**BRIEF ESSAY OF SCIENTIFIC, PEDAGOGICAL AND PUBLIK ACTIVITIES OF ACADEMICIAN OF RK NATIONAL ACADEMY OF SCIENCES A.A. ASHIMOV**

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Abdykappar Ashimovich Ashimov was born on January, 1, 1937, in the Berlik village, Kokterek district, Dzhambul oblast. From 1945 to 1954 he studied at school in Chu, a railway station of the Kazak railway. Like many children of his age he suffered hardships of that time. The youth boy’s desire to make his parents remembered displayed in excellent achievementsat school and his serious attitude to the work. This made him a strong-willed and purposeful man and determined his future way of life.

In 1954 A.Ashimov entered the metallurgical department of the Kazak Polytechnic Institute (KazPTI, now Kazakh National Technical University named after K.I. Satpayev), specialty «Automation of metallurgical processes». His years of studies at the institute revealed his inclination to do research, to learn more about philosophical and human aspects of relations between people. That was noted by many outstanding scientists of the institute who had come to Kazakhstan from Russia to develop science andscientific intelligentsia. In 1960 he graduated from the institute with honors and was recommended a post-graduate student.

Since 1960 to 1963 A.A. Ashimov was a postgraduate student at Moscow Institute of Steel and Alloys at the chair of «Automation of Processing Non-ferrous and Rate Metals», headed by Doctor of engineering, Professor D.I. Lisovsky. Scientist A.A. Ashimov was formed under the influence of well-known Moscow scientific schools of the Institute of Control Problems at the USSR Academy of Sciences and Moscow Institute of Steel and Alloys. Outstanding scientists, academicians such as S.V. Yemelyanov, A.A. Krasovsky, G.S. Pospelov. Y.Z. Tsypkin and others influenced the formation of his scientific interests and life position. In 1964 A.A. Ashimov defended his thesis for candidate’s degree at Moscow Institute of Steel and Alloys on the theme «Research into the shaft smelting of oxidize nickel ores with the help of a mathematical model», specialty 0.5254 «Automation of processing non-ferrous and rate metals production». He carries out fruitful research at a problem laboratory at the Kazak Polytechnic Institute on solving tasks related to prognosis and optimization ofmetallurgicalprocesses using methods of mathematical modeling, identification and adapted control of technological processes in nonferrous metallurgy. At the same time he works as deputy professor, delivers lectures on «Research into operations», «Modeling of systems», «Theory of automatic control». That was the time when A.A. Ashimov, a young scientist, with persistence inherent in him actually studied to establish a basis for future Kazakhstan scientific school in modern automatic control theory.

Since 1965 till 1989 A.A. Ashimov has been in a charge of two chairs «Automation of metallurgical processes» and «Technical cybernetics» organized by him in 1965 and 1971 respectively, at the same time he worked as a scientific supervisor at the problem and sector laboratories of automation control systems. In 1970 he was awarded the medal «For Valiant Labor». In 1972 he defended his doctoral thesis on the theme «Optimal control of non-ferrous concentrates and ores smelting in shaft furnaces», specialty 05.254 – «Automation of processing non-ferrous and rate metals production». In 1973 he was appointed a professor at the «Technical cybernetics» chair.

Since 1976 till 1985 A.A. Ashimov is a Rector of the Kazak Polytechnic Institute. In this period he successfully combines great organization work with pedagogical and scientific activities. Under his management and at direct participation the scientific-methodical and normative base of management by activity of the Higher educational institution on a professional training and carrying out of research works as the Complex control system of quality of preparation of experts (CCSQPE) is developed and takes root into practice within the framework of positions of the modern approach of Management by the project (development). Introduction of the specified system in high school has led to appreciable improvement of quality of training of experts. So, the educational achevements of students from receipt to release have risen. The degree projects with use of elements of scientific researches and devoted to real themes became much more. Efficiency of performance of research works has increased. Results of development and introduction of CCSQPE were widely reported on pages of magazine «Bulletin of the higher school» of USSR Ministry of Higher education. The given work has been marked by silver medal of the Achievements of National Economy Ehibition in Moscow in 1985.

