

Preface

The present volume of IRMA Lectures is dedicated to the memory of Andrei Bolibrukh. It assembles original papers by authors who all have shared the privilege of personal, mathematical acquaintance with our late colleague. The subjects of the articles range from differential equations to quantum groups. They relate to questions such as the Riemann–Hilbert problem (Kostov), isomonodromic deformations (Dubrovin and Mazzocco), Painlevé equations (Boalch), integrability (Audin), summability (Balser), monodromy of KZ and CKV equations (Golubeva, Leksin), Bethe Ansatz and Schubert calculus (Belkale, Mukhin and Varchenko), differential Galois theory and differential algebraic groups (Cassidy and Singer, Umemura). This is exactly the palette of themes that Andrei Bolibrukh included in one of his last important achievements, namely the research cooperation program PICS (Programme International de Recherche Scientifique) between France and Russia, aimed at bringing together mathematicians from these fields. As this program started, Andrei Bolibrukh was already seriously ill, but even from his hospital room he kept thinking about new ideas and plans for this cooperation. He passed away on November 11, 2003 in Paris without having benefitted himself from this exchange program.

Andrei Andreevich Bolibrukh was born on January 30, 1950 in Moscow – one hundred years exactly after the birth of Sonia Kovalevskaia, whom he celebrated in January 2000 in a memorial conference. He received his mathematical education at the University of Moscow, with Postnikov and Chernavskii as thesis advisers. In 1989 Bolibrukh closed the chapter of a decade of doubts and uncertainty about Hilbert’s 21st problem: he produced famous counterexamples which once for all invalidated the supposedly positive solution of Plemelj (1908). This was to be the beginning of a brilliant career, which started with an invited lecture at ICM 90 in Zurich, then took him to many countries as an invited professor, in particular to France where he held a permanent invited position, first in Nice, then in Strasbourg, from 1991 until his untimely death in 2003. Andrei Bolibrukh together with his students devoted his efforts mainly to the Riemann-Hilbert problem, making important steps towards his ultimate goal, which was to find full necessary and sufficient conditions for given monodromy data to be those of a Fuchsian differential system. This led him to work on related questions as well, such as the Birkhoff normal form problem or isomonodromic deformations, on which he published important results too. The first two contributions of this volume, by Y. Ilyashenko and by C. Sabbah, describe some of Bolibrukh’s main results. For further biographical information about Andrei Bolibrukh, we refer to the special issue of *Russian Mathematical Surveys* dedicated to our colleague, in particular to the articles [1], [2] and [3], and to our article [4] in the French Mathematical Society’s *Gazette*.

In November 2004, a conference – originally planned by Andrei Bolibrukh in Moscow – was organized in Strasbourg, France, as part of the French-Russian program PICS jointly financially supported by the French CNRS (Centre National de la

Recherche Scientifique) and Russian RFBR (Russian Foundation for Basic Research). It was thankfully dedicated to the memory of our late colleague. About one hundred participants from all over the world, including an important delegation from Russia conducted by Academician D. V. Anosov, and another one from Japan, met for a few days of intense activity and discussions. Andrei Bolibrukh would have been particularly pleased with the high number of young mathematicians who attended his conference, including his former students from Russia and from France.

C. Mitschi and C. Sabbah

- [1] Andrei Andreevich Bolibrukh in life and science, by D. V. Anosov and V. P. Leksin, *Russian Mathematical Surveys* 59, 1213–1224 (2004).
- [2] A. A. Bolibrukh's works on multidimensional regular and Fuchsian systems, by V. P. Leksin, *Russian Mathematical Surveys* 59, 1213–1224 (2004).
- [3] Reminiscences about Andrei Andreevich Bolibrukh, by A. V. Chernavskii, V. P. Leksin, M. Butuzov, I. V'yugin, R. Gontsov, V. Poberezhnyi, Yu. S. Il'yashenko, A. G. Sergeev and S. P. Konovalov, *Mathematical Life*, *Russian Mathematical Surveys* 59, 1213–1224 (2004).
- [4] Andreï Bolibroukh, un mathématicien, un ami, by C. Mitschi and C. Sabbah, *Gazette des Mathématiciens* 100, 20–31 (2004), Société Mathématique de France.