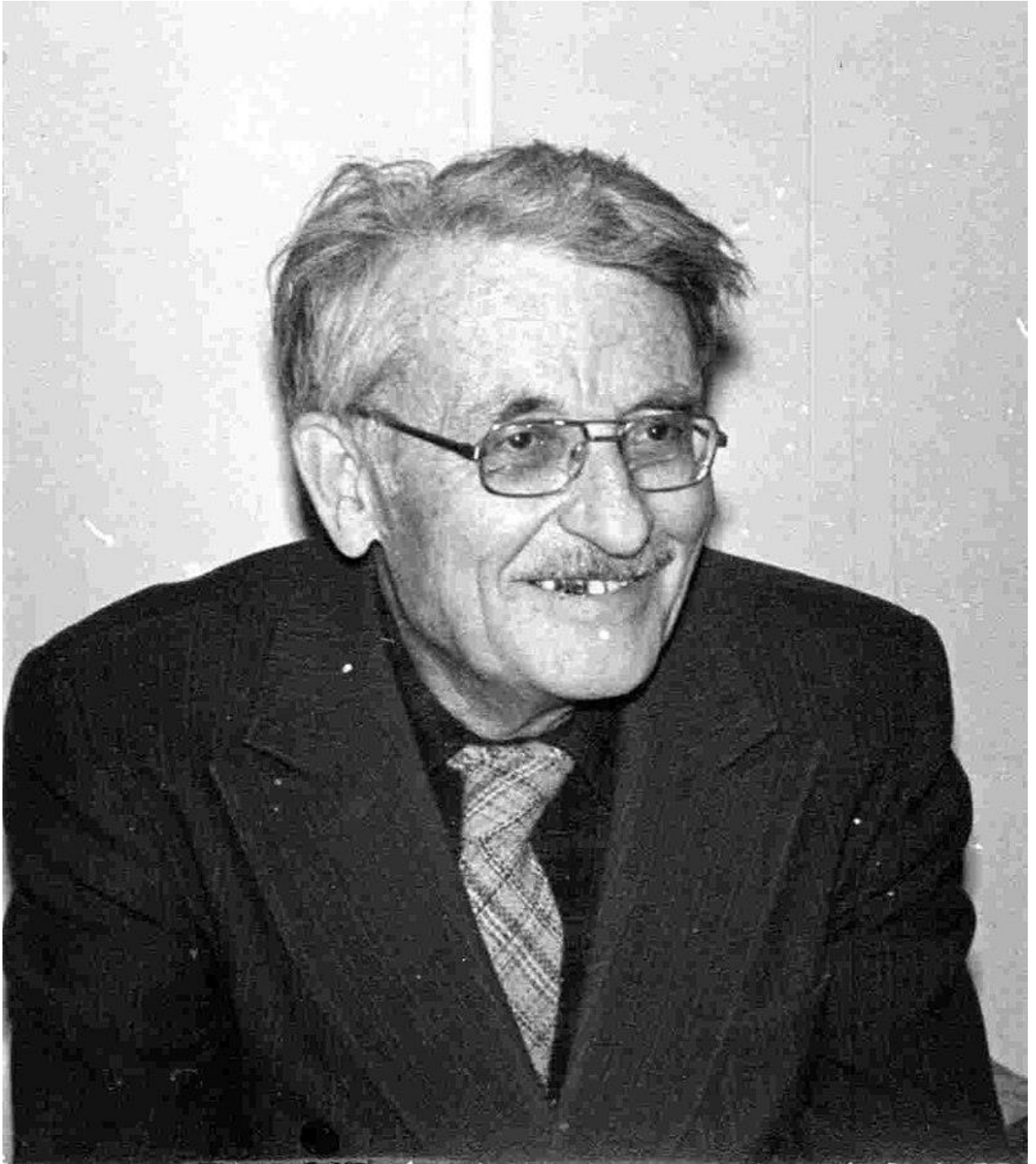# Mark Konstantinovich Gavurin

Mark Konstantinovich Gavurin was born on November 16, 1911. At the age of 20, M.K. Gavurin entered the Faculty of Physics and Mathematics of Leningrad University, with which, with the exception of the war years, his entire life was connected. The first scientific work of M.K. Gavurin, carried out under the direction of G.M. Fichtenholtz while still in his second year and published in the Polish journal *Fundamenta Matematicae*, refers to the classical Lebesgue theorem on the equi-absolute continuity of integrals. In 1936, immediately after graduating from the

