,prof.sen.r.a. **I.M.Nabiyev**

On 2018, the inverse problem of spectral analysis for the Dirac system on a segment was proved. One of the boundary conditions is separable, the another one is non-separated.

In the non-separated boundary condition, a spectral parameter participates. Spectral data uniquely determining the considered Dirac problem were determined and their main properties were studied.

The spectrum of two Dirac operators that differ with one of the boundary conditions was taken as spectral data. A theorem on unique renewal of the considered operators with respect to these spectral data was proved.

Scientific works:

1. Ch.G. Ibadzadeh, I.M. Nabiev. Reconstruction of the Sturm–Liouville operator with nonseparated boundary conditions and a spectral parameter in the boundary condition // Ukrainian Mathematical Journal, V. 69, № 9, February, 2018, P. 1416-1423. (Восстановление оператора Штурма-Лиувилля с неразделенными граничными условиями и со спектральным параметром в граничном условии // Укр. мат. журн. 2017, № 9, с. 1217-1223 məqaləsinin ingiliscə versiyası).(Thomson siyahısında var)

<https://link.springer.com/article/10.1007/s11253-018-1440-0>

2. Н.В. Аббаслы, И.М. Набиев. Единственность восстановления системы Дирака по трем спектрам // Journal of Contemporary Applied Mathematics V. 8, No 1, 2018, P. 3-8.

<http://journalcam.com/wpcontent/uploads/2018/06/1.pdf>

3. Ч.Г. Ибадзаде, Л.И. Маммадова, И.М. Набиев. О разрешимости обратной задачи для оператора диффузии на отрезке / International conference «Operators, Functions, and Systems of Mathematical Physics Conference» (OFSMPC), dedicated to Professor Hamlet Isakhanli's 70 th anniversary, Baku, 20-24 May, 2018, Conference Book, p.199-200. www.khazar.org/en/events/event/3086

4. И.М. Гусейнов, А.И. Исмаилова, В.М. Курбанов, И.М. Набиев. Восстановление операторов Штурма-Лиувилля на отрезке // Collective monograph based on the plenary reports VIII International youth scientific-practical conference «Mathematical modeling of processes and systems», Part I, 4-7 October 2018, Ufa, p. 167-182. <http://mmpsbsu.com/>

5. I.M. Nabiev. An algorithm for reconstructing the Sturm-Liouville operator by the spectrum and sequence of signs / International conference dedicated to the 90 th anniversary of academician Azad Mirzajanzade, Baku, Azerbaijan, December 13-14, 2018

h) Work: “Conditions for solvability of boundary value problems for a class of operator coefficient elliptic equations.”

Executor: doct.ph.m.s., prof. sen. r.a. **A.R. Aliyev.**

In the paper, a boundary value problem for a class of fourth order elliptic type operator-differential equations was studied. In addition to solvability problems some spectral problems were also studied. In one of these problems, the conditions providing the completeness of eigen and associated elements corresponding to eigenvalues from the left surface of a fourth order operator polynomial pencil related to the boundary value problem, were found.

1. Алиев А.Р., Сойлемезо М.А. О задаче без начальных условий для одного класса обратно параболических операторно-дифференциальных уравнений третьего порядка // Доклады РАН, 2018, т. 480, № 1, с. 7-10.(impakt faktorlu,Thomson siyahısında)

<https://link.springer.com/article/10.1134/S1064562418030018>

2. Марданов М.Дж., Алиев А.Р., Асланов Р.М. Роль Заида Исмаил оглы Халилова в развитии математической науки / Приложение в книге З.И.Халилова «Основы функционального анализа». Изд. 2-е, испр. и доп. М.: ЛЕНАНД, 2018. – 256 с.; с. 232-246.

3. Khalilov E.H., Aliev A.R. Justification of a quadrature method for an integral equation to the external Neumann problem for the Helmholtz equation // Mathematical Methods in the Applied Sciences, 2018, vol. 41, no. 16, pp. 6921-6933.(impakt faktorlu Thomson siyahısında var)

<https://onlinelibrary.wiley.com/doi/10.1002/mma.5204>

z)Work:“Differential-operator equations given with undersurface conditions in modified straight sum spaces”. Executor: c.ph.m.s.,lead.r.a. **F.Sh. Mukhtarov.**

In the report period, a boundary value problem arising from boundary conditions.

