

Preface

Fuzzy systems are well suited for advanced scientific and engineering applications. They are universal approximators and the knowledge stored in them is represented in the form of fuzzy rules. Initially, such rules were thought to be inherently interpretable. That resulted, among others, from the theory of fuzzy sets proposed by Prof. Lotfi Zadeh, which assumed that fuzzy rules used fuzzy sets and interpretation of a fuzzy set is intuitive. However, in the 1990s researchers drew attention to the fact that the use of a large number of fuzzy rules and sets increases accuracy of system operation but significantly reduces readability of a rule-based notation. Therefore, solutions associated with the term “interpretability” began to appear. Currently, this term goes far beyond the notions of the fuzzy set and the fuzzy rule. The purpose of this book is to show different aspects of interpretable fuzzy systems design in various fields of applications. This book addresses issues of fuzzy sets and systems theory, machine learning, evolutionary algorithms inspired by nature, multi-criterion optimization, classification, biometrics, automatics and control theory.

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