Institute of Mathematics and Mechanics of ANAS
Semiannual Report of the "Optimal Control" Department for 2019
scientific and scientific organization

The department of "Optimal Control" employs 11 researchers (5 full-time employees, 6 part time). 8 of them are doctors of science, 2 of them are corresponding members of ANAS:

1. Professor Misir Mardanov – head of department (corr. member of ANAS)
2. Professor Kamil Aidazade – Senior Researcher-part time (Corr. Member of ANAS)
3. Professor Telman Melikov – Senior Researcher
4. Professor Hamlet Guliyev – Senior Researcher-part time
5. Professor Yagub Sharifov – Senior Researcher-part time
6. Professor Ramin Rzayev – Senior Researcher-part time
7. Professor Yusif Gasimov – Leading Researcher-part time
8. Professor Ramiz Aslanov – Senior Researcher.
9. Ph.D. of Physics and Mathematics Eldar Məmmədov – Leading Researcher.
10. Samin Malik, Ph.D. – Scientific Researcher (part-time.).
11. Əliyev Nicat. Ph.D. – Scientific Researcher.

During the reporting period, 21 articles and 23 conference materials of department staff were published (13 *Clarivate Analyticsin, 2 papers are published in a journal from Scopus* list).

Grant and programs

In 2019, 3 grant projects are being run under the supervision of the head of the department, Professor Misir Mardanov.

1. Was a winner of the grant project **" Mathematical modeling and optimization of continuous and discrete processes with the help of modern computer programs "** with a total funding of 100,000 manats, total duration of 24 months, financed by the decision March 14, 2018 No 7/3 of the Presidium of the National Academy of Sciences of Azerbaijan. **("Optimal Control" department of IMM, Baku State University, Institute of Control systems of ANAS, Public Administration Academy, Baku Higher Oil School)**.

2. Winner of the grant project **"Methods of analysis of university indicators based on fuzzy logic and the development of information analytical systems"** with a funding amount of **55000 manat**, duration of 12-month,. The project was related to **"Integration of science and education"** announced by the Fund for Development of Science under the President of the Republic of Azerbaijan. **(Optimal Management of the Institute of Mathematics and Mechanics, Baku State University, Azerbaijan State Technical University, Lankaran State University)**.

3. Winner of the project **"Optimization and Application of Oil Exploitation Operations with Gaslift and Depth Pump"** funded by the Science Fund of State Oil Company of Republic of Azerbaijan with amount of **85000 manat** and duration of 12 months. **(jointly with SOCAR-the Oil and Gas Research Project Institute)**

During the reporting period, the following books of Corresponding memebr of ANAS, professor Misir Mardanov have been published:

1. Azerbaijani Mathematicians, Elm və təhsil publisher. (496 p.);

2. Institute of Mathematics and Mechanics of ANAS 60, Elm və təhsil publisher (384 .p.);
3. Azerbaijanis studied university up to 1920-th year. (joint work with pof. Ədalət Tahirzadə) 2nd Volume (551 page.) and 3rd volume (479 page.) Təhsil publisher;
4. Textbook for Advanced Mathematics. (joint work with prof. Ramiz Aslanov and assoc.prof. Sevda İsayeva)- (404 page.), submitted.

In the department of "Optimal control", scientific researches were carried out on the topic **"Optimal control problems described by various systems"** in the first half of 2019 according to the approved plan:

1) Work: "New independent necessary and sufficient conditions for a strong extremum in some variation problems (one-dimensional and multidimensional)".
Executers: Corresponding member of ANAS, prof. Misir Mardanov, doct. of phys. Math. Sci. prof. Telman Malikov

It was suggested two methods to study some variation problems. Using these methods, various necessary conditions for a strong and weak extremum in two variation problems (if integrand $L(\cdot) = L(t, x, \dot{x})$ and $L(\cdot) = L(t, x, \dot{x}, ..., x^{(m)})$) were obtained. Furthermore, in case of the Legendre condition is degenrate, equality and inequality type necessasry conditions were obtained. (submitted and published in the the following conferences)

The nonlinear condition of Neumann, which does not require concordance conditions for a four-order generalized Manjeron equation given in a rectangular region, is considered. While the solution to this problem is sought in the isotropic Sobolev space, it is justified that these conditions are equivalent to the classical boundary conditions. Based on the method of integral representations, a correct solution is established by converting the problem into the system of integral equations. The correct solution of the Neumann problem for the generalized Manjeron equation is proved by the method of operator equations.

