On semi-annual report of "Computing mathematics and information science" department for 2018.

In the reporting period, the department was working on the approved theme "Development of methodical bases of creation of program complexes for screen representation on three dimensional states phase of controlled trajectories" which included 4 independent research and development.

In the department there are 13 employees: 4 doctors of philosophy, 7 engineers of programmers, 2 laboratory assistants. Two employees conduct scientific research for the degree of Doctor of Sciences.

An internal seminar is systematically held every Wednesday at 11:00. Every Tuesday and Thursday, together with the department "Non-harmonic analysis", a seminar is held within the framework of the program "Some issues of approximation and the methodology of using frames in neural networks."

During the reporting period 4 articles(one in the journal included in the WOS database, another article was published in the journal which is primary base of WOS), 2 teaching manuals, 4 thesis reports have been published by the department staff.

One of the articles was published in a journal with an impact factor of scientific citation: A.G.Nagiyev, V.V.Sadikhov, G.A.Nagiyev. The problem of aperture delay in digital measurement systems and its analytical solution by the matrix exponent method // Measuring equipment, Springer, 2017, V.60, №9, Issue 9, pp 874–880. IF = 0.39.

Another article was published in the journal which is primary base of WOS . E.I. Jafarov, A.M. Jafarova, S.M. Nagiyev, "Existence of a pair of new recurrence relations for the Meixner-Pollaczek polynomials", Tbilisi Mathematical Journal (Thomson Reuters primary base), Vol. 11 (3) (2018), pp. 29-39

Two articles are included in the December issues of the magazines of the Republican editions:

1. *A.G. Nagiyev, F.A. Aliyev, G.A. Nagiyev. Oscillatory control in one class of models in partial derivatives by the criterion of maximum time-averaged quality // Proceedings of the Institute of Applied Mathematics, V.7, 2018.*
2. *2. A.G. Nagiyev, F.A. Aliyev, G.A. Nagiyev. about one problem of choosing the optimal strategy for managing the intensity of production for a given volume of output // News of ANAS, Problems of information and management, Volume XXXVIII, 2018, N4.*

Two methodical manuals are printed:

1. Bilalov B.T., Zabidov Z.J., Nagiyev G.A., Sadigova S.R. Signals, classification. Wavelet analysis. Baku-2018.
2. Bilalov B.T., Zabidov Z.J., Nagiyev G.A., Sadigova S.R. , Gasymov Z.A., Guliev A.M. “Mathematical methods for identifying saline lands using satellite data. Baku-2018.

With the thesis of the report "The solution of the algebraic problem of obtaining a matrix exponent in the problem of accounting for time shifts in digital measurement channels" (A.G.Naghiev, V.V.Sadikhov, G.A.Nagiev) participated in the International Conference "Operators, Functions, and Systems of Mathematical Physics Conference, which was held in Baku at the Khazar University on May 21-24, 2018.ss

On November 15-16, 2018 Gulieva N.A, Nagiev G.A attended international conference organized by Sumgayit State University and Institute of Information Technologies of ANAS,with the thesis namely "Information Systems and Technologies: Achievements and Prospects 2018".

Department employees Hasan Nagiyev, Vugar Sadikhov took a part At the International Conference "Modern Problems of Innovation and Technology of

Appliances and Applied Mathematics" dedicated to the 90th anniversary of academician Azad Mirzazhanzade held in Baku on December 13-14, 2017.In the same conference, employee Ainura Jafarova made a presentation: “On the superposition of the stationary states of the q-deformed quantum oscillator.”

The project "Development of optimally controlled methods for nonlinear dynamic objects under the influence of harmonic and impulsive controls (using the example of oil refining processes)" was presented to the staff of the department. It was awarded in the framework of the Grant Contest of the Science Development Fund "Integration in Science and Education" (60 000 manat). The aim of the project is to study the positive effects and the development of appropriate methodologies, caused by non-stationary control effects, which are important properties of large-scale oil refining processes. The scientific idea of the project is the possibility of expanding the class of optimal management influences by using periodic regimes in industrial dynamic systems that take place due to the existence of a set of stationary states. At present, research has been launched. It is expected that as a result of the project, the efficiency of extraction of petroleum hydrocarbons will increase, which is of great importance in the oil refining industry of our republic.

Within the framework of the scientific-research programs of ANAS, H.Nagiyev continued his work in the project "Some questions of approximation and frames in neural networks" headed by B. Bilalov. Specific software modules have been developed for the use of the spectral channel and indices as an input parameter in order to study the dynamics of the optical depiction of surface objects - (soil and vegetation) by using Aero drawings. Software modules have been tested in the area allocated for practice.

Within the grant competition programs of the Science Development Foundation, A.Jafarova continued working with the staff of the Institute of Physics of ANAS in the project entitled "Spin-orbit effect and additive effects in low-semi-conductor and superconductors: application of topological stabilizers in quantum informatics". For Meyxner-Pollachek multichannels, new pairs of recurrent relations

or finite difference equations were found and their accuracy was proven by direct analytical method.

Successfully conducted the guidance of trainees (all days of the week, 19 students of the Faculty of Applied Mathematics of ASOIU passed scientific and production practice). Employees of the department were attracted to both scientific and practical guidance of trainees. Student interns were divided into three groups, according to the topics:

- Creation of software for enterprise management processes in the field of queuing systems;

- Implementation of software for use in queuing systems in MS Visual Studio;

- Methods for solving equations of mathematical physics in the Matlab environment.

Head of department:

doctor of philosophy in technology, associate professor Hasan Nagiev