

On The Intuitionistic Fuzzy Metric Spaces And The

This self-contained monograph presents an overview of fuzzy operator theory in mathematical analysis. Concepts, principles, methods, techniques, and applications of fuzzy operator theory are unified in this book to provide an introduction to graduate students and researchers in mathematics, applied sciences, physics, engineering, optimization, and operations research. New approaches to fuzzy operator theory and fixed point theory with applications to fuzzy metric spaces, fuzzy normed spaces, partially ordered fuzzy metric spaces, fuzzy normed algebras, and non-Archimedean fuzzy metric spaces are presented. Surveys are provided on: Basic theory of fuzzy metric and normed spaces and its topology, fuzzy normed and Banach spaces, linear operators, fundamental theorems (open mapping and closed graph), applications of contractions and fixed point theory, approximation theory and best proximity theory, fuzzy metric type space, topology and applications.

This book presents the state-of-the-art in theory and practice regarding similarity and distance measures for intuitionistic fuzzy sets. Quantifying similarity and distances is crucial for many applications, e.g. data mining, machine learning, decision making, and control. The work provides readers with a comprehensive set of theoretical concepts and practical tools for both defining and determining similarity between intuitionistic fuzzy sets. It describes an automatic algorithm for deriving intuitionistic fuzzy sets from data, which can aid in the analysis of information in large databases. The book also discusses other important applications, e.g. the use of similarity measures to evaluate the extent of agreement between experts in the context of decision making.

This edited volume gathers selected, peer-reviewed contributions presented at the fourth International Conference on Differential & Difference Equations Applications (ICDDEA), which was held in Lisbon, Portugal, in July 2019. First organized in 2011, the ICDDEA conferences bring together mathematicians from various countries in order to promote cooperation in the field, with a particular focus on applications. The book includes studies on boundary value problems; Markov models; time scales; non-linear difference equations; multi-scale modeling; and myriad applications.

Papers on Smarandache adjacent number sequences and its asymptotic property, counterexamples to a theorem concerning solution of certain quadratic Diophantine equation, short interval result for the e -squarefree e -divisor function, log convexity and concavity of some double sequences, intuitionistic fuzzy resolvable and intuitionistic fuzzy irresolvable spaces, super Weyl transform and some of its properties, and similar topics. Contributors: S. Panayappan, J. Wei, S. Chauhan, S. Kumar, S. Keawrahun, U. Leerawat, S. Balasubramanian, P. A. S. Vyjayanthi, S. Balasubramanian, and others.

This book is the outcome of about eight years of work performed by the author largely in the field of intuitionistic fuzzy set theory and more in depth on intuitionistic fuzzy measures presented from a point of view characteristic for pure mathematics. The purpose of the book is to present a continuation of studies conducted focusing mainly on measures that evaluate intuitionistic fuzzy sets by real values and crisp sets by intuitionistic fuzzy values.

In the beginning of 1983, I came across A. Kaufmann's book "Introduction to the theory of fuzzy sets" (Academic Press, New York, 1975). This was my first acquaintance with the fuzzy set theory. Then I tried to introduce a new component (which determines the degree of non-membership) in the definition of these sets and to study the properties of the new objects so defined. I defined ordinary operations as "n", "U", "+" and "." over the new sets, but I had began to look more seriously at them since April 1983, when I defined operators analogous to the modal operators of "necessity" and "possibility". The late George Gargov (7 April 1947 - 9 November 1996) is the "god father" of the sets I introduced - in fact, he has invented the name "intuitionistic fuzzy", motivated by the fact that the law of the excluded middle does not hold for them. Presently, intuitionistic fuzzy sets are an object of intensive research by scholars and scientists from over ten countries. This book is the first attempt for a more comprehensive and complete report on the intuitionistic fuzzy set theory and its more relevant applications in a variety of diverse fields. In this sense, it has also a referential character.

This book aims at providing an overview of state-of-the-art in both the theory and methods of intuitionistic fuzzy logic, partial differential equations and numerical methods in informatics. It covers topics such as fuzzy intuitionistic Hilbert spaces, intuitionistic fuzzy differential equations, fuzzy intuitionistic metric spaces, and numerical methods for differential equations. It reports on applications such as fuzzy real time scheduling, intelligent control, diagnostics and time series prediction. Chapters were carefully selected among contributions presented at the second edition of the International Conference on Intuitionistic Fuzzy Sets and Mathematical Science, ICIFSMAS, held on April 11-13, 2018, at Al Akhawayn University of Ifrane, in Morocco.

