

## To the 100<sup>th</sup> anniversary of the birth of SERGEI NIKOLAEVICH CHERNIKOV

On May 11, 2012, we celebrate the 100th anniversary of the birth of Sergei Nikolaevich Chernikov (1912 – 1987), a great mathematician, one of the main founders of infinite group theory.

Sergey N. Chernikov was born in Sergiev–Posad, Moscow Region, into a Russian orthodox priest's family. He mentioned a significant influence his father had on his moral development and his mindset formation.

In 1928, just after graduation from high school, S. Chernikov began to teach mathematics at a secondary school. In 1930, he became an external student of Physics and Technical School at the Saratov Pedagogical Institute. In 1933, after graduation from the institute, Chernikov moved to Sverdlovsk (now Yekaterinburg). He began his career there as an instructor at the mathematics department of Ural Physics and Mechanics Institute, and later – Ural Industrial Institute. By 1936, strongly impressed with works of Dmitri A. Grave and Otto Yu. Schmidt, which he studied independently, he developed a great interest in the recent developments in algebra. At that time he



began intense studies of group theory. These interests naturally brought him to Moscow University, where he started research work as an external student under Alexander G. Kurosh's supervision that lasted from 1936 to 1939. It should be noted that pursuing a scientist's career was rather difficult for a priest's son in that politically difficult time. Perhaps, this explains why young Chernikov studied mathematics mostly independently.

These years can be characterized as a time of rapid development of investigations in group theory in the USSR. By that time, finite group theory was quite formed as an intensely developing branch of algebra. Moreover, some distinct mathematics branches such as geometry, topology, automorphic function theory, and others began facing problems while dealing with distinct infinite groups, for some of which the methods of finite group theory turned out just not applicable. The task of developing general group theory including as an important part infinite group theory became imperative. This task has been accomplished concurrently by Soviet and German mathematicians. German group theory has a great example – well developed ring theory where the infiniteness was not an obstacle. It's worth mentioning that in that time the relations between German and Soviet mathematicians were very close and fruitful. In particular, the founder of the Russian (and later the Soviet) group theory school O.Yu. Schmidt and the teacher of A.G. Kurosch, P.S. Alexandrov, enjoyed very intense and well-developed personal relationships with German mathematicians and visited Germany very often. Many German prominent mathematicians, (in particular, one of the founders of modern algebra Emmy Noether) delivered their lectures at Moscow State University. This, for the most part, caused the fact that the finiteness conditions became the main tool in infinite group theory. The development of this route was enthusiastically supported by O.Yu. Schmidt, who was conducting the famous seminar at Moscow State University, and by A.G. Kurosh, who was then studying topological groups. O.Yu. Schmidt's algebraic seminar was the main research center at that time. It attracted many young researchers. The program of this seminar was in complete harmony with the interests of young Sergei Chernikov, and he obtained many important results in a short time. In January 1939, S. Chernikov defended his Ph.D. thesis at the Algebra Department of Moscow State University. In September 1939, he was appointed the Chair of Mathematics Department of Ural Industrial Institute. In 1940, he defended his Dr. of Science thesis at Moscow State University, and in January, 1941 he became a full professor. O.Yu. Schmidt was one of the reviewers and opponents for S.N. Chernikov doctoral thesis defense. In his brief but very thoughtful review, Schmidt underlined that Chernikov became an accomplished master of mathematical constructions. In 1945, S.N. Chernikov became a professor in Ural State University. In 1951, he was invited to work for Perm State University, where he had been working up to 1961. During these 10 years of professorship in Perm, S.N. Chernikov created a large algebraic scientific school over there. In 1961, the Sverdlovsk Branch of the famous Steklov Mathematics Institute

of the Academy of Sciences of the USSR was founded, and S.N. Chernikov was invited to head the Algebra Department there. He was working in this position from 1961 to 1965. During that time, he continued his research in group theory, but most of his attention was attracted by his second area of interest: the newly developed linear inequality theory.