1. Misir J.Mardanov Institute of Mathematics and Mechanics of the National Academy of Sciences of Azerbaijan in 60 years, Modern Problems of Mathematics and Mechanics proceedings of the international conference devoted to the 60th anniversary of the Institute of Mathematics and Mechanics of Azerbaijan National Academy of Sciences, p.4-19., 2019, oktober 23-25
2. Mardanov M.J., Melikov T.K., Malik S.T. "Necessary conditions for extremum in calculus of variation for problems with higher derivatives", An International Workshop dedicated to the 80th anniversary of an academician Mirabbas Geogja oglu Gasymov Spectral Theory and its applications, Baku, June 7-8, 2019, pp.118-121.
3. Misir J. Mardanov, Irane A. Abdullayeva, Akbar J. Mammadov "A movable optimal control problem with additional constraint for one heat process" Trans. Natl. Acad. Sci. Azerb. Ser. Phys.-Tech. Math. Sci. Mathematics, 39 (1), 132-140 (2019). - **SCOPUS**
4. Misir J. Mardanov, Telman K. Melikov, Samin T. Malik "Necessary conditions for the minimum in non-smooth problems with higher derivatives of calculus of variation", Operators, Functions, and Systems of Mathematical Physics Conference, June 10-14, 2019, Khazar University, Baku, Azerbaijan. pp. 80-82.
5. Misir J. Mardanov, Telman K. Melikov, "Necessary conditions for extremum in non-smooth problems of variational calculus", İnternational Conference "Modern Problems of

Mathematics and Mechanics" devoted to the 60th anniversary of the İnstitute of Mathematics and Mechanics, 23-25 October, 2019, Baku, Azerbaijan. pp. 363-366.

6. М.Дж.Марданов, Т.К.Меликов, С.Т.Малик «К теории оптимальных процессов в дискретных системах», Математические заметки, том. 106, №3, с. 409-423, 2019. **Clarivate Ananlytics**

7. И.Г.Мамедов , М.Дж. Марданов, Т.К.Меликов, Р.А.Бандалиев «О Корректной разрешимости задачи Неймана для обобщенного уравнения манжерона с негладкими коэффициентами» Дифференциальные уравнения, 2019,том 55, № 10, с.1405–1415. **Clarivate Ananlytics**

8. Мисир Дж. Марданов, А.А. Фейзуллаев, Ч.С. Алиев, Х.А. Джафарова, Д.А. Гусейнов, Р.Дж. Багирли «Статистический Анализ Результатов Мониторинга Уровня Радона И Метеорологических Параметров В Помещениях Геофизических Станций Азербайджана», Геофизические Процессы и Биосфера. 2019. Т. 18, № 2. с. 106−118. **Clarivate Ananlytics (Q_4)**

9. Misir J. Mardanov, Telman K. Melikov, Samin T. Malik, Kamran Malikov "First- and Second-Order Necessary Conditions with Respect to Component For Discrete Optimal Control Problems" , Journal of Computational and Applied Mathematics, Volume 364, 15 January 2020, 112342, https://doi.org/10.1016/j.cam.2019.112342, **Clarivate Ananlytics (Q_1)**

10. М.Дж.Марданов, К.В.Мансимов,Многоточечные необходимые условия оптимальности особых управлений в системах Гурса-Дарбу, Материалы Международного симпозиума – Динамические системы, оптимальное управление и математическое моделирование, Иркутск, 7-11 октября, 2019, с. 253-265.