For the achievements on the results of socialist emulation among USSR higher schools in 1981, 1982, 1983 the Kazak Polytechnic Institute was awarded the Red Banner and the 1st grade Diploma of the USSR Ministry of Higher and Secondary Education and the Central Committee of the educators’ Trade Union, as well as Red Banner of the Central Committee of the Kazakhstan Communist Party, Council of Ministers of KazSSR and Kazak Trade Union broad and the Central Committee of Kazakhstan Komsomol.

The great organization work conducted by A.A. Ashimov allowed successful strengthening the material base of the institute. For this period the biggest academic buildings were built as a result.

The systematic and large-scale growth of highly qualified scientific and pedagogical personnel, the number of students, and the strengthening of the material and technical base of the Polytechnic Institute made it possible to organize the Almaty Institute of Architecture and Civil Engineering (1980) and the Rudny Industrial Institute (1977) on the basis of individual faculties and branches.

By the Decree of the USSR Supreme Soviet Presidium of July, 26, 1984 the Kazak Polytechnic Institute was awarded the order of Labor Red Banner for achievements in training highly qualified specialists and development of researches and has been repeatedly admitted the winner of the socialist competition in USSR and Кazakh SSR and has been included in a number of leading high schools of USSR.

A.A. Ashimov is a great scientist, talented pedagogue, skillful organizer in the field of science and education. He successfully helps the development of science control in Kazakhstan; in 1980 he was awarded the title «Honored Scientist of the Kazakh SSR».

In 1989 he was appointed a deputy director of the Mathematics and Mechanics Institute, RK AS, elected a Corresponding Member of the National Academy of Sciences of RK. In the same year he was given the Prize of the Kazakh SSR Council of Ministers in the field of science and engineering.

Since 1991 till 1994 A. Ashimov was a director of the Institute of Informatics Problems and Control of RK National Academy of Sciences. He did a lot of organization work for the new institute developing its research programand orientation of the institute personnel on actual tasks of both fundamental and applied nature. In this period a corresponding member of RK AS A. Ashimov pays much attention to the development of guidelines in the institute’s research and toresolvingactual and urgent tasks in the field of informatics, theoretical and applied aspects of control.

In 1994 by the Decree of the Cabinet of Ministers of RK A.A. Ashimov was appointed a chairman of the Higher Attestation Comission (since 1995 – the State Attestation Committee) of RK where under his leadership and immediate participation there was created again the normative-technical base and adjusted the expert technology for attestation of scientific and scientific-pedagogical personnel of higher qualification that allowed considerably improving quality of attestation of the scientific and scientific and pedagogical staff of the top skills. Simultaneously Abdykappar Ashimovich has been consultant of the Institute of the Informatics and Control Problems of RK Academy of Sciences. Being a great scientist and an expert in the field of technical cybernetics and control systems he is a founder of the national scientific school in this field.

Professor A.A. Ashimov gives a lot of time to training the young researchers. 10 doctoral and 44 candidate theses were defended under his scientific supervision.

Since 1997 till present time Abdykappar Ashimovich is a head of the laboratory «System analysis and control» at the Institute of Informatics Problems and Control of RK National Academy of Sciences, Professor of the chair «Information technologies» at the Kazakh National Technical University named after K.I. Satpayev. The object of A.A. Ashimov’s researches is a control over technical and organizing systems; data and knowledge engineering. He suggested and investigated a number of effective methods of identification; developed theory of automatic control systems with changing configuration and dynamic frequent-impulse modulation; created theory of synthesis of coordinated mechanisms functioning of active production systems.