dependent on λ being the eigen value of equation

$$ef = -f'' + q(x)f + Af|_x = \lambda f, \quad x \in [-\pi, 0) \cup (0, \pi],$$

boundary conditions

$$l_1 f = \delta_{10} f(-\pi) - \delta_{11} f'(-\pi) = 0$$

$$l_2 f = \delta_{20} f(\pi) - \delta_{21} f'(\pi) + \lambda (\delta_{20}^1 f(\pi) - \delta_{21}^1 f'(\pi)) = 0$$

and additional conditions

$$l_3 f = \gamma_{11}^- f'(0) + \gamma_{10}'' f(0) = 0$$

$$l_4 f = \gamma_{21}^- f'(0) + \gamma_{20} f(0) + \gamma_{21}'' f(0) + \gamma_{20}^{11} f(0+) = 0.$$

This boundary value problem is a quite new problem and was solved by new methods.

1.F.Ş.Muxtarov. Differential operator equations with interface conditions in modified direct sum spaces. 2018. Filomat 323 (2018) 921-931.(impakt faktolu,Thomson siyahısında)

x) Work: “ Conditions for solvability of a clan of elliptic type second order partial operator –differential equations.” Executor:r.a **I.J.Jafarov**

The solvability of boundary value problems of a class of second order partial operator-differential equation was studied and the conditions expressed by the coefficients of this equation were found.

The results were published in the form of an abstract.

1.I.J.Jafarov. Modern problems of innovative texnologies in oil and gas production and applied mathematics. International conference dedicated to the 90 th anniversary of academician Azad Mirzajanzade. Baku, Azerbaijan, December 13-14, 2018.(çapa təqdim olunub)

i) Work: “ Inverse scattering problem for a Sturm-Liuville egression with different asymptotics . ” Executor: phd in math.,chief.r.a.**J.A.Osmanli**.

The scattering data were given by the lost solutions, their properties were studied and Marchenko type equation for solving the inverse problems were found. The existence and uniqueness of this equation was shown and an algorithm for solving the inverse problem was given.The kernel of the main problem is found with respect to the scattering data, its solution is found and the potential is constructed using the formula of relation of the kernel of the lost solution and potential.

i)Work: “Inverse scattering problem on a semi-axis for a system of fifth order ordinary differential equations in the general case.

Executor: c.ph.m.s.,chief.r.a..**K.A.Alimardanova**.

In the report period, the scattering problem was studied for a system of fifth

order ordinary differential equations given in the form of three scattering wave form. A theorem on the existence and uniqueness of the solution of the scattering problem for this system was proved. Furthermore, direct and inverse scattering problems were studied for the system of sixth order hyperbolic equations on a semi-axis. A theorem on the existence and uniqueness of solution of the scattering problem for this system was proved in the form of three incident waves.

Two papers were published.

1. Искендеров Н.Ш., Алимарданова К.А. Задача рассеяния для системы пяти обыкновенных дифференциальных уравнений первого порядка на полуоси с тремя заданными отраженными волнами. *Azərbaycanın Ümummilli Lideri Heydər Əliyevin anadan olmasının 95-ci il dönümünə həsr olunmuş “Riyaziyyat və Mexanikanın aktual problemləri”* adlı respublika elmi konfransının materialları, Bakı, 17-18 may, səh. 154-155.

2. N.Sh.Iskenderov, K.A.Alimardanova. Direct and inverse scattering problems for the first order hyperbolic system of six equations on a semi-axis. “Modern problems of innovative technologies in oil and gas production and applied mathematics” International Conference dedicated to the 90 th Anniversary of Academician Azad Mirzajanzade, 13-14 December 2018, Baku, Azerbaijan.

q) Work: “Determination of the operator in solving inverse problem for Sturm-Liouville operator with discontinuity point at the inner point.” Executor: phd in math., chief. r.a. **A.R.Latifova**

In the paper the system of Dirac equations was considered.

$$By' + \Omega(x)y = \lambda y, \quad a, b \in (0, \pi)$$

The problem for this system of equations was studied within the boundary conditions $y_1(0) = y_2(0) = 0$ and within the interval $(0,1)$ under the intersection conditions at the points $x = a$ and $x = b$.

l) Work: “Studying inverse problems of spectral analysis for nonlocal Sturm-Liouville operator.” Executor: c.ph.m.s., r.a. **N.J.Guliyev**

In the report period, some inverse problems of spectral analysis were studied for the non-local Sturm-Liouville boundary value problems with a spectral parameter in both boundary conditions.

This paper was published.