2) Work: "Nmerical Solution of linear ordinary differential equations with non-local boundary conditions and nonlinear loading".
Author: Corresponding member of ANAS Kamil Aida-zade

I. The solution of a class of parametric inverse problems for processes represented by loaded differential equations is investigated. The formulas yielding to use efficient numerical methods of first order optimization were obtained.

1. Aida-zade K.R., Abdullayev V.M. Numerical Method for solving the parametric Identification Problem for Loaded Differential Equations, Bulletin of the Iranian Mathematical Society, 2019. Volume 45, Issue 6, pp 1725–1742. **Clarivate Ananlytics (Q_4)**

2. Aida-zade K.R. Nonlinearly Loaded Boundary Value Problems for linear Ordinary Differential Equations, Differensial Equations, Pleiades Publishing, Ltd, 2019, Vol. 55, N 6, pp. 1-6. **Clarivate Ananlytics (Q_3)**

II. An approach and schemes for numerical solution to the optimal control problems for loaded systems with nonlocal conditions was suggested. Numerical experiments were implemented.

1. Aida-zade K.R., Abdullayev V.M. Approach to the Numerical Solution of Optimal Control Problems for Loaded Differential Equations with Nonlocal Conditions, Computatıonal Mathematics and Mathematical Physics, 2019, Vol. 59, N 5, pp. 696-707. **Clarivate Ananlytics (Q_4)**

2. Айда-заде К.Р. Абдуллаев В.М. О связи управления с обратной связью с нагруженными дифференциальными уравнениями. Доклади Адыгской (Черкесской) Межд. Академии наук, 2019, т.19, N1, с.7-15.

3) Work: "Solution of inverse problems describing various systems by means of optimal control theory methods".
Authors: Doct. of phys. Math. Sci. professor. Yusif Gasimov

During the reporting period, research was conducted on the topic. In the case of a region-dependent function having eigenvalues of the Pauli operator, the problem of existence of optimal region is considered and the corresponding theorem is proved. In addition, a method has been proposed using fuzzy logic and expert systems to assess risks in freight traffic.

During this time, two papers have been published in the journals indexed by Thomson Reuters, and one paper has been published in an international conference indexing on the Web of Science database.

1. Farjamnia, G., Gasimov, Y.S., Kazimov, J. Review of the techniques against the wormhole attacks on wireless sensor networks, *Wireless Personal Communications,* Vol.105, No.4, 2019, pp.1561-1584. **Clarivate Ananlytics, ESCI.**
2. Gasimov Y.S., Pashayev A., Azizov B., Agamalieva L., Lacinová V., Šmerek M. Application of decision-making expert systems in transportation. *OUR SEA: International Journal of Maritime Science & Technology*, Vol.66, No. 3, 2019, pp.130-134. **Clarivate Ananlytics, ESCI.**
3. Gasimov Y.S., Aliyeva Y.R. On an existence of the optimal shape for one functional related with the eigenvalues of the Pauli operator. *8th International Eurasian Conference on Mathematical Sciences and Applications*, 27-30 August, 2019, Baku, Azerbaijan, pp.92-94. **Clarivate Ananlytics, ESCI.**

4) Work: "Study of some inverse and ill-posed problems for second order hyperbolic equations by means of methods of optimal control".
Author: Doct. of phys. Math. Sci. prof. Hamlet Guliyev

During the reporting period, the following prolems for second order hyperbolic equations were studied:

1) The problem of the determination of initial functions with respect to the measured values of boundary functions for a second order hyperbolic equation is considered.. The problem was reduced to optimal control problem and necessary and sufficient condition for optimality was proved.

2) A problem on the existence and uniqueness of the solution of initial boundary value problem for weak non linear second order hyperbolic equation with non-local boundary condition. The existence and uniqueness of a solution from the class $W_2^1(Q)$ was proved.

