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MULTIPLE CRITERIA METHODOLOGIES FOR TACKLING HARD DECISION MAKING PROBLEMS

Preface

The present volume is the second special issue of *Control & Cybernetics* devoted to methodological and applied aspects of Multiple Criteria Decision Making (MCDM), in which I have a privilege to serve as Guest Editor. The previous volume (*Crisp Versus Fuzzy Approaches to Multiple Criteria Decision Making*, vol. 3, 2002) was a collection of selected papers, prepared at the occasion of the BOS'02 Conference (*Polish Systems and Operational Research Society Conference, Warsaw, September, 2002*). The present volume replicates this concept, this time in conjunction with BOS'04 (*PSORS Conference, Warsaw, September, 2004*).

The six papers the volume consists of are not homogenous with respect to methodologies, but neither is the field of MCDM. Thus, the volume gives, to some extent, a taste of diversity and richness of approaches offered by MCDM for *quantitative* support in decision making.

To stress the vitality of applications for further development of the field and bow to those who have dash to deal with intricacies of *practical* issues, this volume starts with two works which address specific problems. The paper *On multi-criteria approaches to bandwith allocation*, by Wodzimierz Ogryczak and Adam Wierzbicki, analyses the complexity of bandwith allocation in telecommunication management and shows how to tame it via MCDM approach. The second paper, *A multicriteria analysis of cooperation in the case of innovative activity*, by Lech Kruś, addresses cooperation issues in innovative investments and in order to tackle them proposes a multiple criteria bargaining framing.

The four methodological papers which follow deal with general MCDM methodologies. The first two consider the central problem of MCDM: *how to derive a satisfactory* (in the sense of decision maker satisfaction) *decision*? The other two take the pain to investigate the indispensable but often neglected step of MCDM, namely stability of satisfactory decisions (solutions) under different types of perturbations.

In *Interactive approach in multicriteria analysis based on stochastic dominance*, by Maciej Nowak, it is shown how to arrive at satisfactory decisions when MCDM problems are formulated within a stochastic setting. And in *A generalization of Zionts-Wallenius multiple criteria decision making algorithm*, by Ignacy Kaliszewski and Stan Zionts, it is presented how to achieve the same goal, this time in a deterministic setting, with an extension of the classical Zionts-Wallenius method to so-called convex MCDM problems.

The paper *Robust goal programming*, by Dorota Kuchta, addresses uncertainty in goal programming, a non-interactive approach to MCDM, and offers an original methodology to deal with. In *Stability and accuracy functions in multicriteria optimization problem...*, by Marek Libura and Yuri Nikulin, stability of the efficiency (both in the sense of the Pareto and the lexicographical principle) status of decisions under perturbations of parameters in the generic multiple criteria combinatorial optimisation problem is investigated.

Complex decision problems to be solved call for sophisticated tools. One-tool-fit-all approach does not apply in the complex world we all live in. In the field of MCDM a collective effort is made to provide a universal toolset of methodologies capable to handle decision problem complexity, the task to my best knowledge not as yet completed. And the present volume adds to this effort.

Ignacy Kaliszewski
Guest Editor

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