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Multiple Criteria Decision Making Refinements: Models and Methodologies

Preface

The present issue is the third one of *Control & Cybernetics*, hosting papers explicitly devoted to methodological and applied aspects of Multiple Criteria Decision Making (MCDM), of which I have had the privilege to serve as Guest Editor.

The two previous issues of the journal that I had the pleasure of editing, appeared under the titles of *Crisp Versus Fuzzy Approaches to Multiple Criteria Decision Making* (vol. 3, 2002) and *Multiple Criteria Methodologies for Tackling Hard Decision Making Problems* (vol. 3, 2004).

As nowadays applications are, or at least they should be, the main driving force behind research in the MCDM field, this issue starts with an application paper. Jussi Hakanen, Yoshiaki Kawajiri, Kaisa Miettinen and Lorenz T. Biegler in *Interactive multi-objective optimization for simulated moving bed processes* show how MCDM modelling and solution seeking methodologies can improve a technological processes popular in chemical industries.

The five papers, which follow, reflect the standpoint that in MCDM, though it is a mature research field, there still is a room for model and methodology refinements.

Wodzimierz Ogryczak in *Multicriteria models for fair resource allocation* considers various notions related to fairness and investigates how fairness can be guaranteed within MCDM framework. To this aim he proposes and exploits a number of allocation schemes and discusses their viability.

Vladimir A. Emelichev and Eugene E. Gurevsky in *On lexicographic Boolean problem of minimizing absolute value of linear functions under uncertainty* address a problem of parametric optimisation for a specific class of objective functions measuring absolute deviation from zero. For the problem considered some stability results are obtained and discussed.

In *An approach to finding trade-off solutions by linear transformation of objective functions* Dmitry Podkopaev revisits the notion of trade-off and provides a generalization of existing characterizations of outcomes with a priori bounded trade-offs. The paper offers an algebraic framework to interpret but also to operationalise that notion.

On a bicriteria optimal production plan by Dorota Kuchta brings two multiple criteria models of production plans. The problem investigated is “optimal” production plan building for two machines under the presence of two criteria,

where the firsts one measures the economic effect of the production process, whereas the second measures its make span.

Ignacy Kaliszewski in *A method of approximating Pareto sets for assessments of implicit Pareto set elements* investigates the problem of building discrete representations for convex bicriteria problems with given accuracy. Existence of such representations is necessary for calculating bounds on efficient outcomes (variants) instead of deriving them explicitly.

Complex decision problems to be solved call for sophisticated tools. One-fit-all approach does not apply in the complex world we live. In the field of MCDM collective efforts are made to provide a universal toolset of methodologies capable of handling decision problem complexity, the task to my best knowledge not as yet completed. This special section of the journal provides a contribution to those efforts.

Ignacy Kaliszewski
Guest Editor
Warsaw, December, 2006.