

Book reviews

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ROMAN SLOWIŃSKI (Ed.)

Fuzzy Sets in Decision Analysis, Operations Research and Statistics

(The Handbook of Fuzzy Sets Series.)

Kluwer Academic Publishers, Boston – Dordrecht – London 1998.

xxiv + 456 pages.

ISBN 0-7923-8112-2.

The edited volume contains thirteen contributions focused on interesting and perspective topics connected with the fuzzy set theoretical analysis of real data and their processing in optimization problems. The choice of particular chapters respects the prospectivity of the treated applications of the fuzzy set theory, and they were prepared by qualified and experienced authors.

The contributions are divided into four groups covering more specialized branches of the considered field. Part I, devoted to *Decision Making*, is the most extensive one. It collects five chapters contributed by different authors. They offer clear presentations of the topics regarding fuzzy approaches to preference modelling, aggregation of preferences, multiple criteria decision making, group decision making and also some elements of non-cooperative fuzzy game theory. Part II, oriented to *Mathematical Programming*, is composed of four contributions oriented to fuzzy set theoretical models of linear programming (with single or multiple objective, functions), nonlinear programming, discrete optimization and also dynamic programming.

The extent of the remaining two parts is smaller. Each of them consists of two chapters. Part III, focused to *Statistics and Data Analysis*, deals with selected fuzzy set theoretical methods in statistics with fuzzy data and with fuzzy regression analysis. Finally, Part IV titled *Reliability, Maintenance and Replacement* contains contributions on reliability theory and its fuzzification, and on maintenance and replacement models. Some sections of these two chapters display connections with the topics treated in the previous parts.

The editor and twenty five authors of the chapters of this volume succeeded to create a representative collection of highly qualified surveys of the state-of-art in interesting fields of application of fuzzy set theory. The unifying motive of the chapters gathered in the volume is their orientation to fuzzy set theoretical methods which are near to micro-economic models of optimization. Papers with this orientation gradually become more frequent among the contributions of fuzzy set theoretical conferences. It is useful to summarize some of the most progressive results into one volume.

In accordance with the general development in applied mathematics and artificial intelligence, the mathematical methods connected with economic and social sciences, human behaviour and decision-making become more significant and they attract more and more attention. It is true even for the fuzzy set theory. Its ability to include vagueness into its models makes it especially adequate for this purpose. The soft mathematical procedures, typical for fuzzy set theoretical models, represent one of the perspective directions of further progress in applied mathematics. For these reasons, the referred volume appears especially useful.

The book does not bring a global or complete overview about the very wide field of fuzzy set theoretical methods in optimization and related problems. But it offers a representative selection of interesting and attractive topics in this area. In this sense it is inspirational for those who would like to study some of the presented problems or to contribute actively to its further development.

Milan Mareš

ARTURO SANGALLI

The Importance of Being Fuzzy and Other Insight From the Border Between Math and Computers

Princeton University Press, Princeton 1998.

xvi + 173 pages.

ISBN 0-691-00144-8.

The referred book contributes to the class of works which do not appear very frequently and which aim to combine readability for laypeople with sufficient precision acceptable for experts in the relevant field. This one deals with topics related to the soft computing methods, their theoretical backgrounds, and technical tools. The extent of the subject, really, is not narrow but the author succeeded to keep unified style of the presentation.

The book is divided into three parts, each of them consisting of two chapters. The first part is oriented to the theoretical and conceptual roots of the presented ideas. The first chapter explains the general border between certainty and uncertainty and its first connections to fuzziness, the second chapter is devoted to various aspects of fuzzy set theory, fuzzy logic, fuzzy decision-making, etc.

The second part is focused on the limits of soft computing methods. Its Chapter 3 deals rather with hard computing procedures, their algorithmical complexity, P-NP problem and related topics, meanwhile Chapter 4 is oriented to mathematical foundations of reasoning, logic, formal languages, Gödel's incompleteness theorem, and some examples of problems which can and cannot be solved by mechanical computation.

Finally, the third part is interested in so called natural approaches to the problem solution and computational methods like neural networks and genetic algorithms. Specific situations in which these approaches are advantageous are discussed and their relations to natural intelligence phenomenon are shown. The book is completed by appendices devoted to mathematical formalism being behind some of the results presented in the book. Unfortunately, the list of references is distributed to particular chapters. It can be more closely related to concrete topics but, on the other hand, it complicates the orientation in general survey of works related to the topic of the book.

Due to the author's intention the book is devoted to a large public from laypersons to experts. To achieve this goal the demands for reader's mathematical education are minimized. The reader need not know anything from the higher mathematic. But, on the other hand, he is supposed to be able to read mathematical "language" – formulas and formal terminology. This demand rather determines the set of really expectable readers.

They, probably, will belong to people who have some experience with computer science or who are experts in some of its numerous branches, and want to find a sufficient overview about its global possibilities to solve the problems connected with uncertainty or enormous complexity. For such readers the book is written in a lucid and well readable way and they will find it interesting.

Milan Mareš