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Obituary

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Professor Hideo Tanaka (1938–2012).

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Professor Hideo Tanaka passed away on May 16, 2012 in Osaka, Japan, at the age of 74. The cause was a kind of pneumonia after he had struggled with this disease for several years. The loss of Prof. Tanaka deeply saddens our research scholars, especially those in operational research, management engineering, and fuzzy modelling.

Professor Hideo Tanaka was born in Osaka on September 28, 1938. He received a BS degree in Instrumentation Engineering from Kobe University in 1962 and M.S. and Ph.D. degrees in Electrical Engineering from Osaka City University in 1966 and 1969, respectively. He was with the Department of Industrial Engineering at Osaka Prefecture University from July 1969 to March 2000. From 1972 to 1973, he was a Visiting Research Associate in the Computer Science Division under Professor L. A. Zadeh at the University of California, Berkeley in the US. From 1975 to 1977, he was an Alexander Von Humboldt Foundation Fellow under Professor H-J Zimmerman at Technical University of Aachen, Germany, and from 1981 to 1982, he was a Research Associate in the Chemical Engineering Department under Professor L. T. Fun at Kansas State University in the US. From April 2000 to March 2002, he was a Professor in the Graduate School of Management and Information Science at Toyohashi- Sozo College and a Professor in the Department of Kansei Design, Faculty of Psychological Science, Hiroshima International University. He had been an Emeritus Professor at Osaka Prefecture University since April 1, 2000 and an Honorary Professor of Chongqing University of Posts and Telecommunications since October 9, 2003.

Professor Hideo Tanaka served as a member of the editorial boards for Int. J. of Fuzzy Sets and Systems, Fuzzy Economic Review, Mathware and Soft Computing, Fuzzy Optimization and Decision Making, Mathematical Modeling and Algorithms, Advanced Computational Intelligence, ORSA Journal on Computing (American OR Journal), and Artificial Intelligence. Notably, He was an Area Editor for Fuzzy Sets and Systems from 1998 to 2004. He was the Vice President of the International Fuzzy Systems Association (IFSA) from 1989 to 1991, Vice President of the Japan Society for Fuzzy Theory and Systems (SOFT) from 1991 to 1992, and President of SOFT from 1995 to 1996. He received the Contribution Award from The Japan Institute of Industrial Engineering (1991), the Literary Award from Japan Society for Fuzzy Theory and Systems (1993), the Achievement Award from the Japan Society for Fuzzy Theory and Systems (1999), and the IEEE Fuzzy Systems Pioneer Award (2010).

Professor Hideo Tanaka devoted his life to academic research. He made a series of significant achievements and played a leading role in the field of fuzzy operations research, especially in fuzzy systems modelling. The academic legacy he has left is rich and influential, and we remember him with deep respect.

1 Pioneering work on fuzzy systems

Professor Tanaka had already begun his work on fuzzy systems during his Osaka Prefecture University days in 1969. He proposed his first fuzzy regression model in the late 1970s. This model introduced two innovations: it provided a linear programming method to build fuzzy systems, an approach that is now widely employed to develop a variety of fuzzy systems; and it provided an innovative means of data analysis over the fuzzy clustering models of the 1960s and 1970s.

The fuzzy linear programming methodology was published in 1974. This methodology was based on the concept of fuzzy decision making proposed by Bellman and Zadeh's famous paper published in Management Sciences. This paper followed a collaboration with Prof. Koji Izumi, Prof. Ichihashi and Prof. Inuiguchi_D

A widely cited paper on fuzzy regression analysis, published in IEEE Transaction SMC in 1982, had a significant influence on multivariate analysis, as demonstrated by the list of his publications. This research was followed by research on a fuzzy qualification methods, the fuzzy GMDH method. In the 1980s and 1990s, Professor Tanaka was the leading researcher in fuzzy mathematical analysis.