In 1965, S.N. Chernikov moved to Kiev at the invitation of V.M. Glushkov, the founder of the Institute of Cybernetics of the National Academy of Sciences of the Ukraine and one of Chernikov's former students. Since then and until the end of his life, Chernikov headed the Department of Algebra at the Institute of Mathematics of Ukrainian Academy of Sciences. Simultaneously, since 1965, he taught courses of algebra at the Kiev Pedagogic University. S.N. Chernikov is rightfully regarded as one of the founders of modern group theory. He dedicated 50 years of his life to intense and fruitful research of infinite groups. He was one of small circle of researchers who founded infinite group theory, and he did a lot for the development of such important areas theory as the groups with the finiteness conditions and the groups with restrictions on distinct subgroup families. He introduced numerous global imperative concepts in group theory such as series of subgroups and distinct classes of groups defined by these series (so-called Kurosh – Chernikov classes); he discovered many local properties that occurred to be very effective and useful; he proposed many new key fruitful ideas and formulated a number of important problems, some of which are still open by now.

S.N. Chernikov obtained many fundamental results which are recognized as classical. His ideas influenced works of many prominent algebraists, such as O. Yu. Shmidt, V.M. Glushkov, B.I. Plotkin, M.I. Karhapolov, V.S. Charin, I.I. Eremin, Yu.I. Merzlyakov, Yu.M. Gorchakov, V.P. Shunkov, D.I. Zaitsev, R. Baer, P. Hall, B.H. Neumann, B. Hartley, O.H. Kegel, H. Heineken, B.A.F. Wehrfritz, D.J.S. Robinson, J. Wiegold, J.S. Wilson, and many others.

Sergey N. Chernikov was one of the pioneers in linear programming and the founder of the algebraic theory of linear inequalities. During WW II, he actively participated in solving important military-related applied problems. This activity led him to introducing and developing the so-called principle of boundary solutions, on whose basis he later constructed a systematically developed theory of linear inequalities. The method of convolution of systems of linear inequalities, developed by S.N. Chernikov, became an important theoretical tool in applied investigations. This method, in particular, provides a way to study incompatible systems of linear inequalities, to develop optimization methods for problems with

incompatible systems of restrictions, and to give a constructive description of the entire set of optimal solutions in problems of linear programming. These results found important continuations in the methods for pattern recognition developed by I.I. Eremin and his school. S.N. Chernikov distinguished and studied a key class of infinite systems of linear inequalities, namely polyhedrally – closed systems, and developed a duality theory for them. This class of systems serves as a basis for the theoretical and numerical analysis of nonlinear optimization problems using the reduction of these problems to problems of semi-infinite and infinite linear programming.

Being completely dedicated to his research activities, Prof. Chernikov also devoted much time to disseminating his knowledge and raising new generation of researchers. He passed his absolute love and dedication to mathematics to his numerous students. He founded the famous Chernikov's group theory school. This school includes more than 50 of his former Ph.D students; one can find among them such prominent scientists as V.M. Glushkov, M.I. Kargapolov, I.I. Eremin, and others.

A brilliant lecturer, S.N. Chernikov was able to introduce his audience in an atmosphere of immediate scientific exploration and discovery. He constantly encouraged students' curiosity and interest for research. He was always ready to answer student questions and never counted hours he spent on discussing mathematics problems with them. His student will never forget that.

These days, remembering Sergey Nikolayevich Chernikov as great scientists and exceptionally wise and caring teacher, the mathematics community expresses its sincere gratitude for everything that was done by him in mathematics and education. His brilliant results found their prominent place in algebra.

*Yu. A. Drozd, V. V. Kirichenko,  
L. A. Kurdachenko, F. M. Lyman,  
M. O. Perestyuk, A. P. Petravchuk,  
A. M. Samoilenko, M. M. Semko,  
L. A. Shemetkov, I. Ya. Subbotin,  
V. I. Sushchansky, V. V. Sharko*