

Book reviews

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RADKO MESIAR, BELOSLAV RIEČAN, Eds.

Fuzzy Structures – Current Trends

Tatra Mountains Mathematical Publications,
Vol 13 – special issue for 7th IFSA Congress
Mathematical Institute of Slovak Academy of Sciences, Bratislava,
Slovakia 1997.
248 pages.

The referred volume was published in connection with the 7th World Congress of International Fuzzy Systems Association held in Prague in June 1997. The Congress was introduced by representatively staffed tutorials in which students and young researchers had the possibility to follow introductory lectures to particular topics related to fuzzy set theory. The volume summarizes 8 of them, namely: *Fuzzy measures and integrals for decision making and pattern recognition* (M. Grabisch), *Deductive systems of fuzzy logic* (P. Hájek), *Industrial applications of fuzzy control* (H. Hellendoorn), *Genetic fuzzy systems* (P. Herrera and L. Magdalena), *Fuzzy linear programming: What, Why and How?* (M. Inuiguchi), *Triangular norms* (E. P. Klement and R. Mesiar), *Data mining and knowledge discovery: A fuzzy set perspective* (W. Pedrycz), *Fuzzy portfolio selection and its application to decision making* (J. Watada).

All of these lectures offer compact and highly qualified introduction to the relevant subject, and they are prepared on the modern level stressing actual approaches to the topics. They can be recommended to anybody who already has elementary knowledge of the fuzzy set theory and wishes to find a brief but compact introduction to some of its branches and related concepts.

Limited number of copies is still available with the main organizing institutions (Mathematical Institute of the Slovak Academy of Sciences, Bratislava; Faculty of Civil Engineering of Slovak Technical University, Bratislava; University of Economics, Prague).

Milan Mareš

MILAN MAREŠ, RADKO MESIAR, VILÉM NOVÁK, JAROSLAV RAMÍK,
ANDREA STUPŇANOVÁ, Eds.

Proceedings of the Seventh International Fuzzy Systems Association World Congress. Volume I–IV

Academia, Prague 1997.

Pages: Vol. I, xxii + 529; Vol. II, xx + 573; Vol. III, xx + 533; Vol. IV, xx + 481
ISBN 80-200-0633-8

Four volumes of the referred Proceedings summarize invited lectures and contributed communications of the 7th World Congress of IFSA, held in Prague in June 25–29, 1997. Particular contributions are organized into 69 sections reflecting the structure of the Congress program. They are completed by a section of invited lectures and concluded by additional sections of late delivered papers. The sections are grouped into 15 specialized chapters focused to particular topics covering practically all branches of fuzzy set theory and its applications, namely the following topics are covered by the content of the proceedings: Fuzzy Set Theory, Fuzzy Relations and Functions, Fuzzy Logic and Approximate Reasoning, Learning and Linguistic Aspects, Fuzzy Measures and Integrals, Fuzzy Topology and Analysis, Fuzzy Numbers and Computing, Fuzzy Systems and Models, Genetic

Fuzzy Systems and Algorithms, Neural Networks, Fuzzy Decision-Making and Mathematical Programming, Fuzzy Optimization Procedures, Fuzzy Control, Fuzzy Data Processing, Applications, Related Topics.

The scientific level of the Congress was highly appreciated by participants. The proceedings volumes reflect this quality. They offer a representative survey of up to date results achieved in practically all fields related to the concept of fuzziness, reaching from general abstract theory to actual practical applications in various fields of human activity. It makes them attractive for readers actively interested in the referred topics.

A limited number of copies of the referred Proceedings is still disposable with the organizing institutions (University of Economics, Prague; Institute of Information Theory and Automation, Academy of Sci., Prague; Faculty of Civil Engineering, Slovak Technical University, Bratislava; Faculty of Natural Sciences, University of Ostrava, Ostrava).

František Včelář

GEORGE J. KLIR, BO YUAN, Eds.

Fuzzy Sets, Fuzzy Logic, and Fuzzy Systems. Selected Papers by Lotfi A. Zadeh

Advanced in Fuzzy Systems – Applications and Theory, Vol. 6

World Scientific, Singapore – New Jersey – London – Hong Kong 1996.

xiv + 826 pages.

ISBN 9810224214.

The name of professor Lotfi A. Zadeh is one of the best known names in the modern mathematics. His seminal paper published in 1965 in *Information and Control*, has opened the fuzzy set theory, very dynamic area of the modern mathematical thinking. The referred book offers a selection of Zadeh's papers devoted to the areas mentioned in its title.

There already exists one volume offering Zadeh's selected papers, namely "*Fuzzy Sets and Applications*" edited by Ronald J. Yager, Sergei Ovchinnikov, Richard M. Tong and Hung T. Nguyen and published in 1987 by John Wiley. Its editors have collected 14 publications representing the Zadeh's contribution to the fundamentals of the fuzzy set theory and possibility theory. Their book proved to be extremely valuable for specialists being interested in the relevant branches.

