

Foreword

When I was asked to write a foreword to this book “*Fuzzy Methods for Customer Relationship Management and Marketing*,” I was glad to see one more important application of fuzzy models. Nowadays, fuzzy models are applied in many fields of science and its applications, ranging from mathematics to engineering, from medical diagnosis to quality control, and from metrology to marketing, just to mention some of them. The bases for fuzzy methods are fuzzy sets which are founded on a generalization of the abstract concept *set*. A classical set A is characterized by its indicator function $I_A(\cdot)$ which is based on dual logic, i.e. indicator functions are allowed to assume only the two values 0 or 1. For an element x in A the indicator function takes the value $I_A(x) = 1$, and for an element x which doesn't belong to A we have $I_A(x) = 0$.

In reality, it turns out that not all sets can be characterized in this way. An example is the set of good books. As far as I know the first mathematical publication on a generalization of indicator functions is from the year 1951 by Karl Menger. He allowed the generalized indicator functions $\mu(\cdot)$ to assume any value in the unit interval $[0; 1]$. This is a generalized logic with a continuity of truth values, where $\mu(x)$ is the degree of membership of the element x to this generalized set. These generalized indicator functions $\mu(\cdot)$ were called *membership functions* by Lotfi Zadeh more than one decade later, and the so defined generalized sets he called *fuzzy sets*. This was the starting point of so-called fuzzy logic and fuzzy methods.

Fuzzy models were flourishing during the last decades of the 20th century and in the first decade of the 21st century. Presently even statistics is taking care of fuzziness of data and a-priori information. Especially for decision making and other executive work, fuzzy logic models are important methods to support managers. Moreover, for marketing and related data mining, fuzzy concepts are essential.

Fortunately this book is continuing quantitative modeling based on fuzzy methods and constitutes a valuable contribution to management science.

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Reinhard Viertl was born in 1946 in Hall in Tyrol, Austria. He studied in civil engineering, philosophy, and engineering mathematics, earning Dipl.-Ing. degree 1972, and Doctor of engineering sciences 1974. He was Assistant at the Technische Hochschule Wien, University docent 1979, Research fellow and visiting Lecturer, University of California, Berkeley, 1980-1981, and Visiting docent, University of Klagenfurt, 1981-1982. Since 1982, he has been full Professor of Applied Statistics with special emphasis on Regional and Information Sciences, Vienna University of Technology. He has also been Visiting

professor, University of Innsbruck, 1991-1993, Seasonal instructor, University of Calgary, 2003, Visiting professor, University of Salatiga, Indonesia, 2010, Visiting professor, University of Brno, Czech Republic, 2011. He is a Member of the International Statistical Institute, Fellow of the Royal Statistical Society, London, President of the Austrian Statistical Society 1987-1995, and received invitation to membership in the New York Academy of Sciences, 1999. He gained election as honorary member of the Austrian Statistical Society, 2008. Scientific publications include: Statistical Methods in Accelerated Life Testing (1988), Introduction to Stochastics (in German, 2003), Statistical Methods for Non-Precise Data (1996), Description and Analysis of Fuzzy Information (in German, 2006), Statistical Methods for Fuzzy Data (2011). He has been Editor and co-Editor of several other books, and the author of over 100 scientific papers in mathematics and statistics.