In this manuscript, we obtain common fixed point theorems in the neutrosophic cone metric space. Also, notion of (α, β) -weak contraction is defined in the neutrosophic cone metric space by using the idea of altering distance function. Finally, we review many examples of cone metric spaces to verify some properties.

The Second International Conference on Fuzzy Information and Engineering (ICFIE2007) is a major symposium for scientists, engineers and practitioners in China as well as the world to present their latest results, ideas, developments and applications in all areas of fuzzy information and knowledge engineering. It aims to strengthen relations between industry research laboratories and universities, and to create a primary symposium for world scientists.

This book gathers original research papers presented at the 4th International Conference on Computational Mathematics and Engineering Sciences, held at Akdeniz University, Antalya, Turkey, on 20–22 April 2019. Focusing on computational methods in science, mathematical tools applied to engineering, mathematical modeling and new aspects of analysis, the book discusses the applications of mathematical modelling in areas such as health science, engineering, computer science, social science, and economics. It also describes a wide variety of analytical, computational, and numerical methods. The conference aimed to foster cooperation between students and researchers in the areas of computational mathematics and engineering sciences, and provide a platform for them to share significant research ideas. This book is a valuable resource for graduate students, researchers and educators interested in the mathematical tools and techniques required for solving various problems arising in science and engineering, and understanding new methods and uses of mathematical analysis.

“Neutrosophic Sets and Systems” has been created for publications on advanced studies in neutrosophy, neutrosophic set, neutrosophic logic, neutrosophic probability, neutrosophic statistics that started in 1995 and their applications in any field, such as the neutrosophic structures developed in algebra, geometry, topology, etc. Some articles in this issue: n-Refined Neutrosophic Modules, A Neutrosophic Approach to Digital Images, A Novel Method for Neutrosophic Assignment Problem by using Interval-Valued Trapezoidal Neutrosophic Number.

This book is the proceedings of the Third International Conference on Fuzzy Information and Engineering (ICFIE 2009) held in the famous mountain city Chongqing in Southwestern China, from September 26-29, 2009. Only high-quality papers are included. The ICFIE 2009, built on the success of previous conferences, the ICFIE 2007 (Guangzhou, China), is a major symposium for scientists, engineers and practitioners in the world to present their updated results, ideas, developments and applications in all areas of fuzzy information and engineering. It aims to strengthen relations between industry research laboratories and universities, and to create a primary symposium for world scientists in fuzzy fields as follows: Fuzzy Information; Fuzzy Sets and Systems; Soft Computing; Fuzzy Engineering; Fuzzy Operation Research and Management; Artificial Intelligence; Fuzzy Mathematics and Systems in Applications, etc.

In this article, we present fixed and common fixed point results for Banach and Edelstein contraction theorems in neutrosophic metric spaces. Then some properties and examples are given for neutrosophic metric spaces. Thus, we added a new path in neutrosophic theory to obtain fixed point results. We investigate and prove some contraction theorems that are extended to neutrosophic metric space with the assistance of Grabiec.

In this paper, we introduce the neutrosophic contractive and neutrosophic mapping. We establish some results on fixed points of a neutrosophic mapping.

In this book, we introduce some generalized probabilistic structure by extending several concepts of known classical spaces such as Random Space, Ultrametric Space and Hyper Space. In these newly developed probabilistic structure, we prove several fixed point theorem under some generalized contraction conditions. Particularly, a fixed point theorem for iterated function system (IFS) on a precompact probabilistic metric (PM) spaces investigated. In addition, we extend the theory of fixed points for multi-valued contractions in PM spaces and prove several common fixed point theorems and coincidence point theorems. In the case of non existence of fixed point, we study the approximate fixed point with some weak conditions. In chapter 6 we prove a fixed point theorem for self discontinuous mappings on probabilistic normed spaces. Finally, in the last two chapters, we considered the intuitionistic fuzzy metric spaces. We extend the fuzzy quasi-metric spaces to intuitionistic fuzzy quasi-metric spaces. By defining an appropriate contraction condition we proved a fixed point theorem in this space.

