

Joint Review of**Fuzzy Set Theory - and Its Applications
(H.J. Zimmermann) Kluwer, 1985****and of****Fuzzy Mathematical Techniques with Applications
(A. Kandel) Addison-Wesley, 1986**

In the last ten years fuzzy sets have gained a greater credibility and respectability with the development of important theoretical tools and the advent of genuine applications. A great number of books, which are either specialized in a particular field of applications (e.g. decision and risk analysis, clustering and pattern classification, system theory, switching theory, ...) or organized collections of recent papers by various authors, give evidence of the intense research activity during this period. In contrast, there were only a few general monographs devoted to fuzzy set theory and its applications until recently ; in fact if we restrict to books written in English, there were mainly the introductory treatise by Kaufmann and the mathematically oriented concise book by Negoita and Ralescu, whose English versions appeared both in 1975, and our more recent survey book published in 1980. The two books under review are new attempts at offering a more up-to-date account of the main results and applications of fuzzy set theory. Both volumes concentrate in their theoretical part on the basic operations on fuzzy sets, the extension principle and the computation with fuzzy numbers, the fuzzy relations, the fuzzy mappings, the fuzzy measures and the fuzzy events (with a special emphasis on possibility measures), and the approximate reasoning

patterns (including the handling of fuzzy quantifiers). All these topics were already present in our own book and it seems that there is a consensus among researchers about their importance in the theory and their fundamental rôle in the applications. The two books focus on the main issues and give basic results generally, rather than proposing a research compendium of the recent theoretical developments. This is natural since their intended purpose is to serve as introductory books ; however some new results obtained in rather mathematically-oriented topics such as fuzzy random variables for instance, which may be of interest from an application point of view in the future, are not presented in any of the two books. The two volumes have important sections devoted to applications, although they are written in different styles. Kandel gives a brief presentation of various applications experienced in his research group : fuzzy decision tables, analysis of the transient behavior in digital systems, modelling of systems in uncertain environments using the author's approach to fuzzy statistics, pattern clustering, possibilistic search trees and fuzzy data bases. Zimmermann's presentation of applications is based on representative works done by various people in the late seventies or in the early eighties for most of them. The reported works include approximate reasoning systems, fuzzy controllers, fuzzy clustering methods, fuzzy linear programming, fuzzy dynamic programming, fuzzy multi-criteria analysis, applications to scheduling problems and the empirical research in fuzzy set theory done in the author's group. Inevitably, there are some instances in both books where some more recent examples of valuable applications are not presented and discussed, especially for knowledge-based systems. However each book offers a comprehensive and convincing coverage of the topic.