including graduate students and researchers. Since its inception by Professor Lotfi Zadeh about 18 years ago, the theory of fuzzy sets has evolved in many directions, and is finding applications in a wide variety of fields in which the phenomena under study are too complex or too ill-defined to be analyzed by conventional techniques. Thus, by providing a basis for a systematic approach to approximate reasoning and inexact inference, the theory of fuzzy sets may well have a substantial impact on scientific methodology in the years ahead, particularly in the realms of psychology, economics, engineering, law, medicine, decision-making, information retrieval, and artificial intelligence. This volume consists of 24 selected papers invited by the editor, Professor Paul P. Wang. These papers cover the theory and applications of fuzzy sets, almost equal in number. We are very fortunate to have Professor A. Kaufmann to contribute an overview paper of the advances in fuzzy sets and systems. One special feature of this volume is the strong participation of Chinese researchers in this area. The fact that the Chinese mathematicians, scientists and engineers have made important contributions to the theory and applications of fuzzy sets through the past decade. However, not until the visit of Professor A. Kaufmann to China in 1974 and again in 1980, did the Western World become fully aware of the important work of Chinese researchers. Now, Professor Paul Wang has initiated the effort to document these important contributions in this volume to expose them to the western researchers. This book is a printed edition of the Special Issue “Fuzzy Mathematics” that was published in Mathematics: Fundamentals of Fuzzy Sets covers the basic elements of fuzzy set theory. Its four-part organization provides easy referencing of recent as well as older results in the field. The first part discusses the historical emergence of fuzzy sets, and delves into fuzzy set connectives, and the representation and measurement of membership functions. The second part covers fuzzy relations, including orderings, similarity, and relational equations. The third part, devoted to uncertainty modelling, introduces possibility theory, contrasting and relating it with probabilities, and reviews information measures of specificity and fuzziness. Finally, the last part deals with fuzzy sets that are real-valued, emphasizing their fundamental role in applications. Each chapter of this book offers a tutorial introduction to the topics, together with an extensive bibliography. This book provides original research on the theoretical and applied aspects of artificial life, as well as addresses scientific, psychological, and social issues of synthetic life-like behavior and abilities. This self-contained monograph presents an overview of fuzzy set theory in mathematical analysis. 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notion of fuzzy metric space by George and Veeramani has many advantages in analysis in many notions and results from classical metric spaces can be extended and generalized to the setting of fuzzy metric spaces, for instance: the notion of completeness, completion of spaces as well as extension of maps. The primary aim of the book is to provide a systematic development of the theory of metric spaces of normal, upper semicontinuous fuzzy convex fuzzy sets with compact support sets, mainly on the base space $\mathbb{R}$. An additional aim is to sketch selected applications in which these metric space results and methods are essential for a thorough mathematical analysis. This book is distinctly mathematical in its orientation and style, in contrast with many of the other books now available on fuzzy sets, which, although all making use of mathematical formalism to some extent, are essentially motivated by and oriented towards more immediate applications and related practical issues. The reader is assumed to have seen some previous undergraduate level acquaintance with metric spaces and elementary functional analysis. It is an indisputable argument that the formulation of metrics (by Fréchet in the early 1900s) opened a new subject in mathematics called non-linear analysis after the appearance of Banach's fixed point theorem. Because the underlying space of this theorem is a metric space, the theory that developed following its publication is known as metric fixed point theory. It is well known that metric fixed point theory provides essential tools for solving problems arising in various branches of mathematics and other sciences such as split feasibility problems, variational inequality problems, non-linear optimization problems, equilibrium problems, selection and matching problems, and problems of proving the existence of solutions of integral and differential equations are closely related to fixed point theory. For this reason, many people over the past seventy years have tried to generalize the definition of metric space and corresponding fixed point theory. This trend still continues. A few questions lying at the heart of the theory remain open and there are many unanswered questions regarding the limits to which the theory may be extended. Metric Structures and Fixed Point Theory provides an extensive understanding and the latest updates on the subject. The book not only shows diversified aspects of popular generalizations of metric spaces such as symmetric, $b$-metric, $\varphi$-distance, $\varphi$-metric, modular metric, probabilistic metric, fuzzy metric, graphical metric and corresponding fixed point theory but also motivates work on existing open problems on the subject. Each of the nine chapters contributed by various authors contains an Introduction section which summarizes the material needed to read the chapter independently of the others and contains the necessary background, several examples, and comprehensive literature to comprehend the concepts presented therein. This is helpful for those who want to pursue their research career in