KYBERNETIKA — VOLUME *49* (2013), NUMBER 3, PAGES 391–394

SPECIAL ISSUE DEDICATED TO MILAN MAREŠ

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This issue of Kybernetika is dedicated to the memory of Milan Mareš (1943 – 2011). The contributions were submitted by his friends, co-authors and followers.

Milan Mareš was born on May 30, 1943 in České Budějovice, Czechoslovakia. After attending elementary and secondary schools in České Budějovice, he graduated in Probability Theory and Mathematical Statistics at Charles University in Prague, Faculty of Mathematics and Physics, in 1965. He received Candidate of Science and Doctor of Science degrees from Czechoslovak Academy of Sciences, Prague, in 1975 and 1990, respectively, with specialization in game theory. He became Associated Professor (thesis: Computation with Vague Numbers) and Full Professor (area of study: Informatics - Theoretical Informatics) at Charles University in 1997 and 2001, respectively. He had been a key researcher at ÚTIA since 1966 and he served as ÚTIA Vice-Director for Research in the period June 8, 1990 – May 31, 1998, and as ÚTIA Director in the period June 1, 1998 – April 30, 2007. Moreover, he held part-time positions at several Czech universities.

Milan Mareš passed away unexpectedly on July 25, 2011. He was an outstanding figure in the fields of fuzzy quantities, fuzzy information theory and fuzzy game theory. In the early 1980s, he recognized the potential of fuzzy set theory for the modeling and processing of vague information sources. After several contributions he summarized his Fuzzy Quantities Theory in monograph "Computation Over Fuzzy Quantities" published by CRC-Press, Boca Raton, Florida in 1994. This monograph was cited in more than 160 scientific works by renowned authors, among others L. A. Zadeh, G. J. Klir, D. Dubois, E. E. Kerre, and B. De Baets. Another field deeply influenced by Milan Mareš is game theory. His first monograph on this topic, "On Bargaining in Games", appeared in Kybernetika 12 (1976) as Supplement in Issues 2–6. Fuzzy approaches to coalitions in game theory resulted in his next monograph "Fuzzy Cooperative Games: Cooperative Behaviour with Vague Expectation" published by Physica Verlag, Heidelberg, in 2001. This monograph has more than 60 known citations. Recently, he started a deep research in the area of information measures and uncertainty of particular symbols, publishing a few papers in this field; but his work in this direction was interrupted by his unexpected death.

Milan Mareš published about 20 chapters in monographs and edited volumes, 190 papers in scientific journals, and 60 conference contributions. It is possible to find more than 280 citations of his publications in Google (excluding self-citations). However,

a strict numerical evaluation of his scientific work can never express his fundamental contribution and influence in the field of information theory and fuzzy mathematics. Moreover, it is impossible to describe in few lines the great charm of Milan Mareš not only in personal communications, but also when presenting deep mathematical results and theories. Many people, even those who are far from mathematics, have enjoyed his popularization contributions in journals and newspapers, exceeding 150 in total. Especially popular are his two books published only in Czech to date, namely "The Appropriate Words, or How to Talk about Mathematics, Cybernetics and Informatics" ("Slova, která se hodí, aneb jak si povídat o matematice, kybernetice a informatice", in Czech) published in 2006, and "Stories of Mathematics" ("Příběhy matematiky", in Czech), which appeared in 2008. His third popularization monograph concerning the possible abuse of mathematical statistics in the real life remains uncompleted. Milan Mareš was a member of Editorial Board of Kybernetika since 1992, and its Editor-in-Chief since 1999. He served as a member in several other editorial boards of journals such as Problems of Control and Information Theory, International Journal of Intelligent Systems and Information Processing, Open Cybernetics and Systemics Journal, Prague Economic Papers and The Space (Vesmír, in Czech). Moreover, he was a member of 10 scientific boards of universities in Czechia and abroad. His work work was awarded by several medals and awards.

Milan Mareš was a great person with an unforgettable charm and humor. He was a man of many plans and ambitions, who succeeded to achieve a lot in his life. His work and attitude inspired many. We lost in him a nice person, great friend and a fine colleague.

