ITERATIVE FUNCTIONAL EQUATIONS

MAREK KUCZMA, BOGDAN CHOCZEWSKI
and ROMAN GER

Iterative Functional Equations

Christopher G. Small

Iterative Functional Equations:

Iterative Functional Equations Marek Kuczma,Bogdan Choczewski,Roman Ger,1990-07-27 A cohesive and comprehensive account of the modern theory of iterative functional equations Many of the results included have appeared before only in research literature making this an essential volume for all those working in functional equations and in such areas as dynamical systems and chaos to which the theory is closely related The authors introduce the reader to the theory and then explore the most recent developments and general results Fundamental notions such as the existence and uniqueness of solutions to the equations are stressed throughout as are applications of the theory to such areas as branching processes differential equations ergodic theory functional analysis and geometry Other topics covered include systems of linear and nonlinear equations of finite and infinite ORD various function classes conjugate and commutable functions linearization iterative roots of functions and special functional equations **Iterative Functional Equations** ,1990 *Iteration Theory and its Functional Equations* Roman Liedl,Ludwig Reich,György Targonski,2006-11-14 *Functional Equations and Inequalities* Themistocles M. Rassias,2000-07-31 Functional Equations andInequalities provides an extensive studyofsome of the most important topics of current interest in functional equations and inequalities Subjects dealt with include a Pythagorean functional equation a functional definition oftrigonometric functions the functional equation ofthe square root spiral a conditional Cauchy functional equation an iterative functional equation the Hille type functional equation the polynomial like iterative functional equation distribution ofzeros and inequalities for zeros of algebraic polynomials a qualitative study ofLobachevsky s complex functional equation functional inequalities in special classesoffunctions replicativity and function spaces normal distributions some difference equations finite sums decompositions of functions harmonic functions set valued quasiconvex functions the problem of expressibility in some extensions of free groups Aleksandrov problem and mappings which preserve distances Ulam s problem stability of some functional equation for generalized trigonometric functions Hyers Ulam stability of Hosszil s equation superstability of a functional equation and some demand functions in a duopoly market with advertising It is a pleasureto express my deepest appreciationto all the mathematicians who contributed to this volume Finally we wish to acknowledge the superb assistance provided by the staffofKluwer Academic Publishers June 2000 Themistocles M Rassias xi ON THE STABILITY OF A FUNCTIONAL EQUATION FOR GENERALIZED TRIGONOMETRIC FUNCTIONS ROMAN BADORA lnstytut Matematyki Uniwersytet Sli ski ul Bankowa 14 PL 40 007 Katowice Poland e mail robadora gate math us edu pl Abstract In the present paper the stability result concerning a functional equation for generalized trigonometric functions is presented Z *Analytic Solutions of Functional Equations* Sui Sun Cheng,Wenrong Li,2008 The purpose of this volume is to examine bio informatics and quantum information which are growing rapidly at present and to attempt to connect the two with a view to enumerating and solving the many fundamental problems they entail To this end we look for interdisciplinary bridges in mathematics physics and