With his immediate participation and efforts of his disciples K.Sh. Asaubayev, B.A. Djaparov, G.Z. Kaziyev, K.S. Sagyngaliyev, D.Zh. Syzdykov, S.P. Sokolova, G.M. Tokhtabayev, U.A. Tukeyev, D.N. Shukayev, and the others the fundamental researches into the theory of identification and modern theory of automatic control and organization systems have been carried out. The results of these studies laid the foundation of the algorithmic provision for automation control over complexes and individual inertia continuous technological processes subsystems for operative scheduling of industrial activities of enterprises with continuous and discrete nature of production scheduling of technical maintenance and repairs of the automatic control equipment.

High erudition in the field of identification and average standard of differential equations made A.A. Ashimov possible to carry out theoretical explorations in searchless identification of one-dimensional and multi-dimensional continuous dynamic control units with the use of simplified algorithms for changing the parameters of the models with the purpose of synthesis of the simplified searchless algorithms. There were shown ways of reducing differential equations describing the dynamics of processes in the search system of automatic identification with simultaneous detecting to a standard form. By means of the theory of averaging the standard differential equations there were revealed the average motions and obtained simplified searchless algorithms of identification for quasistationary and forced modes. By Lyapunov’s second method they revealed the stability conditions for the searchlessidentification of one-dimensional and multi-dimensional control objects. The results of the research are summarized in searchless discrete systems of identification for which with the use of discrete analogue of Lyapunov’s second method they revealed the conditions of stability and asymptotical stability of the identification system.

Comprehensive and profound researches allowed proposing a new method of identifying the complex multi-dimensional systems named the general parameter method. The constructive theory of the method was worked out; the algorithms of the parameters assessments were synthesized; convergence conditions and its speed were determined. Accuracy assessments of the proposed identification algorithms were obtained. On the basis of general parameter method combined methods of multi-parametrical objects assessment were developed. The effectiveness of the proposed method wasdisplayed in comparison with well-known multi-dimensional objects identification methods in the class of Volter’s functional rows.

Works in the field of economic systems regulation are of great economic importance. Macro-analysisof transforming macro-economic system presented as various equations and recurrent relationships. This model and method allow assessing the impact of the mechanisms for state regulation on the changes of the economic system and convenient for program implementation have been developed. Methods of analysis of nationalization and privatization processes, model of dynamics in the fixed assets and labor resources in the country and models of assessing the impact of privatization on changes of the economic system have been developed.

Experimental system of information and appropriate technology for imitation modeling and analysis of the economic system development and for assessing the impact of various mechanisms of state regulation on the economic system have been created.

In the field of automatic control theory the fundamentals of stochastic theory of frequency and impulse equations of ITO type and Volter functional rows have been developed as well as method for stochastic stability exploration, statistical analysis and synthesis of systems belonging to this class.

The researches done by A.A. Ashimov and his employees in the field of analysis and synthesis of systems with changing configuration are of particular importance. Theoretical and methodological basis for research and design of automatic control systems with changing configuration for automation of technological complexes have been developed, as well as constructive approach to controlling multipurpose modes of operating of technological complexes in case of violated technical provisions and dynamic emergency situation.

For the technological complex algorithms for selecting coordinated modes of operation of individual objects of control have been developed and the conditions of convergence algorithms in controlling technological complexes have been confirmed.

Theoretical basis, modes and methods of automatic designing of data base and programs complex of real-time systems have been created.

The theoretical results obtained laid the foundation for mathematical provision for automatic system of researches and design developed in the framework of target programs coordinated by the USSR State Committee on science and ingeneering.

In the field of organization system of control methodology of describing the mechanisms of operating of multi-level active production systems and ways of their improvement – synthesis of optimal mechanisms of on the basis of utilization of coordinated planning principles have been developed, as well as mathematical models and methods for optimal coordinated planning of key production activities of a wide range of scheduling of technical mint and repairs of equipment providing reliable information in the situation uncertainty. The task of synthesizing and optimal coordinated systems of stimulating active elements in case of limitation have been solved.

Models and analysis of synthesis of model systems of data processing have been developed.

A.A. Ashimov paid much attention to the development of applied science in the field of technological and manufacturing processing automation. In this connection in 1980 A.A. Ashimov set up a fieldresearch laboratory «Automatic control system in nonferrous metallurgy» and became its scientific leader.

