110th anniversary of the outstanding scientist corresponding member of the Academy of Sciences of the Republic of Kazakhstan ENGVAN INSUGOVICH KIM (1911–1994)

In November 2021 it was the 110th anniversary of the birth of the outstanding Scientist, Doctor of Science in Physics and Mathematics, Professor E.I. Kim, who made a significant contribution to the development of mathematical science in Kazakhstan, created a school for the study of equations of mathematical physics and raised many students who continue his research.

Yengvan Insugovich Kim was born on November 12, 1911 in the village of Ust-Sidimi, Khasansky District, Primorsky Territory, into a Korean family, the family of Insug Kim (who came from peasants, then became a railway worker).

In 1929, after graduating from a seven-year school, he entered the Nikolsko-Ussuri Korean Pedagogical Technical College in the mathematical department. After graduating with honors in 1932 from the College, he, on the advice of a teacher (according to E.I., who noticed the mathematical abilities of a young man), decided to continue his studies at Moscow State University. As Yengvan Insugovich later recalled, the road to Moscow took about a month, and on the way, he ate mainly fried grain taken from home. Arriving in Moscow, Yengvan, almost not knowing Russian, but having received excellent marks in mathematics and physics, entered the Faculty of Mechanics and Mathematics of Moscow State University. Years of hard study, language learning, attendance at scientific seminars began under the guidance of scientists, well-known to all mathematicians: A.N. Tikhonov and S.L. Sobolev.

In 1937, Kim graduated from the University with honors and was sent to work at the Vladivostok Korean Pedagogical Institute, where he arrived with his wife. But unfortunately, in the same 1937, almost the entire Korean diaspora was resettled from the Far East to Central Asia (mainly Kazakhstan, Uzbekistan, Kyrgyzstan).

Yengvan Insugovich also left Vladivostok for Kazakhstan and was hired by the Kyzyl-Orda Pedagogical Institute (KPI), where from 1937 to 1945 he held both teaching and administrative positions and also spent a lot of time doing mathematical research. The first field of his scientific researches (suggested to him by S.L. Sobolev) was the determination of solvability conditions for general boundary value problems for harmonic functions.

For the results obtained, E.I. Kim, after defending his dissertation in 1942 on the topic: "The Hilbert problem for a multi-connected domain", awarded the degree of Candidate of Science in Physics and Mathematics. The defence took place in the Academic Council of the United Ukrainian University, which was evacuated in the Kyzyl-Orda at that time. In 1943, he received the academic title of Associate Professor.

In 1945, E.I. Kim went to work at the S.M. Kirov Kazakh State University in Alma-Ata, as the head of the Department of Geometry, and supervises the scientific work of graduate students. In 1951, he moved to Rostov-on-Don, where he worked as the head of the Department of Geometry and Dean of the Faculty of Physics and Mathematics of the Pedagogical Institute.

From 1953 to 1956 he was a postdoc student at the Mathematical Institute of the USSR Academy of Sciences named after V.A. Steklov in Moscow. His scientific adviser was the outstanding mathematician I.N. Vekua, later Academician of the AS USSR.

In 1956, after completing his doctoral studies, E.I. Kim moved to Ukraine, where he has maintained good scientific contacts since defending his PhD thesis. He was the head of the Department of Higher Mathematics at the Kharkov Polytechnic Institute, and still devotes a lot of time to scientific research.

In 1959, he defended his thesis for the title of Doctor of Science in Physics and Mathematics "On a class of singular integral equations and some problems for piecewise homogeneous materials". Such equations arise, in particular, when solving boundary value problems for the heat equation with piecewise constant coefficients by the method of thermal potentials. As Yengvan Insugovich himself notes in his dissertation, similar integral equations were studied earlier, in particular, in the works of A.B. Datsev and G. Mintz, where it was stated that they can be solved by the method of successive approximations, since they are similar to Volterra equations

of the second kind. However, in a work published in the DAN USSR back in 1953, E.I. Kim showed, that this is a special class of singular equations for which successive approximations do not converge to a solution. In the following works, which became the basis of the dissertation, he proposed and substantiated regularization methods, and also determined the exact upper bounds for the spectrum of the main integral operator of these equations. These studies are a significant contribution to the theory of Voltaire integral equations, since they define a special class of equations that have the properties of the Fredholm's equations.

