TIMOTHY J. ROSS

Fuzzy Logic With Engineering Applications

McGraw–Hill, Inc., New York – St. Louis – San Francisco 1995.
xx + 600 pages.
ISBN 0-07-113637-1

Fuzzy set theory and fuzzy logic become significant components of the applied mathematics. They have developed a long list of effective and well elaborated tools for technical application in control, identification of systems and other related branches. This fact is reflected by this work which offers a very good overview of results and methods created by fuzzy set theory for the engineering applications.

The referred book represents an advanced educational text. Even if it is a compact unit with logical inner structure, each of its chapters can be used as separate brief textbook of the branch of its subject.

The educational purpose of the book is evident also from the arrangement of the explanations. The theoretical paragraphs are completed by many numerical examples (about 120 of them are numbered, others briefly illustrate the general results), which include lots of figures (almost 400) and tables (almost 200). The formal independence of particular chapters is underlined by introducing relevant references after each of them. The reader can also test his understanding of the explanation by means of numerous exercises – they are headed *Problems* and their sum amounts over 340 – which are illustrative and well chosen. Even their including to each chapter supports the educational character of the publication.

The fifteen chapters of the book can be divided into four main groups. The first one of them is formed by chapters presenting the basic elementary concepts of fuzziness and, especially, determining their relation to their crisp patterns. Besides the heuristic *Introduction* chapters like *Classical Sets and Fuzzy Sets, Relations and Fuzzy Relations, Membership Functions, Fuzzy–to–Crisp Conversions* form this first group. The second one deals with more advanced but still general fuzzy set theoretical topics like *Fuzzy Arithmetics, Numbers, Vectors and the Extension Principle* and *Classical Logic and Fuzzy Logic* as well as *Fuzzy Rule–Based Systems*. The last one of these three chapters represents a continual transition to the third group. It includes more application-oriented chapters dealing with specific topics of fuzzification of some procedures and models being familiar in the control and information sciences or operations research, like *Fuzzy Nonlinear Simulation, Fuzzy Decision–Making, Fuzzy Classification, Fuzzy Pattern Recognition* and *Fuzzy Control Systems*. The last two chapters *Miscellaneous Topics* (fuzzy optimization, inverse fuzzy relational equations, fuzzy linear regression are included under this heading) and *Fuzzy Measures: Belief, Plausibility, Probability and Possibility* link the topic of the book to some other advanced models of uncertainty and data processing. The book is concluded by *Index*, references are (as mentioned above) attached to particular chapters.

The referred book is written in a lucid style, the theoretical ideas are illustrated and discussed by means of examples. The arrangement of chapters and presentation of Problems supports the initiative reading. The book can be recommended to advanced students of applied fuzzy set theory or control theory as well as to skilled specialists in both of those fields who wish to complete their knowledge in the subjects of some of the chapters.

Milan Mareš