Rostislav I. Grigorchuk

To the 70th anniversary

On February 23, 2023, Professor Rostislav I. Grigorchuk, a prominent mathematician whose contributions to various branches of mathematics could not be overstated, turned 70. Among his many achievements, of particular importance are influential discoveries that propel algebra and dynamic systems, as well as his active involvement in the international mathematics community.

Rostislav I. Grigorchuk was born in Ternopol Region, Ukraine. In the years following his graduation from high school no. 23 in Chernivtsi, Ukraine, I. Grigorchuk enrolled in the Mechanics and Mathematics School of Lomonosov Moscow State University, and, in 1975, he was awarded Masters of Science Degree. He continued his education pursuing a Ph.D. from the same school under the supervision of well-known ergodic theory and dynamic systems expert Professor A.M. Stepin. Come 1978, I. Grigorchuk defended his thesis titled "Banach Means on Homogeneous Spaces and Random Walks." Come 1985, Steklov Institute of Mathematics honored him with a Doctor of Sciences degree for his outstanding work known as "Growth Functions of Finitely Generated Groups and Its Applications."

R.I. Grigorchuk started his promising pedagogical career as an assistant professor in Moscow State University of Transportation's mathematics department, earning his promotion to full professor and department chair between the years 1987 and 1995. He worked among celebrated colleagues such as Yurii Kuzmin, Zoya Lipkina, Leonid Sadovsky and Elena Ventzel. Since 1995, Grigorchuk has been consistently demonstrating competent research and leadership skills, serving as a chief researcher for the Department of Ordinary Differential Equations at 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 essential to point out 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's wide range of interests includes group theory, dynamical systems, low dimensional topology, discrete mathematics, abstract harmonic analysis, random walks, invariant means, bounded cohomology, and L2-invariants. He has obtained remarkable results in all these areas. In 1980, Grigorchuk created his very first example of an infinite finitely generated periodic group, which became known as the first Grigorchuk group. It represents the simplest and most elegant construction of the so-called groups of Burnside type. This group found various applications in numerous branches of mathematics, and it most definitely belongs to a fairly small circle of the greatest and most widely used algebraic constructions. It is also 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 notable self-similar properties. The automata and self-similar groups have plenty 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, particularly the famous long-standing-since-1968 Milnor's problem about groups of intermediate growth. Grigorchuk group has several other noteworthy properties—it is a finitely generated infinite residually finite 2-group (i.e., every element of the group has a finite order that 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" (i.e., 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 famous results in the area is a counterexample to the conjecture of Michel Atiyah on L2-Betti numbers of closed manifolds.

R. Grigorchuk is also known for his input in the theory of random walks on groups, and the theory of amenable groups. Here, it is enough to mention

his commonly known Grigorchuk co-growth criterion of amenability for finitely generated groups.

It is without a shadow of a doubt that Grigorchuk has amassed an incredible number of achievements that are more than highly regarded by the mathematics community. Among others, his awards include the following: 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 "Outstanding scientist of Russia" state awards, and the London Mathematical Society Visiting Professor Awards. In 2012, he became a Fellow of the American Mathematical Society.

In 2015, Rostislav Grigorchuk was awarded the highly prestigious AMS Leroy P. Steele Prize for Seminal Contribution to Research. Additionally, he became a laureate of Bogolyubov Prize of Ukrainian National Academy of Science that year.

In 2020, he has been elected as a laureate of the prestigious Humboldt Research Award by Germany's Alexander von Humboldt Foundation.

Professor R.I. Grigorchuk's active service to the international mathematics community is difficult to overestimate. He is the Founding Editor of the journal "Groups, Geometry and Dynamics", published by the European Mathematical Society. His list of the editorial board memberships includes the following journals: "Mathematical Notes", "International Journal of Algebra and Computation", "Journal of Modern Dynamics", "Geometriae Dedicata", "Ukrainian Mathematical Journal", "Algebra and Discrete Mathematics", "Carpathian Mathematical Publications", "Bukovinian Mathematical Journal", and "Matematychni Studii".

He dedicated much of his time to organizing international mathematics events, activities, and conferences around the globe. Among his impressive long list of invited and key-note speaker talks in many different countries, it is worthy to mention 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 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, and Pierre Deligne Competition for Young Mathematicians in Russia, Ukraine and Belarus. He was one

of the main founders of the prestigious US-NTSA Award for Ukrainian Mathematicians and its co-chair. With his robust assistance, the International Algebraic Conferences in Ukraine were organized and successfully conducted.

Professor Grigorchuk is an excellent lecturer who enjoys great appreciation and respect from his students and colleagues. His students rate him very highly.

In this brief article, it is not possible to reflect on all the distinguished professional accomplishments and achievements of Professor Grigorchuk, his great efforts on behalf of the international mathematics community.

Rostislav Grigorchuk was born in Ukraine, he is a distinguished son of this great country. He does an exceptional job in developing connections between Ukrainian and American mathematicians. This is a crucially important task in the current times.

We want to also mention his exceptional character qualities. He is a very charismatic, friendly, and caring person who is always ready to extend a helping hand to his friends and colleagues. Many mathematicians have benefited from his great support and encouragement.

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

We warmly congratulate him on his 70th birthday and wish him strong health and many successful years of fruitful research and teaching.

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