metric fixed point theory and its related areas. Features Explores the latest research and developments in fixed point theory on the most popular generalizations of metric spaces. Describes various new topological fixed points in graphical and modular metric spaces. Enriched with examples and open problems. This book serves as a reference for scientific investigators who need to analyze a simple and direct presentation of the fundamentals of the theory of fixed points. It may also be used as a textbook for postgraduate and research students who are trying to derive future research scope in this area. Provides readers with the foundations of fuzzy mathematics as well as more advanced topics. A Modern Introduction to Fuzzy Mathematics provides a concise presentation of fuzzy mathematics, moving from proofs of important results to more advanced topics, like fuzzy algebras, fuzzy graph theory, and fuzzy topologies. The authors take the reader through the development of the field of fuzzy mathematics, starting with the publication in 1965 of Lotfi Azer Zadeh's seminal paper, Fuzzy Sets. The book begins with the basics of fuzzy mathematics before moving on to more complex topics, including: Fuzzy sets Fuzzy numbers Fuzzy relations Possibility theory Fuzzy abstract algebra And more Perfect for advanced undergraduate students, graduate students, and researchers with an interest in the field of fuzzy mathematics, A Modern Introduction to Fuzzy Mathematics walks through both foundational concepts and cutting-edge, new mathematics in the field. Fuzzy Intelligent Systems: Methodologies, Techniques and Applications comprises state-of-the-art chapters detailing how expert systems are built and the fuzzy logic resembling human reasoning powering them. Hybrid and neuro-fuzzy intelligent systems are discussed along with Evolutionary and, in particular, Genetic Algorithms. This approach has been extended by using Multiojective Evolutionary Algorithms, which can consider multiple conflicting objectives instead of a single one. The book also discusses the hybridization between Multiobjective Evolutionary Algorithms and Fuzzy Systems which is known as Multiojective Evolutionary Fuzzy Systems. Featuring the clearly presented and expertly refereed contributions of leading researchers in the field of approximation theory, this volume is a collection of the best contributions at the Third International Conference on Applied Mathematics and Approximation Theory, an international conference held at TOBB University of Economics and Technology in Ankara, Turkey, on May 28-31, 2015. The goal of the conference, and this volume, is to bring together key work from researchers in all areas of approximation theory, covering topics such as ODEs, PDEs, difference equations, applied analysis, computational analysis, signal theory, positive operators, statistical approximation, fuzzy approximation, fractional analysis, semigroups, inequalities, special functions and summability. These topics are presented both within their traditional context of approximation theory, while also focusing on their connections to applied mathematics. As a result, this collection will be an invaluable resource for researchers in applied mathematics, engineering and statistics. Mathematics of Fuzzy Sets: Logic, Topology and Measure Theory is a major attempt to provide much-needed coherence for the mathematics of fuzzy sets. Much of this book is new material required to standardize this mathematics, making this volume a reference tool with broad appeal as well as a platform for future research. Fourteen chapters are organized into three parts: mathematical logic and foundations (Chapters 1-2), general topology (Chapters 3-10), and measure and probability theory (Chapters 11-14). Chapter 1 deals with non-classical logics and their syntactic and semantic foundations. Chapter 2 details the lattice-theoretic foundations of image and preimage powerset operators. Chapters 3 and 4 lay down the axiomatic and categorical foundations of general topology using lattice-valued mappings as a fundamental tool. Chapter 5 focuses on the fixed-basis case, including a convergence theory demonstrating the utility of the underlying axioms. Chapter 7 focuses on the more general variable-basis case, providing a categorical unification of locales, fixed-basis topological spaces, and variable-basis compactifications. Chapter 5 relates lattice-valued topologies to probabilistic topological spaces and fuzzy building blocks. Chapter 6 investigates the important role of separation axioms in lattice-valued topology from the perspective of space embedding and mapping extension problems, while Chapter 7 examines separation axioms from the perspective of Stone-Cech-compactification and Stone-Representation theorems. Chapters 8 and 9 introduce the most important concepts and properties of uniformities, including the covering and entourage approaches and the basic theory of precompact or complete $[0,1]$-valued uniform spaces. Chapter 10 sets out the algebraic, topological, and uniform structures of the fundamentally important fuzzy real line and fuzzy unit interval. Chapter 11 lays the foundations of generalized measure theory and representation by Markov kernels. Chapter 12 develops the important theory of conditioning operators with applications to measure-free conditioning. Chapter 13 presents elements of pseudo-analysis with applications to the Hamilton-Jacobi equation and optimization problems. Chapter 14 surveys briefly the fundamentals of fuzzy random variables which are $[0,1]$-valued interpretations of random sets. This paper introduces the novel concept of KM-single valued neurofuzzy metric spaces as an especial generalization of KM-fuzzy metric spaces, investigates several topological and structural properties and presents some of its applications. This study also considers the metric spaces and constructs KM-single valued neurofuzzy spaces with respect to any given triangular norms and triangular conorms.