Professor Tanaka proposed various influential and innovative models and approaches in fuzzy systems and related fields. In particular, he contributed extensively to data analysis, operations research and to their applications, such as management engineering problems. After retiring from Osaka Prefecture University, he moved to Sozo University and then to Hiroshima International University in the 2000s. There, he expanded his research to rough sets and fuzzy AHP, including possibility theory.

2 Contribution to academic service

Professor Tanaka was committed to the establishment of a fuzzy systems society in Japan and was selected as the President of the society from 1995 to 1997. He served as Vice President of the International Fuzzy Systems Association (IFSA) from 1987 to 1989. He was a recipient of the Achievement Award from SOFT in 1998, Fellow of the IFSA and Fellow of the SOFT in 2003, and the 20th IE Contribution Award in 1991. Professor Tanaka contributed as an area editor or associate editor of various journals as metioned above.

3 Contribution to education

Professor Tanaka educated many PhD students who became influential scholars with expertise in fuzzy systems in Japan. These scholars include Tetsuji Okuda (Emeritus Professor, Osaka Institute of Technology), Junzo Watada (Professor, Waseda University), Hidetomo Ichihashi (Professor, Osaka Prefecture University), Koji Izumi (Professor, Hannan University), Keisuke Noma (Professor, Ryukoku University), Hiroshi Yokoyama (Associate Professor, Osaka Electro-Communication University), Isao Hayashi (Professor, Kansai University), Seung-Gook Hwang (Professor, Kyungnam University), Masahiro Inuiguchi (Professor, Osaka University), Hisao Ishibuchi (Professor, Osaka Prefecture University), Peijun Guo (Professor, Yokohama National University), Tomoe Entani (Associate Professor, Kochi University), Kazutomi Sugihara (Associate Professor, Fukui University of Technology) and others. Many of these scholars currently play important roles in academic and educational communities.

4 Memories of Prof. Hideo Tanaka

Professor Tanaka encountered the famous fuzzy sets paper while pursuing his PhD degree at the graduate school of Electrical Engineering, Osaka City University, where he majored in optimal control theory, including sensitivity analysis. During his time as a PhD student, he had not yet begun his research on fuzzy systems. After completing his degree, he moved to the Department of Industrial Engineering, Faculty of Engineering, Osaka Prefecture University. He worked on fuzzy systems research with Professor Kiyoji Asai for many years until Prof Asai's retirement. His main research achievements were accomplished over 30 years at Osaka Prefecture University.

He was interested in theoretical and mathematical modelling rather than heuristic approaches. His main achievements were theoretical models, including fuzzy regression analysis, mathematical programming, and GMDH. His pioneering work in fuzzy systems earned Professor Hideo Tanaka the IEEE/CIS Fuzzy Systems Pioneer Award.

We have fond memories of Professor Hideo Tanaka, Mrs. Fuku Tanaka and their daughters. We will never forget our interactions with his family.

He was kind, good and stubborn. When we read books and scientific papers with him, he sometimes persisted in clarifying certain points when he was not satisfied with the explanations he received from his students. He often could not move forward without clarifying these points. These discussions were difficult for students because this information is not easily explained; often, we engaged in discussions or arguments on unclear points for hours. These discussions helped us understand how to seek the logic and concepts behind the material we read. Prof Tanaka's students have happy memories of these experiences.

Prof Tanaka invited his students to his home on many occasions. Mrs. Fuku Tanaka was always very hospitable and provided a variety of succulent dishes. She acquired these recipes during the Tanakas' two visits to the US and during their one-time stay in Germany.

Professor Tanaka generally preferred philosophical discussions with sociological implications. He offered explanations that provided easier comprehension of difficult subjects.

Professor Tanaka was an exceptionally good and benevolent person who developed a personal friendship with many of his colleagues, in Japan and abroad. He behaved like a good father to his students and juniors, helping them in every way he could, both in physical and spiritual distress, and helping them towards the development of better personalities, in their academic and private lives. After retirement he peacefully admired the Beauty of Creation and often he made happy his friends by sending them lovely picture shows presenting the beauty of the World.

May his soul rest in peace.

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