This book is devoted to Prof. Juan J. Nieto, on the occasion of his 60th birthday. Juan José Nieto Roig (born 1958, A Coruña) is a Spanish mathematician, who has been a Professor of Mathematical Analysis at the University of Santiago de Compostela since 1991. His most influential contributions to date are in the area of differential equations. Nieto received his degree in Mathematics from the University of Santiago de Compostela in 1980. He was then awarded a Fulbright scholarship and moved to the University of Texas at Arlington where he worked with Professor V. Lakshmikantham. He received his Ph.D. in Mathematics from the University of Santiago de Compostela in 1983. Nieto's work may be considered to fall within the ambit of differential equations, and his research interests include fractional calculus, fuzzy equations and epidemiological models. He is one of the world's most cited mathematicians according to Web of Knowledge, and appears in the Thompson Reuters Highly Cited Researchers list. Nieto has also occupied different positions at the University of Santiago de Compostela, such as Dean of Mathematics and Director of the Mathematical Institute. He has also served as an editor for various mathematical journals, and was the editor-in-chief of the journal *Nonlinear Analysis: Real World Applications* from 2009 to 2012. In 2016, Nieto was admitted as a Fellow of the Royal Galician Academy of Sciences. This book consists of contributions presented at the International Conference on Nonlinear Analysis and Boundary Value Problems, held in Santiago de Compostela, Spain, 4th-7th September 2018. Covering a variety of topics linked to Nieto's scientific work, ranging from differential, difference and fractional equations to epidemiological models and dynamical systems and their applications, it is primarily intended for researchers involved in nonlinear analysis and boundary value problems in a broad sense.

In present paper, the definition of new metric space with neutrosophic numbers is given. Several topological and structural properties have been investigated. The analogues of Baire Category Theorem and Uniform Convergence Theorem are given for Neutrosophic metric spaces.

This book aims to be a comprehensive and accurate survey of state-of-art research on intuitionistic fuzzy sets theory and could be considered a continuation and extension of the author's previous book on *Intuitionistic Fuzzy Sets*, published by Springer in 1999 (Atanassov, Krassimir T., *Intuitionistic Fuzzy Sets, Studies in Fuzziness and soft computing*, ISBN 978-3-7908-1228-2, 1999). Since the aforementioned book has appeared, the research activity of the author within the area of intuitionistic fuzzy sets has been expanding into many directions. The results of the author's most recent work covering the past 12 years as well as the newest general ideas and open problems in this field have been therefore collected in this new book.

This book is a collection of papers devoted to the emergence and development in Bulgarian Academy of Sciences of some of the areas of informatics, including artificial intelligence. The papers are prepared by specialists from the Academy, some of whom are among the founders of these scientific and application areas in Bulgaria and in some cases in the world. The book is interesting for specialists in informatics and computer science and researchers in history of sciences.

The use of fuzzy logic has become prominent in a variety of fields and applications. By implementing these logic sets, problems and uncertainties are more effectively resolved. *Emerging Research on Applied Fuzzy Sets and Intuitionistic Fuzzy Matrices* is a pivotal reference source for the latest scholarly perspectives on the interdisciplinary use of fuzzy logic theory, focusing on the application of sets and matrices. Highlighting theoretical framework and empirical research findings, this book is ideally designed for academics, practitioners, upper-level students, and professionals interested in an innovative overview of fuzzy logic sets and matrices.

“Neutrosophic Sets and Systems” has been created for publications on advanced studies in neutrosophy, neutrosophic set, neutrosophic logic, neutrosophic probability, neutrosophic statistics that started in 1995 and their applications in any field, such as the neutrosophic structures developed in algebra, geometry, topology, etc. In this issue: A hybrid Model Using MCDM Methods and Bipolar Neutrosophic Sets for Select Optimal Wind Turbine: Case Study in Egypt, Graphical Representation of Type-2 Neutrosophic sets, PESTEL Analysis to Identify Key Barriers to Smart Cities Development in India.

This book is a printed edition of the Special Issue "Fuzzy Mathematics" that was published in *Mathematics*

In this paper, the notion of neutrosophic soft metric space(NSMS) is introduced in terms of neutrosophic soft points and several related properties, structural characteristics have been investigated. Then the convergence of sequence in neutrosophic soft metric space is defined and illustrated by examples.