In these works, the porblem of optimal control with coefficients for hyperbolic equations are studied and necessary conditions for optimality are proved.

Published scientific papers:

1. Guliyev H.F., Safarova Z.R. On a determination of the initial functions from the observed values of the boundary functions for the second-order hyperbolic equation. Advanced mathematical models and applications, 2018. Vol. 3, № 3, pp. 215-222.
2. Кулиев Г.Ф., Сафарова З.Р. Об определении начальных функцей по измеренным значениям граничных функцей для гиперболического уравнения. Материалы V

международной научной конференции «Нелокальные краевые задачи и родственные проблемы математической биологии, информатики и физики» к 80-летию А.М.Нахумева. 4-7 декабря 2018 г. Нальчик, Кабардино-Балкарская Республика. с. 115.

3. H.F. Guliyev, H.T. Tagiev. On the existence and uniquenese of the solution of a problem with a nonlocal condition for a hyperbolic type equations. An İnternational Workshop dedicated to the 80th anniversary of an academician Mirabbas Geogja oglu Gasymov "Spectral theory and its applications" . Baku / June 7-8, 2019, pp. 78-79.

4. H.F. Guliyev, G.G.Ismailova, On the determionation of the lowest coefficient of one weakly nonlinear wave equation in a mixed problem, International Conference "Modern Problems of Mathematics and Mechanics" devoted to the 60th anniversary of the Institute of Mathematics and Mechanics 23-25 October, 2019, Baku, Azerbaijan. pp. 220-222.

5. H.F. Guliyev, Kh.I.Seyfullayeva, Optimal control problem for the weak nonlinear equation of thin plate with control at the coefficient of lowest term, International Conference "Modern Problems of Mathematics and Mechanics" devoted to the 60th anniversary of the Institute of Mathematics and Mechanics 23-25 October, 2019, Baku, Azerbaijan. pp. 223-224.

6. H.F. Guliyev, Kh.T.Tagiyev, R.O.Haciyeva, An optimal control problem by the coefficient of the wave equation with non local condition, International Conference "Modern Problems of Mathematics and Mechanics" devoted to the 60th anniversary of the Institute of Mathematics and Mechanics 23-25 October, 2019, Baku, Azerbaijan. pp. 225-226.

5) Work: "Problems with non-local boundary conditions and the study of optimal control problems described by them".
Author: Doct. of phys. Math. Sci. prof. Y. A. Sharifov

In this paper, we first consider the three-point boundary value problem for ordinary differential equations of the first order. A theorem on the existence and uniqueness of the solution of a differential equation by the method of principle of compressed mappings is proved. A theorem on the existence of a solution is proved using the Schaufer fixed-point theorem. Similar results were obtained for the boundary problem given by three-point and integral boundary conditions. Results were also obtained in three-point and impulse conditions.

1) Mısır J. Mardanov, Yagub A. Sharifov and Kamala E. Ismayilova. Existence and uniqueness of solutions for nonlinear impulsive differential equations with three-point boundary conditions. E-Journal of Analysis and Applied Mathematics 2018(1) (2018), 21 – 36 DOI 10.2478/ejaam-2018-0003.

2) M. J. Mardanov, Y. A. Şarifov, K. E. İsmailova, Existence and Uniqueness of Solutions for the System of First-order Nonlinear Differential Equations with Three-point and Integral Boundary Conditions, European Journal of Pure And Applied Mathematics Vol. 12, No. 3, 2019, 756-770 ISSN 1307-5543. **Clarivate Ananlytics**

3) Mardanov, M.J., Sharifov, Y. A., Zeynally, F. M. "Existence and uniqueness of solutions for nonlinear impulsive differential equations with nonlocal boundary conditions", Выпуск, 60, стр.61-72, 2019, **Clarivate Ananlytics**

4) M.J. Mardanov, Y.A. Sharifov, K.E. Ismailova, Existence and uniqueness of solutions for the first-order non-linear differential equations with three-point boundary conditions, Filomat, vol. 33, No5,2019. **Clarivate Ananlytics (Q_2)** (Impact factor: 0,789)

5) Misir J. Mardanov, Y.A. Sharifov, R.A. Sardarova, " Existence and uniqueness results for nonlinear impulsive differential with three-point and integral boundary conditions", İnternational Conference "Modern Problems of Mathematics and Mechanics" devoted to the

60th anniversary of the İnstitute of Mathematics and Mechanics, 23-25 October, 2019, Baku, Azerbaijan. pp. 366-368.