1. Guliyev N.J., Ismailov V.E. On the approximation by single hidden layer feedforward neural networks with fixed weights. *Neural Networks*, 98 (2018), 296-304. (impakt faktor - 7.197 Thomson siyahısında)

<https://www.sciencedirect.com/science/article/pii/S0893608017302927>

k) Work: “Continuons dependence of inverse boundary value problem for second order nonclassical boundary condition parabolic equation.” Executor: j.r.a.**A.N.Safarova**.

The inverse boundary value problem for finding the unknown coefficient of second order parabolic equations was studied and the existence of the solution of non-local boundary value problem for secon order hyperbolic equations was shown.

In the report period, in the theme of inverse problems with non-local boundary conditions for parabolic equations a phil. doctor dissertation (October 12, 1918) was maintained.

Short abstract. In the work the existence and uniqueness of inverse boundary value problem was proved within the nonclassical boundary conditions for a second order parabolic equation.

The published papers.

1. Сафарова А.Н. Обратная задача об определение известного коэффициента и свободного члена для параболического уравнения второго порядка. *Riyaziyyat və mexanikanın aktual problemləri adlı respublika elmi konfransının materialları*, Bakı 2018 səh. 197-200.

2. G.N. İsgəndərova, A.N. Səfərova. On solvability of an inverse value problem for hyperbolic equation of the second order üith inteqral condition. *International Conference Dedicated to the goth annivarsary of Academician Azad Mirzacanzade* 13-14 december 2018, Baki, Azerbaijan, 3s. (çapa verilib)

II. Scientific-social activity.

The head of the department, **doct. ph.m.s.,prof.sen.r.a. H.M. Aslanov** is a participant of the Science foundation, of the grant project of state oil Company.

He was an official opponent of one doctor of sciences degree and one phil. doct. dissertations.

He supervises three doctoral students. One cand. for a degree has defended phil. doct. dissertation.

Doct. ph.m.s.,prof.sen.r.a. S.A. Aliyev was a member of three organization committees of the International Conferences, was a member the editorial board of six scientific journals, has written reviews to doctoral and phil. doctor dissertations as a member of the expert board of the Higher Certificate Committee under the president of the Republic of Azerbaijan.

His one monograph has been published in the USA.
He was a supervisor of one phil. doct. dissertation, a participant of a grand project of Science Foundation at the President of the Republic.

Doct. ph.m.s.,prof.sen.r.a. A.R. Aliyev is an editor-in-chief of the international scientific journal “Azerbaijan Journal of High performance computing” (Azerbaijan), manager editor of the international scientific journal “Azerbaijan journal of Mathematics” and a member of the journals: «Proceedings of the Institute Mathematics and Mechanics, National Academy of Sciences of Azerbaijan» (Azərbaycan), «Transactions of Azerbaijan Institutes of Technology» (Azərbaycan), “Electronic scientific journal, SCIENCE and TECHNOLOGIES: MATHEMATICAL MODELLING. COMPUTER SCIENCE“ (Rusiya) və «Mathematics and Statistics»

Doct. ph.m.s.,prof.sen.r.a. I.M. Nabiyev has participated at 3 international Conferences.

He has been an opponent of 5 phil. doct. and 1 doctor of sci. dissertation. He was a chairman of the State Certificate Commission (in mathematics) in Azerb. State Oil and Industry University.

Doct. ph.m.s.,prof.sen.r.a. H.M. Huseynov's one post graduate student defended his dissertation. He is a member of editorial boards of several journals.

Doct. ph.m.s.,prof.sen.r.a. S.S. Mirzoyev's two cand. for degrees have submitted their dissertation works to the Scientific Council of IMM.

The collaborators of the department S.S. Mirzoyev, I.M. Nabiyeu are the members of the Dissertation Defense Council. V.M. Kurbanov, S.A. Aliyev are the members of the expert commission in math. of the Higher Certificate Commission.

Many of the department collaborators are engaged in pedagogical activity in different higher education institutions of the Republic.

Professional trips

In the report period doct. ph.m.s.,prof.sen.r.a. S.A. Aliyev was on a professional trip in Dnepr city of Ukraine in may.

PARTICIPATION IN SCIENTIFIC SEMINARS

All the collaborators have participated in the institute and department seminars.

PUBLISHED SCIENTIFIC PAPAERS

In the report year 1 book, 29 papers ,15 abstracts were published, 3 papers 5 abstracts were submitted for publication .19 of them are in foreign journals, 8 of them are in impact factor journals.

Heard of department:

d.ph.m.s.prof.s.r.a.H.İ.Aslanov