This book constitutes the refereed proceedings of the International Conference on Logic, Information, Control and Computation, ICLICC 2011, held in Gandhigram, India, in February 2011. The 52 revised full papers presented were carefully reviewed and selected from 278 submissions. The papers are organized in topical sections on control theory and its real time applications, computational mathematics and its

application to various fields, and information sciences focusing on image processing and neural networks.

In this paper, the notion of compact neutrosophic soft metric space is introduced. The concept of neutrosophic soft function and the composition of functions in a neutrosophic soft metric space along with suitable examples also have been brought. The continuity and uniform continuity of a neutrosophic soft function in this space have been defined and verified by proper examples. Several related properties, theorems and structural characteristics of these have been investigated here.

This book is the result of a meeting on Topology and Functional Analysis, and is dedicated to Professor Manuel López-Pellicer's mathematical research. Covering topics in descriptive topology and functional analysis, including topological groups and Banach space theory, fuzzy topology, differentiability and renorming, tensor products of Banach spaces and aspects of Cp-theory, this volume is particularly useful to young researchers wanting to learn about the latest developments in these areas.

This book provides an overview of the state-of-the-art in both the theory and methods of intuitionistic fuzzy logic, partial differential equations and numerical methods in informatics. Covering topics such as fuzzy intuitionistic Hilbert spaces, intuitionistic fuzzy differential equations, fuzzy intuitionistic metric spaces, and numerical methods for differential equations, it discusses applications such as fuzzy real-time scheduling, intelligent control, diagnostics and time series prediction. The book features selected contributions presented at the 6th international congress of the Moroccan Applied Mathematics Society, which took place at Sultan Moulay Slimane University Beni Mellal, Morocco, from 7 to 9 November 2019.

This book comprises a selection of papers from IFSA 2007 on new methods and theories that contribute to the foundations of fuzzy logic and soft computing. Coverage includes the application of fuzzy logic and soft computing in flexible querying, philosophical and human-scientific aspects of soft computing, search engine and information processing and retrieval, as well as intelligent agents and knowledge ant colony.

Recent Advances in Intuitionistic Fuzzy Logic Systems Theoretical Aspects and Applications Springer

Recently, Fibonacci matrix was introduced and studied by Kara and Basarir [3]. In the present paper, we introduce Fibonacci statistical convergence in neutrosophic normed space and examine some basic properties like Fibonacci statistical Cauchy-ness and Fibonacci statistical completeness.

This carefully edited book presents an up-to-date state of current research in the use of fuzzy sets and their extensions. It pays particular attention to foundation issues and to their application to four important areas where fuzzy sets are seen to be an important tool for modeling and solving problems. The book's 34 chapters deal with the subject with clarity and effectiveness. They include four review papers introducing some non-standard representations

This book is a printed edition of the Special Issue "New Trends in Fuzzy Set Theory and Related Items" that was published in Axioms

This book describes the latest advances in fuzzy logic, neural networks, and optimization algorithms, as well as their hybrid intelligent combinations, and their applications in the areas such as intelligent control, robotics, pattern recognition, medical diagnosis, time series prediction, and optimization. The topic is highly relevant as most current intelligent systems and devices use some form of intelligent feature to enhance their performance. The book also presents new and advanced models and algorithms of type-2 fuzzy logic and intuitionistic fuzzy systems, which are of great interest to researchers in these areas. Further, it proposes novel, nature-inspired optimization algorithms and innovative neural models. Featuring contributions on theoretical aspects as well as applications, the book appeals to a wide audience.

The book focuses on soft computing and its applications to solve real-world problems in different domains, ranging from medicine and health care, to supply chain management, image processing and cryptanalysis. It includes high-quality papers presented at the International Conference on Soft Computing: Theories and Applications (SoCTA 2018), organized by Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, Punjab, India. Offering significant insights into soft computing for teachers and researchers alike, the book inspires more researchers to work in the field of soft computing.

Neutrosophic Sets and Systems (NSS) is an academic journal, published quarterly online and on paper, that has been created for publications of advanced studies in neutrosophy, neutrosophic set, neutrosophic logic, neutrosophic probability, neutrosophic statistics etc. and their applications in any field.

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