

# ROSTISLAV I. GRIGORCHUK

*To the 60th anniversary*

On February 23, 2013, an outstanding mathematician, one of the founders of our journal Professor Rostislav I. Grigorchuk turns his 60th. The influence of Grigorchuk's famous results on the development of various branches of mathematics is difficult to overestimate and his active involvement in the international mathematics community life is pretty significant.

Rostislav Grigorchuk was born in Ternopol Region, Ukraine. After graduation from the high school no. 23 in Chernovtsy, Ukraine, he became a student of the world known elite Mechanics and Mathematics School of Lomonosov Moscow State University, where he received his Master of Science Degree in 1975. He continued his post-graduate study at the same school as the Ph.D student of a well-known expert in ergodic theory and dynamic systems Professor A. M. Stepin. In 1978, R. Grigorchuk defended his Ph.D thesis: "Banach means on homogeneous spaces and random walks" at Moscow Lomonosov State University. In 1985, he was awarded Doctor of Sciences Degree by Steklov Institute of Mathematics for his outstanding research work "Growth functions of finitely generated groups and its applications".

R.I. Grigorchuk began his teaching career in the Department of Mathematics of Moscow State University of Transportation as an assistant professor, and then he was promoted to a full professor and department chair (1987-1995). Such known mathematicians as Yurii Kuzmin, Zoya Lipkina, Leonid Sadovsky and Elena Ventzel worked at this department that time. Since 1995, R.I. Grigorchuk has been working as the leading

researcher for the Department of Ordinary Differential Equations of the famous Steklov Institute of Mathematics of Russian Academy of Science. In 2001-2002 he served as a professor in the Department of Dynamical Systems of Moscow State Lomonosov University. It is important to point that this department was created and developed with his energetic assistance. Since 2002 R. Grigorchuk is a professor, and since 2008 he is a Distinguished Professor in the Department of Mathematics of Texas A&M University, College Station, USA.

Rostislav I. Grigorchuk wide range of interests includes group theory, dynamical systems, low dimensional topology, discrete mathematics, abstract harmonic analysis, random walks, invariant means, bounded cohomology, and  $L^2$ -invariants. He obtained remarkable results in all these areas. In 1980, R.I.Grigorchuk created his first example of infinite finitely generated periodic group. This group is known as the first Grigorchuk's group and it represents the simplest and the most elegant construction of the so-called groups of Burnside type. This group found various applications in numerous branches of mathematics and definitely belongs to a quite small circle of most useful and graceful algebraic objects. Grigorchuk's group is a central object in the study of the so-called branch groups and automata groups. These finitely generated groups of automorphisms of rooted trees have remarkable self-similar properties. The automata and self-similar groups have a number of unexpected connections with other areas of mathematics, including dynamical systems, differential geometry, Galois theory, ergodic theory, random walks, fractals, Hecke algebras, bounded cohomology, functional analysis, and others. Many of these self-similar groups arise as iterated monodromy groups of complex polynomials, where important relations have been discovered between the algebraic structure of self-similar groups and the dynamical properties of the polynomials in question.

R.I. Grigorchuk solved a series of central problems in asymptotic and geometric group theory; in particular, he solved the long-standing (since 1968) famous Milnor's problem about groups of intermediate growth. Grigorchuk's group has a number of other remarkable mathematical

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properties: It is a finitely generated infinite residually finite 2-group (that is, every element of the group has a finite order which is a power of 2); it is also the first example of a finitely generated group that is amenable but not elementary amenable (thus providing an answer to another long-standing problem, posed by Mahlon Day in 1957); it is “just infinite”, that is, it is infinite but every proper quotient of this group is finite.

In the 1990s and 2000s, R. Grigorchuk has been working on developing the theory of branch, automata and self-similar groups. One of his great results in the area is a counter-example to the conjecture of Michel Atiyah on L2-Betti numbers of closed manifolds, developed with his collaborators. R. Grigorchuk is also known for his input in the theory of random walks on groups and the theory of amenable groups. It is enough to mention here his commonly known Grigorchuk’s co-growth criterion of amenability for finitely generated groups.

Outstanding research achievements of R.I. Grigorchuk were widely recognized by mathematical community. Among other his awards are the Fellowship of American Mathematical Society, the awards of Russian Academy of Science and the MAIK Publishing for the best publication, the award “The best scientific result in the Russian Academy of Science”, the award “The best scientific result in the Steklov Institute of Mathematics”, the state awards “Outstanding scientist of Russia”, London Mathematical Society Visiting Professor Awards, and many others.

Professor R.I. Grigorchuk’s active service to international mathematics community is well-known. He is the Editor-in-Chief of the journal “Groups, Geometry and Dynamics”, and a member of the editorial boards of the journals “International Journal of Algebra and Computation”, “Journal of Modern Dynamics”, “Geometriae Dedicata”, “Algebra and Discrete Mathematics” and “Matematychni Studii”. He worked on organizing committees of many international conferences around the globe. Rostislav Grigorchuk gave an invited address at the 1990 International Congress of Mathematicians in Kyoto an AMS Invited Address at the March 2004 meeting of the American Mathematical Society in Athens, Ohio, and a

plenary talk at the 2004 Winter Meeting of the Canadian Mathematical Society. He was invited professor at many universities in different countries.

Professor R.I. Grigorchuk dedicated much of his time to organizing international mathematics events and activities. He has been playing an important role in the work of National Science Foundation (USA), European Research Council, Switzerland National Science Foundation, Israel Science Foundation, Science and Engineering Research Canada, Marie Curie fellowship proposal with the European Commission's 6th Framework Program, Pierre Deligne Competition for young mathematicians in Russia, Ukraine and Belarus. He is the one of the founders and a co-chair of prestigious US-NTSA Award for Ukrainian Mathematicians. With his active assistance the International Algebraic Conferences in Ukraine in 1997-2011 were organized and conducted.

Professor Grigorchuk is an excellent lecturer who enjoys great appreciation and respect from his students and colleagues. He is a very friendly and caring person who is always ready to extend his hand to his friends and colleagues.

Rostislav Grigorchuk is a very energetic and enthusiastic mathematician with more great achievements to come.

We warmly congratulate him on his 60th birthday and wish him strong health and many successful years of fruitful research and teaching.

*Yu. Drozd, O. Bezushchak, V. Kirichenko,  
M. Komarnitsky, L. Kurdachenko, Ya. Lavrenyuk,  
V. Lyubashenko, V. Nekrashevich, B. Novikov,  
A. Oliynyk, B. Oliynyk, A. Petravchuk,  
I. Subbotin, V. Sushchansky, E. Zelmanov,  
A. Zhuchok, Yu. Zhuchok*