In 1960, E.I. Kim received the academic title of Professor. Being in Kharkov, he along with teaching and scientific work, maintained close ties with Kazakhstan, supervised postgraduate students from the Kazakh State University. Among his first students, who then defended Candidate of Science dissertations, were B.B. Baimukhanov, L.P. Ivanova, Sh.T. Irkegulov, K.K. Kabdykairov, S.A. Usoltsev. The next group included A.A. Askarov, L.Zh. Zhumabekov, V.H. Ni, M.O. Orynbasarov, S.N. Kharin. After returning to Kazakhstan, many of them worked as teachers in various universities and continued their scientific research.

In 1964, E.I. Kim was elected a corresponding member of the Academy of Sciences of the Kazakh SSR, moved to Alma-Ata, and from that time the Kazakhstan period in his life began, which lasted until its end. The main part of this time was devoted to scientific work, teaching and training of scientists. Basically, owing to his efforts, in 1964 the Laboratory of Equations of Mathematical Physics (EMPh) was created at the Institute of Mathematics and Mechanics of the Academy of Sciences of the Kazakh SSR, as well as Department of EMPh at the Kazakh State University. For a number of years he headed both of these divisions. Then he worked in them as a leading researcher and professor. At the same time, E.I. Kim organized a citywide weekly scientific seminar on the equations of mathematical physics, which played an important role in the training of mathematical scientists in the country. He was a brilliant lecturer. At his lectures, there were always many participants and visitors, who also reported the results of their works. These were not only graduate students but also students of Kazakh State University, and teachers from other universities in Alma-Ata and other regions of Kazakhstan, scientists.

These initiatives of E.I.Kim and the results achieved by the graduates of the EMPh department, members of the EMPh laboratory, participants of the seminar, made a significant contribution to the development of mathematical researches on partial differential equations in Kazakhstan, as well increasing their level. For instance, an member of the EMPh laboratory Dr M.T. Jenaliyev, after defending his doctoral dissertation, for a number of years was the head of the Institute of Mathematics (IM) of the National Academy of Sciences (NAS) of RK in Almaty. The graduate of the Department of EMPh, Doctor of Sci. in Physics and Mathematics E.S. Smailov headed the Institute of Applied Mathematics in Karaganda. One of the first students of E.I. Kim, who also worked at KazSU and in the laboratory of the EMPh – S.N. Kharin became an academician of the NAS RK, other students and employees of E.I. Kim worked as teachers in universities in many cities of Kazakhstan.

It can be noted that at Karaganda University, in addition to Dr. E.S. Smailov, (and are working) Doctor of Sci. in Physics and Mathematics M.I. Ramazanov, Candidates of Sci. in Physics and Mathematics – T.E. Omarov, S. Mataev, M.A. Pervertun also worked. Candidate of Sci. K.K. Kabdykairov was the vice-rector of the Semipalatinsk University (at that time – the Pedagogical Institute), etc.

The E.I.Kim's followers continued researches related to the above singular integral equations. Significant results in the theory of partial differential equations and their applications are associated with their names. These are singular integral equations, initial-boundary value problems for parabolic equations and for equations with discontinuous coefficients, nonlinear problems with free boundaries, and problems in angular and degenerate domains.

Of especial interest to E.I. Kim has always been challenged by tasks to which ordinary research methods are not applicable, which do not fit into a general theory, and for their solution it is necessary to show ingenuity and apply non-standard approaches.