Alongside with successful theoretical exploration A.A. Ashimov headed and took an active part in the development and introduction of a number of automatic control systems of the technological and production system processes at Chimkent Lead Plant, Ust-Kamenogorsk Lead and Zink Kombinat, Balkhash and Zhezkazgan Copper Smelting Plants and Aktubrentgen Production Amalgamation.

In 1989 he was awarded the title of the Kazak SSR Council of Ministers Prize Laureate in the field of science and engineering for the development and putting into operation the automatic control system of the gas tracks and dust absorbing at Zhezkazgan Copper Plant.

Now together with colleagues he develops the Theory of parametrical regulation of development of market economy. The received results are at a junction of theories of the dynamic systems, differentiated displays, information technologies and the macroeconomic theory. Difference of the given work from known one in the literature is in the development of new methods of testing of mathematical models on an opportunity of transferring the results received on their base in a subject domain, development of some multy-country macroeconomic models and in creation of new information technologies of calibration, testing of mathematical models, and also the macroeconomic analysis and development of recommendations in sphere of economic policy.

Utility and promotion of the works is both in the development of applied mathematics and macroeconomic theory, and in the development of effective information technologies of a world level for the macroeconomic analysis and development of recommendations in the sphere of optimum economic policy.

Results of the development of parametrical regulation theory are approved in far abroad: 65 reports at the international scientific forums and 85 publications on pages of scientific magazines, books and works of the international conferences. The common number of publications is 184, among them are 8 scientific monographs (3- Springer and 3 - Physmatlit). Reviews of the monographs are published in magazine «Automatics and telemechanics». Scientific proceedings are awarded «The Outstanding Paper» prize of magazine Kybernetes (Great Britain) for the best report submitted on 15 International Congress on cybernetics and systems (WOSC 2011) in Nanking (Chinese People's Republic).

Results of work also have been submitted as 5 reports at panel session «Macroeconomic policy, implements of macroeconomic forecasting and regulation» of V Аstana economic forum (May, 2012), 4 reports at the panel session «Мacroeconomic analysis, parametrical regulation and state policy within the framework of the regional economic unions» of VI Аstana economic forum (May, 2013), 4 reports at the panel session «Мacroeconomic analysis and parametrical regulation of the regional economic unions» of VII Аstana economic forum (May, 2014) organized by the Кazakh National Research Technical University named after K.I. Satpaeva. The Nobel economy prize laureates of 2004 such as Finn Kidland (2012, 2014) and Edward Preskott (2012) have taken part in the work of panel session on economy, also Dzheffri Forrest – Professor of mathematics, economy, finance and sciences about systems of university Sleeperry-Rock (USA) (2013), А.R.Bachtizin, the Russian Academy of Sciences corresponding member, Doctor of economic sciences, Professor, the deputy director on scientific work at the Central Economic and Mathematic Institute, the Russian Academy of Sciences (2013), V.N. Burkov – Doctor of technical sciences, Professor, the State Prize of USSR laureate, the Council of Ministers prize of USSR laureate, Honored scientist of the Russian Federation, head of the laboratory at the Institute of Management Problems of the Russian Academy of Sciences (2014).

Results of the long-term creative activity of the scientist are represented in more then 490 works, among them monographs – 25, patents – 14. The works published by him are traced in Elsevier, one of the largest publishing houses of the world, Scopus, unified abstract base, search systems Scirus, Google Scholar, the all-Russian mathematical portal Math-Net.ru and others**.**

The h-index of A.A. Ashimov, academician of RK NAS is equal 7.