6) Mardanov M.J. , Sharifov Y.A., "Existence and Ulam-Hyers stability results for nonlinear implicit differential equations with three-point boundary conditions", Operators, Functions, and Systems of Mathematical Physics Conference,June 10-14, 2019, Khazar University, Baku, Azerbaijan. pp. 78-79.

Scientific research on **"Optimization of higher education management"** was conducted:

Work: "Development of an information and analytical system and methods for analyzing the university indicators based on the application of expert knowledge and the fuzzy inference".
Authors: Corresponding member of ANAS, professor. M. J. Mardanov, doctor of technical science, professor R. R. Rzayev

The studies conducted during the reporting period, are associated with further development of methods and algorithms for solving the problems in the field of decision making under uncertainty and the set of related tasks. In particular, new method for the constructive evaluation of alternatives (or the effectiveness of their behavior) with the involvement of a large variety of criteria with various nature related to the subject area of research was proposed. In the framework of the proposed methodology, an approach based on the combined useage of neural network modeling techniques and expert evaluation is formulated: the knowledge gained from expert opinions, like external representations about weighted total evaluations of alternatives, is compiled into effective internal representations about them in logical basis of a multilayered neural network.

1. Mərdanov M.C., Rzayev R.R. One Approach to Multi-criteria Evaluation of Alternatives in the Logical Basis of Neural Networks. Springers's Series "Advences in Intelligent Systems and Computing Systems and Computing", Vol. 896, pp. 279-287, 2019.
2. Mərdanov M.C., Rzayev R.R., Ibrahimov N.S., Camalov Z.R. Формирование рейтингов университетов на основе компиляции экспертных оценок в логическом базисе нейронной сети. Математични машини и системи, Институт Проблем Математических Машин и Систем, Киев, 2019, №1, стр. 107-123.

The research was conducted ent'tled **"History of Science-History of Mathematics**:

Work: "The study of the history of mathematics in the late 19th and early 20th centuries in Azerbaijan".
Authors: Prof. R. M. Aslanov

1. Высшая математика (задачник). Книга из пяти частей часть 5.2. Учебное пособие. – М.:. Издательство «Перо», 2019.320 с. (соавторы Нижников А.И., Муханова А.А., Муханов С.А., Мурадов Т.Р.)
2. Higher Mathematics (Volume 407) - Textbook of Ministry of Education of the Republic of Azerbaijan

3. Ali Riyaziyyat (həcmi 407 s.)- dərsliyinə Azərbaycan Respublikası Təhsil nazirliyinin qrifi verilib (16.05. 2019, əmr № F-289)- The printing is made (co-authors: prof. M.C. Mərdanov, dos. S.E. İsayeva)

Published works:

1. Formation of ICT Competency of Bachelor Students While Studying the Course "Information Technologies" in Education / Helix- 2019, Vol. 9 (4): p. 5182-5186 (соавторы M. A. Lukoyanova, N. I. Batrova, L. L. Salekhova,)

2. Ашраф Гусейнов – основоположник математического образования и науки в Азербайджане // CONTINUUM. Математика. Информатика. Образование, 2019.№ 3(15). С.101-107. (соавторы: Марданов М.Д., Гасанова Т.Х.)

