

This issue of the journal consists of the proceedings of an international conference dedicated to the 100th anniversary of the birth of Academician Nikolai N. Yanenko (1921-1984).



Nikolai Nikolayevich Yanenko is an outstanding mathematician and mechanic, a scientist with a very wide range of scientific interests. Nikolai Nikolaevich was born on May 22, 1921 in Kainsk (now Kuibyshev, Novosibirsk region). In 1942, he graduated early with honors from Tomsk State University, received the specialty "teacher of mathematics," was drafted into the army and in November was at the Leningrad front. In 1946, he became a graduate student of the well-known geometer P. K. Rashevsky. The results of N. N. Yanenko's research described in his Candidate's thesis (1949) and Doctor's thesis (1954) allowed him to create a theory of surface bending signs. In 1948, N. N. Yanenko started working in the group headed by the academician A. N. Tikhonov on the new applied problems in physics and mathematics. His investigations on asymptotic properties and solutions for the generalized Thomas-Fermi model were in fact the first in the world that provided the basis for his method of constructing interpolation formulas for the equation of state for substances in a broad range of pressure and temperature. N. N. Yanenko developed the method of differential relations for the construction of partial solutions, which made it possible to solve a number of one- and multidimensional problems of continuum mechanics. He had studied the parabolic equations with alternating viscosity that describe turbulent flows. He had suggested a method of artificial compressibility for modeling the flows of viscous incompressible fluid that allowed to reduce the Navier–Stokes equations describing these flows to the equations of the Cauchy–Kovalevsky type. N. N. Yanenko's main achievement in the field of computational mathematics is the creation and justification of the fractional step method (splitting method), which makes it possible to construct economical finite-difference schemes for solving multidimensional systems of equations. He also proposed a method of differential approximation of difference schemes for the construction and investigation of algorithms with specified prop-

erties. In order to improve the accuracy of the solution of hydro- and aerodynamics problems in regions of complex geometry, N. N. Yanenko developed a new approach to the construction of computational grids that allowed him to formulate the concept of information environment as a set of initial differential equations and control equations for the grid that automatically adapted to the solution. N. N. Yanenko was the first to suggest that the difference scheme be considered as an independent object of research — a mathematical model adequate to a particular physical model. N. N. Yanenko is one of the creators of the scientific discipline he named mathematical technology (mathematical modeling). He proposed the idea of creating specialized computing devices, focused on solving a certain class of problems. N. N. Yanenko developed the basic principles of modular analysis, defined the module and the package of applied programs, carried out their classification. He was one of the first who evaluated the great role of paralleling and creating supercomputers with very high performance. He showed that there is an interrelation between the structure of algorithms and the structure of a computer. N. N. Yanenko noted that the development of mathematical modeling was connected with the need to solve large problems, to create computer-aided design systems and parallel computers. N. N. Yanenko obtained most of the above results in Novosibirsk Akademgorodok after he moved from Chelyabinsk-70 (now Snezhinsk), where he headed the mathematical department of the All-Russian Research Institute of Technical Physics. Since 1963 he was working as the head of the department of Computational Center of SB AS USSR, and since 1976–1984 he was the director of the Institute of Theoretical and Applied Mechanics of SB AS USSR. N. N. Yanenko had an outstanding ability to take the responsibility for solving the problems, in which he was not an expert before, but which needed to be solved. Each time this resulted in new ideas, reevaluation of methods, and new results in fundamental science. A considerable place in the activity of N. N. Yanenko was occupied by the training of scientific personnel. He lectured in Moscow, Ural and Novosibirsk state universities. Among the students of N. N. Yanenko, there are four academicians, dozens of doctors and candidates of sciences. He is the founder of the department of numerical methods for continuum mechanics (currently, the department of mathematical modeling) at the Faculty of Mechanics and Mathematics of Novosibirsk State University (NSU); he was the head of the department of physical kinetics at the NSU Faculty of Physics. A classic word combination of Novosibirsk Akademgorodok, is the famous "ring of seminars" of Academician N. N. Yanenko. After his arrival in 1963 to Novosibirsk Akademgorodok, he managed to conceive, organize and implement the business, which is successfully continued by his students and followers today. That was the time when the all-union seminars on the numerical solution of the problems of viscous incompressible fluid, on the numerical solution of the problems of multiphase incompressible fluid filtration, on the numerical solution of the problems of elasticity and plasticity theory, on the analytical methods in gas dynamics, on the sets of programs for the problems of mathematical physics, on the models of continuum mechanics began their work. The seminar on numerical solution of elasticity and plasticity theory problems began its work with the active participation and support of another legendary Akademgorodok personality, E. I. Shemyakin, head of the department of elasticity and plasticity theory at NSU, director of the Mining Institute of the SB AS USSR, who later, as well as N. N. Yanenko, became an academician. The combined efforts of these outstanding specialists and their students and associates in the field of deformable solid mechanics and computational mechanics produced a synergetic effect: the research at the junction of two relevant branches of science proved to be very effective and productive. All-Union seminars created by N. N. Yanenko attracted researchers with a variety of scientific topics and benevolence of its participants. In 1966, N. N. Yanenko was elected a corresponding member of the USSR Academy of Sciences and in 1970 — a full member of the USSR Academy of Sciences. The life of N. N. Yanenko is an example of selfless service to science. For his outstanding services in scientific and organizational activities N. N. Yanenko was awarded the title of the Hero of Socialist Labor in 1981, he is a laureate of three State Prizes, was awarded the Lenin and Red Star Orders, other orders and medals.