**Progress in Fuzzy Sets and Systems**

Edited by Wolfgang H. Janko, Marc Roubens, and H.-J. Zimmermann

Kluwer Academic Publishers, Dordrecht

1990, 188 pp.

ISBN 0-7923-0730-5

This anthology is the proceedings of the Second Workshop on Progress in Fuzzy Sets in Europe sponsored jointly by the European chapter of the International Fuzzy Systems Association and the Working Group on Fuzzy Sets of the Association of European Operational Research Societies, held on April 6-8, 1989 in Vienna. It contains fifteen papers on both theory and applications of fuzzy sets and related methods, contributed by researchers from both Western and Eastern Europe and Japan.

A book review cannot serve to adequately describe the breadth of material presented. Therefore I will only briefly describe each paper in order to give the reader an idea of some of the methods and applications discussed.

Some of the papers are strictly mathematical. **Chanas and Florkiewicz** develop methods for determining the fuzzy expected value of a random variable given fuzzy evidence. **Gonzalez, Muñoz and Vila** develop ordering and ranking relations among fuzzy numbers, and the related concepts of dominance and indifference. **de Campos and Moral** consider comparisons among fuzzy numbers of different granularity under scale transformation. And **Meyer and Kruse** develop covariance analysis methods of fuzzy random variables.

Other authors are concerned with the use of fuzzy methods for observation and identification. **Cazenave, Roques, and Videau** use fuzzy membership grade approximations to probability distributions to measure anatomical differences between hunters and non-hunters. **Bandemer and Kraut** present new results on the determination of functional relationships in models based on fuzzy measurement of visual data.

Two papers describe engineering and control applications. **Kóczy and Hirota** present further results in fuzzy flip-flop design using algebraic methods and "furry numbers" (fuzzy-digit, or "fit" strings). And **Stipanicev and Bozicevic** study fuzzy feedforward control systems.

But the majority of the contributors present results of their applications of fuzzy methods to knowledge-based systems. **Adlassnig** surveys CADIAG-2, a Computer Assisted medical DIAGnostic system based on fuzzy logic. **Barreiro et al.** describe ONCOGAL, a leukosis diagnostic

system, which uses mixed prototype and fuzzy production rule methods. **Geyer, Geyer-Schulz, and Taudes** describe a time series analyzer using a fuzzy rule-based expert system and a Box-Jenkins ARMA time series analysis tool-kit. **Kallala and Bellin** present a fuzzy model of computer user's attitudes towards text-editting tasks. **Martin-Clouaire** discusses some issues in the application of fuzzy logic and possibility theory to knowledge-based systems. **Spies** compares Zadeh's fuzzy quantifiers and Baldwin's support logic in modeling human heuristic reasoning, including an empirical study and consideration of conditional objects. **Shirai, Fujishiro and Kunii** describe EGDM, the Extended Graph Data Model, which uses the entity-relationship model to create network-style fuzzy databases.

This volume represents an excellent look at the current state of the art of the application of fuzzy methods to a variety of problems in knowledge-based systems, as well as a brief look at some current mathematical and theoretical issues. It will well serve the reader with interests in any of the specific subjects mentioned, or with a general interest in the use of fuzzy theory in science and engineering.

Reviewed by Cliff Joslyn, Graduate Fellow, Systems Science, SUNY–Binghamton, 327 Spring St. # 2, Portland ME, 04102, USA, (207) 774-0029, `cjoslyn@bingsuns.cc.binghamton.edu`, `joslyn@kong.gsfc.nasa.gov`.