university, Mark Konstantinovich was left in the graduate school of the Department of Mathematical Analysis, and then became an assistant in this department. In 1940 he defended his Ph.D. thesis "On the construction of differential and integral calculus in Banach spaces". From 1941 until the end of the war, M. K. Gavurin served in the anti-aircraft troops. In 1945, Captain Gavurin was elected Associate Professor of the Department of Mathematical Analysis. Even before the war, M.K. Gavurin introduced into consideration the Stieltjes integral of an abstract function and with its help established the general form of a linear functional in the space of continuous functions with values in a Banach space, developed an algebraic apparatus of multiple linear functionals. After the war, his studies in functional analysis were continued. In particular, he proved the existence theorem for an abstract antiderivative function and studied abstract power series in which the role of coefficients is played by multiple linear operators. This stage of activity is reflected in the large article "Analytical Methods for the Study of Nonlinear Functional Transformations" *in Scientific Notes of Leningrad State University (1950)*, as well as in the work *"Nonlinear Functional Equations and Continuous Analogs of Iterative Methods", Izv. universities. Mat., 1958, no. 5.* In the fifties, there was a growing general interest in computational mathematics. When L.V. Kantorovich initiated the use of functional analysis in computational mathematics, Mark Konstantinovich was one of the first researchers in this direction. In 1950, he suggested using the best approximation operator polynomials to speed up the convergence of iterative processes. This work has become a classic (*M.K. Gavurin, "Application of best approximation polynomials to improve the convergence of iterative processes", Uspekhi Mat. Nauk, 5:3(37) (1950)).* In 1948, L.V. Kantorovich and M.K. Gavurin created a specialization of computational mathematics at the Department of Mathematical Analysis, on the basis of which the Department of Computational Mathematics was formed in 1951. Professor V.I. Krylov (1902-1994) became the first head of the Department of Computational Mathematics After his departure to Minsk, the department was headed by L.V. Kantorovich. In 1957, Mark Konstantinovich headed the computer center of the Leningrad State University that appeared at that time, and after the departure of L.V. Kantorovich to Novosibirsk, M.K. in 1960 became the head of the Department of Computational Mathematics (1960-1970). In parallel with his work at Leningrad State University, starting in 1940, M.K. Gavurin works as a senior researcher at LOMI Academy of Sciences of the USSR. Here, together with V. N. Faddeeva in the fifties, he supervised, in particular, the calculation of Bessel tables. The main areas of work of M.K. Gavurin in the field of computational mathematics were: acceleration of convergence of iterative methods; construction of algorithms for

calculating eigenvalues and eigenvectors based on perturbation theory; creation of an effective method of "false perturbations"; construction of iterative methods for solving nonlinear functional equations (one of the strongest existence theorems for the latter was published by him in 1959); solving ill-posed problems and applying regularization methods for the rehabilitation of unstable methods for solving well-posed problems; general issues of assessing the quality of approximate calculations, including those using the concepts of information theory. The latter formed the basis of a doctoral dissertation defended in 1964. (Opponents: academician L.V. Kantorovich, academician Yu.V. Linnik, professor S.M. Lozinsky).

No less important than the creation of new algorithms is the formation by M. K. Gavurin of general views and concepts. His book "Lectures on Methods of Computation" (1971) is the first textbook in the world literature, where the presentation is based on the general functional-analytical scheme of approximate methods, the beginnings of which were outlined in the book by L.V. Kantorovich and G.P. Akilov "Functional analysis in normed spaces". In 1969, M.K. Gavurin headed the scientific and methodological preparation of the creation of the Faculty of Computing Department. The Department of Computational Mathematics opens training for students in operations research and computer programming. As a result of the development of this training, two new departments separated from the department. Mark Konstantinovich takes over the leadership of the newly formed Department of Operations Research. The problems of mathematical economics, however, were not new to him - they were written jointly with L.V. Kantorovich in 1940 and published in 1949 the work "Application of mathematical methods in the analysis of cargo flows" is included in the classics of this direction. M.K. Gavurin was one of the lecturers of the famous "sixth year" at the Faculty of Economics of the Leningrad State University, from which the training of economists who mastered the mathematical methods of research began, and for a long time he was a member of the Methodological Council of the Mathematical and Economic Department of the Faculty of Economics. He organized a popular seminar on operations research in the city, in which not only mathematicians but also economists and engineers took part. Already at the age of seventy, M.K. Gavurin successfully worked in areas of mathematical programming that were new to him, obtained new results in quadratic, linear-fractional, and parametric programming. Mark Konstantinovich is one of the last representatives of the Petersburg-Leningrad mathematical school. He was very demanding of himself and his students, but at the same time, he showed so much respect for each person that it lifted and helped him meet the requirements.