Igor Rostislavovich Shafarevich

$$\Longrightarrow\!\!\circ\!\!\sim\!\!\circ\!\!\Longleftarrow$$

(03.06.1923 – 19.02.2017)

The great Russian mathematician Igor Rostislavovich Shafarevich died on February 19, 2017. This news grieved the whole mathematical society, since his name was inseparably linked to so many outstanding achievements and ideas of the modern mathematics, especially number theory and algebraic geometry.

Igor Shafarevich was born in Zhytomyr on June 3, 1923. After the ninth grade of secondary school he was admitted to the last year of the Department of Mecanics and Mathematics of the Moscow State University wherefrom he graduated in 1940. His first advisors in mathematics were B. N. Delone, I. M. Gelfand and A. G. Kurosh. In 1942 he was awarded his candidate's degree (Ph. D.) for an investigation on absolute values in topological fields (supervisor A. G. Kurosh). Just after that, inspired by B. N. Delone, he started his work on Galois groups of fields of algebraic numbers and algebraic functions. In 1946 he was awarded the degree of Doctor of Sciences for these investigations. In particular, he described all p-extensions of the fields of $\mathfrak{p}$-adic numbers and non-ramified p-extensions of the fields of algebraic numbers. An outstanding achieve-

ment of Shafarevich was an explicit, completely local formula for the Hilbert residue symbol in the fields of $\mathfrak{p}$-adic numbers and, as a corollary, the most general explicit formula for the power residues reciprocity law.

His investigations in the Galois theory led Shafarevich to a solution of the inverse Galois problem for solvable groups. Namely, he proved that every field of algebraic numbers has infinitely many Galois extensions whose Galois group is any prescribed solvable group. In 1959, for his investigations in the algebraic number theory and the Galois theory, Shafarevich was awarded the Lenin prize. In 1958 he was elected a corresponding member of the Academy of Sciences of the USSR.

In 1964, together with E. Golod, Shafarevich proved an inequality for the numbers of generators and relations for finite p-groups, which implied, in particular, the existence of infinite chains of non-ramified extensions for a wide class of fields of algebraic numbers, as well as the existence of finitely generated infinite p-groups (thus, a negative solution of the "unrestricted Burnside problem") and infinite dimensional finitely generated nil-algebras.

Starting from 1960's, Shafarevich initiated investigations in algebraic geometry, in particular, in birational geometry of algebraic surfaces, resulted in a well-known monograph "Algebraic Surfaces" published in 1965. It led to the creation of a powerful school in algebraic geometry, well-known by the names of S. Arakelov, I. Dolgachev, M. Gizatullin, Yu. Manin, B. Moishezon, A. Parshin, A. Tiurin and many others. Together with I. Piatetski-Shapiro he obtained important results on K3 sutfaces. Studying the structure of algebraic curves over algebraic number fields, he invented (parallelly and independently of J. Tate) "the most mysterious group" related to ellitic curves, now called the Tate–Shafarevich group and denoted by the cyrillic letter 'Ш' (perhaps the unique case when cyrillic symbols are used in mathematics). He also formulated the Shafarevich conjecture which stated the finiteness of the set of Abelian varieties over a number field having fixed dimension and prescribed set of primes of bad reduction. This conjecture was proved by G. Faltings as a step in his proof of the Mordell conjecture.

Generations of mathematicians through the world studied (and are studying) the theory of algebraic numbers and algebraic geometry by the wonderful books "Number Theory" by Borevich and Shafarevich (the first edition in 1964) and "Basic Algebraic Geometry" by Shafarevich (the first edition in 1972). For the series "Modern Problems in Mathematics. Fundamental Directions" (known in English translation as "Encyclopaedia of Mathematical Sciences") he wrote several issues: "Algebra. I, Basic

notions of algebra", "Algebraic Geometry. I, Introduction. Riemann Surfaces and Algebraic Groups", "Algebraic Geometry. II, Algebraic Surfaces" (together with V. Iskovskikh). He was also an Editor of the whole series "Algebra" and "Algebraic Geometry."

I. Shafarevich played an important role in the formation of the Ukrainian algebraic school. In particular, he highly supported the investigations in the representation theory in Kyiv and Uzhgorod and influenced significantly on their development. One of the young Kyiv algebraists of 1960's, Yuriy Drozd, was a Ph. D. student of Shafarevich and picked up a lot from his study, contacts and discussions with the great maître who combined kindness and understanding with objectivity and sharp, though well-disposed criticism. Another student of I. Shafarevich, Oleg Vvedenskiy, initiated investigation in algebraic geometry in Lviv Ivan Franko University.

We will always remember Igor Shafarevich as a great mathematician and a great person.

<div align="right">

Yu. Drozd, V. Kirichenko, A. Petravhuk,
V. Petrychkvych, I. Shapochka, B. Zabavskiy,
A. Zhuchok, P. Varbanets

</div>