We are very grateful that we can present this issue of Kybernetika to honor such an exceptional personality. It contains 8 contributions from the game theory, information theory and other fields related to Milan Mareš' research interests. The first paper from game theory entitled "One-Point Solutions Obtained from Best Approximation Problems for Cooperative Games" is due to T. Tanino. The paper deals with point-valued solutions of coalitional games with transferable utility. The author enhances a recent idea of regarding these solutions as solutions to the best approximation problems in suitably chosen real normed spaces of finite dimension. In particular, the author clarifies the question of how to choose the norm to obtain Harshanyi's payoff vector, a random order value, and the Shapley value.

The second contribution titled "Simple Games in Lukasiewicz Calculus and Their Cores" by P. Cintula and T. Kroupa is devoted to the investigation of the core solution on the class of games with fuzzy coalitions with the coalition function represented by a monotone formula in Lukasiewicz logic. The resulting family of games generalizes the simple boolean games in the presence of fuzzy coalition formation. The authors show that the core of each simple Lukasiewicz game is an intersection of finitely-many halfspaces, depending only on the linearizing triangulation of the McNaughton function. Nonemptiness of the core is characterized by a variant of the balancedness condition and by existence of (weak and strong) veto players in the game.

Next two papers are linked to information theory. The article "A short note on multivariate dependence modeling" by V. Bína and R. Jiroušek introduces the problem of aggregating several different pairwise dependencies into a single multivariate copula.

Their approach is information-theoretic: the well-known Iterative proportional fitting procedure (IPFP) is used in order to recover a joint probability distribution. The authors propose some heuristics yielding a relaxed solution of the problem even for inconsistent pairwise dependence relations in case when IPFP tends to cycle.

The subsequent contribution "Information in vague data source" of M. Mareš and R. Mesiar is based on a previous joint work of authors and their discussions. It brings an alternative to probabilistic Shannon's entropy, replacing the uncertainty hidden in a probability distribution by possibilistic approach and exploiting fuzzy quantities and their processing.

Next four contributions have touched several other fields of interests of Milan Mareš. In the paper "Tilt Stability in Nonlinear Programming under Mangasarian–Fromovitz Constraint Qualification", B. S. Mordukhovich and J. Outrata focus on the study of tilt stability of local minimizers in the general extended-real-valued framework of unconstrained optimization. They obtain a characterization of tilt-stable local minimizers via strong metric regularity of a certain set-valued mapping associated with the first-order stationarity with no explicit Lagrange multipliers.

As stated previously, Milan Mareš was interested in modeling of situations involving conflict of interests and ways how to resolves them cooperatively. Consequently, he was also interested in various means of preference representation. The sixth paper "Measuring consistency and inconsistency of pair comparison systems" by J. Ramík and M. Vlach is concerned with the representations that are based on pairwise comparison of alternatives. The authors study the desirable properties of such representation like various types of transitivity, reciprocity and consistency, and they also develop mathematical tools for the measurement of the degree of satisfaction of these properties when the perfect satisfaction is difficult to obtain. The results can be also used for coalitional preferences and coalitional domination studied by Milan Mareš.

The next paper entitled "Modelling financial time series using reflections of copulas" is due to J. Komorník and M. Komorníková. They have shown that convex combinations of reflections of copulas exhibit potentially useful fitting properties, especially when considering tail dependencies. Based on the proposed approach, and considering original copulas from Normal, Frank, Gumbel and Clayton families, authors have constructed interesting models for the relations between investments in stocks and gold.

In the last contribution of this special issue "Fair majorities in proportional voting" written by F. Turnovec, we can find a game-theoretical model of voting to find a quota that defines the fair voting rule as a function of the structure of political representation. Such a quota is called a fair majority. The proposed concept of fair majorities (which can differ for different structures of the parliament) is applied to the Lower House of the Czech Parliament elected in 2010.

We are grateful to all authors, reviewers and the editors of Kybernetika for their contributions, reviews and support yielding this special issue devoted to a great man, to our unforgettable friend Milan Mareš.

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