

# Preface

The present book has been composed on the occasion of the 16th International Conference on Functional Equations and Inequalities (ICFEI) that took place in the Mathematical Research and Conference Center in Będlewo, Poland, on May 17–23, 2015. We dedicate it to the memory of Stanisław Marcin Ulam (April 13, 1909–May 13, 1984), who 77 years ago posed a problem concerning approximate homomorphisms of groups that stimulated long-lasting research into stability of functional equations and inequalities (FEI). Several papers featured in this volume have been devoted fully or partly to Ulam’s stability problem.

The book consists of articles written by eminent scientists from the international mathematical community, who present important research works in the field of FEI as well as related subjects. These works provide an insight into the progress achieved on the study of various problems of nonlinear flavor and present up-to-date developments of selected topics of FEI as well as of related fields of mathematics. Both old and new results are presented in expository and research papers written by 17 authors from 8 countries who have been intensively involved in those areas of investigations. Special emphasis has been placed on a variety of topics applying methods and techniques involving or originating from FEI.

Several of these results have been influenced and inspired by the work of S.M. Ulam, the well-known mathematician and physicist. Emphasis is placed on those questions, concerning approximate homomorphisms, that he posed in 1940.

We aim for this publication to serve as a kind of guidebook for mathematicians and other researchers, whose works are somewhat connected or related to the fields of FEI and in particular to Ulam’s type stability.

Subjects which have been treated in this book include (in order of appearance in the volume):

- Some quasi-means and the behavior of their difference
- The isometric approximation problem in bounded sets and some applications of the results related to it to the extension problems for bilipschitz and quasisymmetric maps
- A mathematization method of social choice

- One-parameter subgroups (iteration groups) of the group of all invertible power series in one indeterminate  $x$  over  $\mathbb{C}$  and a description of their construction
- The Fischer-Muszély equation, its pexiderization, and Hyers-Ulam stability, as well as two inequalities related to it
- The “alienation phenomenon” for functional equations (and inequalities)
- Haar meager sets and Haar null sets and some analogies between them
- Different types of stability of a system of two equations related to one-dimensional dynamical systems
- The role of functional equations in the asymptotic analysis needed to elicit the characterization of various laws in probability theory
- The translation equation and its stability
- Stochastic convex ordering and some applications of the results related to it to the Hermite-Hadamard type inequalities
- Two constructions of the field of reals closely related to functional equations and their stability
- The generalized Dhombres functional equation and a classification of its possible solutions as well as a description of the structure of periodic points contained in the range of the solutions
- Functional equations as well as their stability and superstability on hypergroups
- The nonstandard analysis approach to some systems of functional equations and their stability in the compact-open topology

It is a pleasure to express our deepest thanks to all of the mathematicians who, through their works, participated in this volume. We would also wish to acknowledge the support of the reviewers and the superb assistance that the staff of Springer has provided for this publication.

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