information and life sciences In particular research into a new paradigm for information science and life science on the basis of quantum theory is emphasized **Functional Equations and How to Solve Them** Christopher G. Small,2007-04-03 Over the years a number of books have been written on the theory of functional equations However very little has been published which helps readers to solve functional equations in mathematics competitions and mathematical problem solving This book fills that gap The student who encounters a functional equation on a mathematics contest will need to investigate solutions to the equation by finding all solutions or by showing that all solutions have a particular property The emphasis here will be on the development of those tools which are most useful in assigning a family of solutions to each functional equation in explicit form At the end of each chapter readers will find a list of problems associated with the material in that chapter The problems vary greatly with the easiest problems being accessible to any high school student who has read the chapter carefully The most difficult problems will be a reasonable challenge to advanced students studying for the International Mathematical Olympiad at the high school level or the William Lowell Putnam Competition for university undergraduates The book ends with an appendix containing topics that provide a springboard for further investigation of the concepts of limits infinite series and continuity <u>Iterative Functional Equations</u> Sukrawan Talwong,Mahāwitthayālai Kasētsāt. Department of Mathematics,2004 **Iteration Theory and Its Functional Equations** Roman Liedl,Ludwig Reich,Gyorgy Targonski,2014-01-15 **Iteration Theory and Its Functional Equations** Roman Liedl,Ludwig Reich,György I. Targonski,1985 *Developments in Functional Equations and Related Topics* Janusz Brzdęk,Krzysztof Ciepliński,Themistocles M. Rassias,2017-08-14 This book presents current research on Ulam stability for functional equations and inequalities Contributions from renowned scientists emphasize fundamental and new results methods and techniques Detailed examples are given to theories to further understanding at the graduate level for students in mathematics physics and engineering Key topics covered in this book include Quasi means Approximate isometries Functional equations in hypergroups Stability of functional equations Fischer Musz ly equation Haar meager sets and Haar null sets Dynamical systems Functional equations in probability theory Stochastic convex ordering Dhombres functional equation Nonstandard analysis and Ulam stability This book is dedicated in memory of Stani saw Marcin Ulam who posed the fundamental problem concerning approximate homomorphisms of groups in 1940 which has provided the stimulus for studies in the stability of functional equations and inequalities *On Functions and Functional Equations* Smital,2020-08-26 On Functions and Functional Equations introduces the main topics in iteration theory and the theory of functional equations with emphasis on applications in the fields of mathematics physics biology chemistry and electronics and mechanical engineering The book contains many classical results as well as important more recent results It also includes numerous exercise and some problems that have yet to be resolved The book is accessible to readers having a secondary level mathematical education <u>Functional Equations of Iterative Type</u> Mariusz Bajger,1996 **Linear Iterative Functional Equations with**

Random-valued Functions Janusz Marian Morawiec,2023   <u>Functional Equations and Modelling in Science and Engineering</u> Enrique Castillo,1992-05-27 Provides engineers and applied scientists with some selected results of functional equations and their applications with the intention of changing the way they think about mathematical modelling Many of the proofs are simplified or omitted so as not to bore or confuse engineers Functional equati   **Introduction to Functional Equations** Costas Efthimiou,2011-10-13 Functions and their properties have been part of the rigorous precollege curriculum for decades And functional equations have been a favorite topic of the leading national and international mathematical competitions Yet the subject has not received equal attention by authors at an introductory level The majority of the books on the topic remain unreachable to the curious and intelligent precollege student The present book is an attempt to eliminate this disparity The book opens with a review chapter on functions which collects the relevant foundational information on functions plus some material potentially new to the reader The next chapter presents a working definition of functional equations and explains the difficulties in trying to systematize the theory With each new chapter the author presents methods for the solution of a particular group of equations Each chapter is complemented with many solved examples the majority of which are taken from mathematical competitions and professional journals The book ends with a chapter of unsolved problems and some other auxiliary material The book is an invaluable resource for precollege and college students who want to deepen their knowledge of functions and their properties for teachers and instructors who wish to enrich their curricula and for any lover of mathematical problem solving techniques In the interest of fostering a greater awareness and appreciation of mathematics and its connections to other disciplines and everyday life MSRI and the AMS are publishing books in the Mathematical Circles Library series as a service to young people their parents and teachers and the mathematics profession   **A Two Parameter Family of Operators and Iterative Functional Equations** H.-H. Kairies,2000   *Iteration Theory and Its Functional Equations* Roman Liedl,Ludwig Reich,György Targonski,1985-12   **Nonlinear Functional Equations and Continuous Analogs of Iterative Methods** M. K. Gavurin,John H. Avila,Mirijana Kocho,1968   *Functional Equations in a Single Variable* Marek Kuczma,1968   **A Recurrent Method of Solving Iterative Functional Equations** Witold Jarczyk,1991

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