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On Nonsymmetric Topological and Probabilistic Structures

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In this book, several properties of bitopological spaces generated by probabilistic and fuzzy generalizations of classical quasi-pseudo-metrics are studied. The book consists of 12 chapters, and it brings a list of 345 references and the subject index.

In the introductory Chapter 1, a motivation and a short history of the classical developments of the probabilistic metric spaces theory and related theories is presented. Chapter 2 brings some basic concepts, definitions and properties of the subject of the book. The main contribution of the book is concentrated in Chapters 3–12. Chapter 3 is devoted to the study of probabilistic quasi-pseudo-metrics and their conjugates, both generalizing probabilistic metric spaces. Several interesting and typical examples are introduced and studied in Chapter 4. In Chapter 5, several properties of topological spaces generated by probabilistic quasi-pseudo-metrics are investigated. Chapter 6 takes into account the properties of some random normed structures and random quasi-normed structures. Chapter 7 deals with the problem of quasi-pseudo-metrization of probabilistic quasi-pseudo-metric spaces. In Chapter 8, authors propose general methods and concrete formulas to obtain distances of Fréchet- and Lévy Ky Fan-types on Menger spaces, together with some applications. Chapter 9 is devoted to the study of complete probabilistic H-spaces and of complete probabilistic quasi-pseudo-metric spaces, defining among others also different concepts of a Cauchy sequence. Chapter 10 brings an introduction and a deep study of fuzzy quasi-pseudo-metric spaces. In Chapter 11, different concepts of probabilistic and fuzzy contractive mappings are defined and conditions for the existence and for the uniqueness of fixed points of these mappings are given. Finally, in Chapter 12, the concept of Cartesian products of (fuzzy) probabilistic quasi-pseudo-metric spaces and of probabilistic H-spaces are introduced and studied.

This book is a good reading for scientists interested in metric spaces and their generalizations, and it has already found its place in the series of monographs devoted to probabilistic metric spaces, their generalizations and fixed point theorems on these spaces (Schweizer and Sklar 1983, second edition in 2006; Radu 1994; Hadžić 1995; Hadžić and Pap 2001; Chang, Cho and Kang 2001).

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