3. История науки: Роль женщин –математиков Франции/ Современный учитель естественного цикла: сборник материалов Международной научно-практической конференции (15-16 февраля 2019г.; Ишим)- Ишим: издательство ИПИ им. П.П. Ершова (филиала) ТюмГУ, 2019 стр. 25-30

4. З.И.Халилов один из основоположников функционального анализа/Алгебра, теория чисел и дискретная геометрия: современные проблемы, приложения и проблемы истории Материалы XVI Международной конференции, посвященной 80-летию со дня рождения профессора Мишеля Деза Тула, 13–18 мая 2019 года, Тула, Тульский государственный университет им. Л.Н. Толстого, 2019, стр. 359-363. (соавторы Марданов М.Дж., Гасанова Т.Х.)

5. Методика и учебники по математике в школах Азербайджана (до 1920 года)/ V Международный форум по педагогическому образованию «Развитие профессиональных компетенций учителя: основные проблемы и ценности» 29-31 мая 2019 года, Казанский федеральный университет г. Казань. стр. (соавтор Марданов М.Дж.)

6. Козельский Яков Павлович: энциклопедист, философ-просветитель России XVIII века (290-лет со дня рождения)/Современное образование: научные подходы, опыт, проблемы, перспектива: материалыXV Междунар. Науч.-практ. Конф. «Артёмовские чтения» (г. Пенза, 17-18 апреля 2019 г.) – Пенза: Изд-во ПГУ, 2019.-366с. стр. 10-18 (соавтор Зейналов Г.Г.(Мордовский государственный педагогический университет))

7. Математик-механик и художник - Пелагея Яковлевна Кочина(к 120-летию со дня рождения) / труды IX Международной научной конференции «Математика. Образование. Культура», 24-26 апреля 2019 г., Россия, г. Тольятти - Тольятти: Изд-во ТГУ, 2019. С.6-11(пленарный доклад).

8. Kazan University and Development of Geometry in Azerbaijan/IECMSA-2019 8-TH International Eurasian Conference on Mathematical Sciences and Applications Baku / Azerbaijan, p. 242.

9. И.И.Ибрагимов — создатель школы теории функций в Азербайджане. Международная научно0практическая конференция «XV Колмогоровские чтения», посвящённая памяти профессора М.И. Зайкина, 10-13 сентября2019 г., г. Арзамас, стр.162-168.

10. Дифференциальные уравнения- первая любовь Вячеслава Васильевич Степанова (к 130 летию со дня рождения)/ Математическое образование в цифровом обществе: материалы XXXVIIIМеждународного научного семинара преподавателей

математики и информатики университетов и институтов вузов (26-28 сентября 2019 г.)-Самара: СФУ ГАОУ ВО МГПУ, 2019, 320 стр. с.19- 23 (соавтор Марданов М.Дж.)

11. «Живой классик» спектральной теории – Мираббас Геогджа оглы Гасымов (к 80-летию со дня рождения). /Математика образование в школе и вузе:MATHEDU - 2019Материалы IX научно-практической конференции. Казань, октябрь 2019- Казань: Издательство Казанского университета 2019. стр. 27-34 (соавторы Марданов М.Дж, Гасанова Т.Х.)

12. Сборник задач по теории функций комплексной переменной./ Proceedings of the 60th Anniversary of the Institute of Mathematics and Mechanics (23-25 October, 2019) (соавтор Сушков В.В.) с. 138.

The scientific research entitled **"The role of Science-metr in the progress of Science"** was employed.

Work: "The role of Science-metr in the progress of Science".

Executives: Corresponding Member of ANAS, prof. M. C. Mərdanov, Aynur Həsənova

1. Misir Mərdanov, Aynur Həsənova "The role of Science-metr in the progress of Science". Journal of Azərbaycan school, 2019, № 2, s. 129-152

Following scientific seminars of department were held

1. 10.01.2019 – The head of the laboratory "Mathematical problems of control" of the Institute of Control Systems of ANAS, prof. of ANAS, doctor of mathematics Ilgar Gurbat oglu Mamedov "Some usual and fractional model differential and integral equations of mathematical biology and their applications".

