

Editorial

Ulam's Type Stability 2013

**Janusz Brzdęk,¹ Nicole Brillouët-Belluot,² Krzysztof Ciepliński,¹
Soon-Mo Jung,³ and Bing Xu⁴**

¹ Department of Mathematics, Pedagogical University, Podchorążych 2, 30-084 Kraków, Poland

² Ecole Centrale de Nantes, Département d'Informatique et de Mathématiques, 1 rue de la Noë, BP92101, 44321 Nantes Cedex 3, France

³ Mathematics Section, College of Science and Technology, Hongik University, Sejong 339-701, Republic of Korea

⁴ Department of Mathematics, Sichuan University, Chengdu, Sichuan 610064, China

Correspondence should be addressed to Janusz Brzdęk; jbrzdek@up.krakow.pl

Received 3 December 2013; Accepted 3 December 2013

Copyright © 2013 Janusz Brzdęk et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

This is the second special volume of the journal *Abstract and Applied Analysis* that is focused on *Ulam's type stability*. Let us remind that the investigation of the issue of that type of stability has been motivated by one of the problems posed by S.M. Ulam in 1940 (the one concerning approximate homomorphisms). Nowadays, it is an expanding area of research, which concerns various types of equations and inequalities (difference, functional, differential, and integral) and some other mathematical objects, as well.

The theory that has been created in this way is called *the Hyers-Ulam stability theory* and seems to be at its very early stage of development. It is the subject of many papers as well as talks presented at various conferences, especially International Conference on Functional Equations and Inequalities organized by the Department of Mathematics of the Pedagogical University in Cracow since 1984. Moreover, Conference on Ulam's Type Stability will be held in Rytro (Poland) in June next year.

This volume includes 14 research articles (a survey and 13 regular papers) containing the latest achievements in that type of stability. They have been written by 24 authors from 10 countries. As usual, several authors use in their investigations the direct and the fixed point methods.

A wide variety of problems for different classes of functional equations is considered. A few papers concern also

some systems of such equations, a functional inequality equivalent to the classical quadratic functional equation and a differential equation (the heat equation). Their stability is traditionally investigated in classical Banach spaces, but also in non-Archimedean Banach spaces, fuzzy Banach spaces, n -Banach spaces, quasi β -Banach, and quasi fuzzy β -Banach spaces, and for Schwartz distributions.

Two papers deal with the stability of some kinds of derivations; namely, ring derivations in intuitionistic fuzzy Banach algebra and cubic Lie derivations in normed algebra are studied. One paper considers stability of fixed points in b -metric spaces.

Moreover, the volume provides some results on the stability of four Cauchy functional equations, the corresponding Pexiderized equations and the Pexiderized version of an equation equivalent to the logarithmic functional equation on some restricted domains.

Finally, the volume contains a few papers on hyperstability. They concern n -Jordan homomorphisms from a commutative normed algebra to a commutative Banach algebra, two functional equations in non-Archimedean Banach spaces, a functional equation in an intuitionistic fuzzy normed algebra with unit and cubic Lie derivations in normed algebras. Moreover, the survey discussing some recent results on the

hyperstability and superstability of functional equations is presented.

We believe that, analogously as the 2012 volume, this volume will have some influence on the further research in that area of mathematics.

Janusz Brzdęk
Nicole Brillouët-Belluot
Krzysztof Ciepliński
Soon-Mo Jung
Bing Xu