The fact that the first volume appeared to be "too selective" and the demand for good survey of other papers by L. A. Zadeh became urgent means a great evaluation of his contribution to the contemporary science. The editors of the referred volume have aimed to prepare an easily accessible overview of Zadeh's papers for the benefit of those working in the areas named in the heading.

They have chosen 44 papers from Zadeh's impressive bibliography, to select the most comprehensive representatives of every group of papers on the same topic. Only the seminal paper which has opened the fuzzy set theory is in both volumes, in the one from 1987 and the referred one. In this way, the two volumes form an organic unit displaying the width and originality of L. A. Zadeh's contribution to the development of the fuzzy approaches to various fields of mathematics. An admirer of historical authenticity surely evaluates the editor's idea to reprint most of the selected papers in their original form except only those whose accessible copies were not of sufficient quality.

In addition to the selected papers, the book includes a brief *Preface*, bibliographical *Introduction* focused to the Lotfi A. Zadeh's scholarly contributions primarily to fuzzy set

theory, fuzzy logic and fuzzy systems, and a complete bibliography of his papers. The bibliography is divided into two parts summarizing publications on fuzzy sets and publications on other topics. Among the fuzzy set theoretical papers those ones being published in the first volume and in the referred one are distinctly marked. The volume is concluded by *Subject Index*.

The editors have prepared the book in the year of 30th anniversary of the publication of the seminal paper and it represents a nice reminder of the event. (Let us note for the readers of *Kybernetika* that one of events remembering the 25th anniversary was a representatively attended international seminar organized in Bechyně in former Czechoslovakia by Czech and Slovak fuzzists with valuable assistance of one of the editors, professor G. J. Klir, in 1990).

Lotfi A. Zadeh is an undoubtedly luminary celebrity whose creative and original ideas have evidently influenced the trends of contemporary mathematics. He has been born in 1921 in Baku, the former Soviet Azerbaijan, since 1931 he lived in Teheran, Iran, and since 1944 he lives in the United States. It is worth mentioning that the latest one of his works referred in the list of publications in the volume was published in 1995.

The editors of the referred book of Zadeh's selected papers have done a creditable piece of work. They have succeeded to prepare a representative collection of principal contributions to the development of the fuzzy set theory, fuzzy logic and fuzzy systems. Their volume surely becomes a valuable aid for active researchers, lecturers and students being interested in the relevant topics. It is compiled with care, responsibility and excellent knowledge of the matter, and it can be doubtlessly recommended to anyone who is deeply interested in the fuzzy mathematics.

Milan Mareš

A. JULIANO, W. BRANDLER

Tracing Chains-of-Thought

Fuzzy Methods in Cognitive Diagnosis

Physica-Verlag, Heidelberg 1996.

xvii + 230 pages, 38 tables, 71 figures.

ISBN 3-7908-0922-5.

The development of the fuzzy set theory was prevalably motivated by the demand for adequate mathematical models of some phenomena existing in non-classical applied sciences, e. g., in human or social ones. The literature oriented to the applications of fuzzy sets published in late years is evidently increasing in accordance with the applicational motivation mentioned above. Nevertheless, the monographs on the use of fuzzy sets in cognitive diagnoses are very rare and in this sense the referred book fills up an alarming gap in the existing works.

The book is oriented to the phenomenon of the cognitive state of a person and its relation to its desired or target state. Investigating these problems the authors aim to design and develop intelligent tutoring systems which would be able to diagnose the student's problem-solving performance. The observation of the cognitive process cannot be direct but only in connection with the actions resulting from it. Mutual connection between these two areas is necessarily vague, and it can be naturally modelled by means of the fuzzy sets. The main formal tools for the methods presented in the referred book are fuzzy cognitive maps as representation of the knowledge states. The book introduces various measures and operations on fuzzy relations as formal apparatus for handling the maps.

The book is divided into 10 chapters which are grouped in 4 main sections titled "*The Search for Chains-of-Thought*", "*On Using Fuzzy Cognitive Maps*", "*Investigations and Applications*" and "*What Have we Learned from all These?*". The last, fifth, section includes 6 appendices mostly devoted to special approaches or techniques related to the subject of the book.

The referred work brings undoubtedly original ideas and opens a new area of research index. Its contribution to the mathematical modelling in human and social sciences is highly qualified and perspective. Moreover, the entire book is written in a lucid and illustrative style well understandable for any reader who is familiar with elementary mathematical notations. The theoretical explanations are illustrated by well chosen examples, the formal mathematical results are heuristically discussed and interpreted.

It is possible to recommend the book to anybody who is interested in the artificial intelligence and models of human thinking and who is not afraid of a bit of well readable and illustrative mathematics.

Milan Mareš