2. 24.01.2019 – Baku Engineering University, head of the department of Mathematics, Ragib Efendiev "Spectral analysis for non-self adjoint Hill operators".

3. 07.02.2019 – The Institute of Control Systems of ANAS, Dr., Assoc. Prof. Anar Rahimov "An approach to numerical solution to inverse source problems with nonlocal conditions".

4. 28.02.2019 – The sen. Res. Ass. of "Optimal Control" department, prof. Yagub Sharifov "Some non-local boundary problems and the investigation of optimal control problems described by them".

5. 14.03.2019 – The sen. Res. Ass. of "Optimal Control" department, prof. Yagub Sharifov "Some non-local boundary problems and the investigation of optimal control problems described by them".

6. 04.04.2019 – Professor of Baku State University, doct. of phys. Math. Sci. Misreddin Allahverdi oglu Sadigov will give a talk on "Extreme problem for integral inclusion".

7. 18.04.2019 – Professor of Baku State University, doct. of phys. Math. Sci. Misreddin Allahverdi oglu Sadigov will give a talk on "Extreme problem for integral inclusion".

8. 02.05.2019 – The Institute of Control Systems of ANAS, Dr., Assoc. Prof. Anar Rahimov "Optimal control of concentrated system on the class of piecewise constant functions with uncertain information on parameters and initial conditions".

9. 16.05.2019 – The acting Candidate of Mathematical Sciences, Associate professor Shakir Yusubov "Some generalizations of the Pontryagin maximum principle in the theory of optimal control".

10. 30.05.2019 – The head of the laboratory “Mathematical problems of control” of the Institute of Control Systems of ANAS, prof. of ANAS, doctor of mathematics Ilgar Gurbat oglu Mamedov “Differentiation and integration of fractional order and illustrative examples and problems about them”.

11. 19.09.2019 – The head research of the department “Mathematical Analysis”, dr. sci. Rovshan Bandaliyev on “An analogue of the Pontryagin maximum principle for optimal control problem described by ordinary fractional order differential equation in weighted Lebesgue spaces”.

12. 03.10.2019 – The head of the laboratory “Mathematical problems of control” of the Institute of Control Systems of ANAS, prof. of ANAS, doctor of mathematics Ilgar Gurbat oglu Mamedov on “On the well-posed solvability of the Neumann problem for a generalized Mangeron equation with nonsmooth coefficients”.

13. 17.10.2019 – The head of the laboratory “Mathematical problems of control” of the Institute of Control Systems of ANAS, prof. of ANAS, doctor of mathematics Ilgar Gurbat oglu Mamedov on “On the well-posed solvability of the Neumann problem for a generalized Mangeron equation with nonsmooth coefficients”.

14. 14.11.2019 – Prof. Kamil Aida-zade will give a talk on “Investigation of the problem of optimal control by a system ODE of block structure with blocks connected only by boundary conditions”.

15. 28.11.2019 – Professor Telman Malikov, "The Necessary Optimality Conditions in Discrete Systems".

About the scientific activities of Ph.D students of the Department

In the reporting year, under the supervision of Corresponding Member of ANAS, Professor Misir Mardanov, doctoral candidacy of Aynur Safarova and phylosophy of doctorate in mathematics of Samin Malik, have been approved by the AAC.

SCIENTIFIC AND SOCIAL ACTIVITIES

Head of the department, professor Misir Mardanov is Chairman of the Dissertation Council D.01.111 and of the Scientific Council of IMM. He is depute editor-in-chief of “AMEA Xəbərləri” journal, a member of the editorial board of “Azerbaijan Journal of Mathematics” and “Chebyshevskii sbornik”, editor-in-chief of “Proc. of IMM ANAS”, a member of the international editorial board of “TWMS Journal of Applied Mathematics” and chairman of Scientific Publishing of ANAS.