The results of E.I. Kim in the theory of singular integral Volterra-Fredholm's equations were further developed and have got numerous applications in his joint work with students, while the research topics were significantly expanded. In particular, together with B.B. Baimukhanov, L.P. Ivanova, K.K. Kabdykairov, V.H. Ni, L.Zh. Zhumabekov, S.E. Bazarbaeva and others have studied various initial boundary value problems for equations and systems of equations of parabolic type; with E.M. Khairullin, T.V. Nekrasova studied boundary value problems with boundary conditions containing high-order derivatives of the sought functions; methods for solving problems for parabolic equations with discontinuous coefficients were developed, M.A. Abdrakhmanov, Sh.A. Kulakhmetova, V.H. Ni, F.G. Biryukova, K.D. Kulekeev, R.N. Kantaeva and others. then were effectively used in solving problems of conjugation of various types of equations.

A special class of singular integral equations generated by boundary problems for degenerate domains with

moving boundaries. In this direction E.I. Kim and his students S.N. Kharin, G.I. Bizhanova, , M.I. Ramazanov, M.T. Jenaliyev, T.E. Omarov, A.A. Kavokin, U.K. Koylyshov, S.S. Domalevsky obtained a number of complete results on the solvability of such problems.

It should also be noted the significant results obtained by Doctor of Sci M.O. Orynbasarov in the investigations of boundary value problems for equations of parabolic type in domains with corner points or edges (in the multidimensional case).

E.I. Kim paid great attention to nonlinear problems, problems with free boundaries, in particular, the Stefan problem with the domain degenerating at the initial moment of time, for which asymptotic, as well as analytical methods of solution were developed. worked with him in this direction S.N. Kharin, A.A. Kavokin, Ya.A. Krasnov, G.I. Bizhanova.

In the laboratory of EMPh of the Institute of Mathematics of the AS of the Kazakh SSR, apart from fundamental research, another direction of research was formed – applied, which originated in the years of E.I. Kim at KhPI. It was headed by S.N. Kharin, now an academician of the NAS of RK. Developed methods for solving boundary value problems for heat equations are widely used in applied problems, in particular, in the theory of electrical contacts have been published in monographs. In this direction significant results were obtained in joint work with D.U.Kim, M.A. Perevertun, S.P. Gorodnichev, A.T. Kulakhmetova, Yu.R. Shpadi, S.S. Domalevsky and other students of E.I. Kim and S.N. Kharin.

In total E.I. Kim personally published and co-authored about 130 scientific articles, many of which were published in central mathematical journals, as well as two monographs (co-authored), made reports at International, All-Union, Republican conferences. He prepared 36 candidates of science in physics and mathematics, 7 of his students received the degree of Doctor of science in Physics and Mathematics.

E.I. Kim did a lot of additional public work. He was a member of the NAS RK Problem Council on physical and mathematical sciences, member of the Specialized Council for the defense of dissertations, the editorial council of the All-Union "Engineering-Physical Journal the journal "Proceedings of the Academy of Sciences of the Kazakh SSR. Series of Physics and Mathematics".

For great merits in the development of mathematics in Kazakhstan, as well as for fruitful public-pedagogical activity, E.I. Kim was awarded the title "Honoured Worker of Science of the Kazakh SSR awarded the Certificate of Honour of the Presidium of the Supreme Council of the Kazakh SSR, and inscribed in the "Golden Book of Honour"of the Kazakh SSR.

E.I. Kim passed away on December 14, 1994 due to a serious illness. Until the last minute, his wife Claudia Semenovna Kim and their daughter Evgenia looked after him. He lived a wonderful life filled with work, creative searches. The affair he served all his life lives and continues to develop by his students and followers.

More detailed information about the remarkable mathematician E.I. Kim can be found in publications:

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Editorial board of the journal
«Bulletin of the Karaganda University. Mathematics series»

List of the main published works of E.I. Kim

Books

1 Математические модели тепловых процессов в электрических контактах. — Алма-Ата: Наука, 1977. — 236 с. (совместно с В.Т. Омельченко и С.Н. Хариным).

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