Many of these works were represented at the international forums. For example, only for the last 5 years since 2012 the work have been submitted at 29 international scientific conferences in the countries distant and near abroad, including at the Congress of the World Systems and Cybernetics Organization (2017, Rome, Italy), the International conference on the numerical analysis and applied mathematics (2015, Brazil), the World congress on engineering and computer sciences (WCECS, 2014, San Francisco, the USA), the 16th Congress of the World Systems and Cybernetics Organization (2014, Columbia), the 2nd International conference on information technologies and quantitative management, ITQM (2014, Moscow, the Russian Federation), the International conference on management and applications, IASTED (2013, Honolulu, USA), the International conference on modelling, identification and management, IASTED (AsiaMIC 2013, Рhuket, Тhailand), the International conference on modelling, identification and management, IASTED (MIC 2013, Innsbruck, Austria), the International conference on modelling, IASTED (MS 2012, Banff, Canada), the International conference on applied modelling, IASTED (АSМ 2012, Naples, Italy), the International conference on management and applications, IASTED (2012, Crete, Greece), the International conference IASTED on modelling and identification, (2011, Pittsburgh, USA), the International conference IASTED on modelling and identification (2011, Calgary, Canada), the International conference IASTED on intellectual systems and management (ISC, 2011) (Cambridge, the Great Britain), etc.

АbdykapparAshmovich combined his pedagogical and scientific activities with active social work. He was a deputy of the Alma-Ata City Council of People's Deputies of two convocations, a member of the Commission on adaptive control systems and automation of designing Systems of Control in the framework of the Complex Program (Cybernetics) at the President of the USSR Academy of the Sciences, chairmen of the Kazakhstan Regional Group and a member of the USSR National Committee on Automatic Control, a member of the Committee on State Prizes in the field of science and engineering, editor of the interinstitute collection of Scientific articles on Informatics Control and Technical Cybernetics.

A.A. Ashimov is a man of high education, profound knowledge, exclusive ability to work and exactingness towards himself and other people. These features of an expert and organizer science are combined with such excellent traits as kindness willingness to understand another person and to support him. His merits are confirmed by the Order «Friendship of Peoples», «Diploma» of the Supreme Soviet Presidium and the Medal «For Valiant Labor».

AbdykapparAshimovich is the most published and citing author in the field of system engineering and mathematic modeling. Over 50 weighty results of author’s collective under A.A. Ashimov’s supervision have been published in the transactions of world known international scientific forums and magazines of USA, Canada, Great Britain, CPR, Austria, Russia and others for the last eight years. At XV International congress of the World Organization of Systems and Cybernetics (WOSC) the scientific report of A.A. Ashimov and his co-authors was awarded the high prize «For Outstanding Paper».

A.A. Ashimov is a great scientist, talented pedagogue, skillful organizer in the field of science and education. He is capable to advance and to resolve important scientific and economic tasks. He successfully promotes the development of science in Kazakhstan. A.A. Ashimov’s merits in the field of his scientific and practical activities became the reason to award him the title «Honored Scientist of Kazakh SSR» in 1980. In 2003 A.A. Ashmov was elected a Member (academician) of the RK National Academy of Sciences. Since 1993 – on present time he is the President of the International Academy of Information, in 1996 was elected the full member of the International Academy of the Higher School, the International Academy of Nonlinear Sciences. Since 2015 on present time he is a member of the National scientific council of the RK Ministry of Education and Science. Since 2014 A.A. Ashimov is a member of the editorial board of «Advances in Systems Science and Application» magazine, USA, since 2015 - a member of the editorial board of «Proceedings of the St.-Petersburg Institute of Computer Science and Automation, Russian Academy of Sciences» magazine. The founder is the St.-Petersburg Institute of Computer Science and Automation of the Russian Academy of Sciences (Saint Petersburg).

In 2006 for oustanding achievements and merits A.A. Ashimov was awarded «Parasat» order, in 2012 – «Barys» order of the second degree.

**ASHIMOV ABDYKAPPAR ASHIMOVICH**: **Biobibliographical index** / Compiled by Yu.V. Borovsky, B.A. Aisakova. Bibliogr. editors: Т.V. Vdovukhina, G.I. Belgibayeva, A.Zh. Sakanova. – Аlmaty: «Gylym оrdasy» RSE Central Scientific Library, 2017. – p.: portr. [«Biobibliography of scientists of Kazakhstan» series].

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