The second volume of the “The Azerbaijanis studied of higher institutes to 1920 year” written by director of the Institute of Mathematics and Mechanics of ANAS, corresponding member of ANAS, professor Misir Mardanov and professor Adalat Tahirzade devoted to 100 years of People Republic of Azerbaijan was published.

Head of the department professor Misir Mardanov is Chairman of the Dissertation Council D.01.111 and of the Scientific Council of IMM. He is depute editor-in-chief of “AMEA Xəbərləri” journal, a member of the editorial board of “Azerbaijan Journal of Mathematics” and “Chebyshevskii sbornik”, editor-in-chief of “Proc. of IMM ANAS”, a member of the international editorial board of “TWMS Journal of Applied Mathematics” and chairman of Scientific Publishing of ANAS.

Phd in Physics and Mathematics, correspondign member of ANAS, professor Kamil Aydazadə, chairmanof the labaratory “Numerical methods of decision on the deterministic systems” of ANAS, editor in board in the journal pubslihed in Turkey “Ege University journal of the Faculty of Science”, editor in board in “NASA Proceedings of the İnstitute of Mathematics and mechanics” international journal, the journal published in Russia, “Прикладная математика и фундаментальная информатика”, TWNS “Pure and Applied Mathematics” international journal, Proceedings of İnstitute of Applied Mathematics,

ANAS news (physics-and technology, mathematics), ANAS news (“Problems of Informatics and Control”), editor in board in Azerbaijan State Exam Center journal of “Abituriyent.

Professor Telman Melikov is a member of the AAC Expert Council in Mathematics and Mechanics. Editor in board in **Proceedings of the Institute of Mathematics and Mechanics**.

Doctor of Physical and Mathematical Sciences of Department of Mechanics and Mathematics, BSU, Department of Mathematical Control, professor Hamlet Guliyev is a member of the editorial board of the journal "Modern Mathematical Models and Applications".

Professor Yagub Sharifov is a member of the editorial board of the Proceedings of the Institute of Applied Mathematics.

Professor Ramin Rzayev is a senior researcher at the Institute of Control Systems of ANAS, a member of the editorial board of the Scientific Journal of Automation and Metabolism, a member of the program committee of the International Scientific Conference "Information Systems and Technologies: Achievements and Prospects." Member of “ICSCCW - International Conference on Theory and Application of Soft Computing, Computing with Words and Perceptions” and “ICAFS - International Conference on Theory and Applications of Fuzzy Systems and Soft Computing” program committee of the international conference .

Department’s Senior Researcher Yusif Gasimov is a founder and director of **Jomard Publishing** that issues 8 scientific journals**,** is editor in-chief of international journal “Advanced Mathematical Models and Applications”, journal of “Modern Technology and Engineering” - International journalist member of the editorial board of Applied Mathematics and Information Science - international editorial board, Proceedings of the Institute of Mathematics and Mechanics.

Professor Ramiz Aslanov is a member of the editorial board of the following journals:

1. «Вестник Сыктывкарского университета. Серия 1. Математика. Механика. Информатика». (г. Сыктывкар, РФ)

2. Научно-методический журнал «CONTINUUM. Математика. Информатика. Образование». Елецкий государственный университет им. И.А. Бунина .(г. Елец, РФ)

3. «Вестник Елецкого государственного университета» им. И.А. Бунина . –Серия «Педагогика».(История и теория математического образования) (г. Елец, РФ).

Coordinator of the memorandum between Institute of Mathematics and Mechanics and Unbiversities of Russia since 2016.

(Vologda State University (Vologda), North Arctic Federal University named after M.V. Lomonosov (Arkhangelsk), Syktyvkar State University named after P. Sorokin (Syktyvkar), Moscow State Pedagogical University (Moscow) , Naberezhnye Chelny State Pedagogical

University (Naberezhnye Chelny), Ulyanovsk State Pedagogical University. I.N. Ulyanova (Ulyanovsk)).

Head of department: **Corr. member of ANAS prof.Misir Mardanov**