KYBERNETIKA — VOLUME *50* (2014), NUMBER 2, PAGES 173–174

SPECIAL ISSUE: WUPES'12

Václav Kratochvíl and Jiřina Vejnarová

This special issue of the Kybernetika Journal arose from the 9th Workshop on Uncertainty Processing, WUPES'12, held in Mariánské Lázně, Czech Republic, in September 2012. These workshops, the first of which was organized back in 1988, aim to foster creative intellectual activities and the exchange of ideas in an informal atmosphere. To ensure this goal, the tradition is to limit the number of participants and to encourage the discussion based on a more detailed knowledge of presented ideas that are published in the proceedings. Each WUPES has traditionally been followed by a special issue of a renowned international journal containing the selected contributions: WUPES'12 makes no exception from this practice.

The proceedings of WUPES'12 contain 24 papers. The scope of the contributions encompasses many areas of approximate reasoning from conditional independence structures through Dempster-Shafer theory to fuzzy logic. There are articles investigating properties of uncertainty models in a purely mathematical setting as well as statistical studies based on real datasets.

In the selection process for this special issue, we tried to capture the rich variety of the presented methodological approaches. The quality of the selected papers was judged by reviewers in accord with the usual practice of Kybernetika. After a careful selection, 7 papers were included in the special issue. There are, however, many other articles that would also have deserved to be included in this special issue.

In *The Irrelevant Information Principle for Collective Probabilistic Reasoning* Adamčík and Wilmers study whether or not a special multi-agent extension of maximum entropy inference process (the so-called social entropy process) can satisfy the Irrelevant Information Principle. The authors show that this principle may be too strong and they propose an appropriate alternative.

Standard and Nonstandard Representability of Positive Uncertainty Orderings by Capotorti, Coletti, and Vantaggi gives axioms for positive comparative probabilities and plausibilities defined either on Boolean algebras or on arbitrary sets of events.

Calculations of Graded Ill-Known Sets by Inuiguchi elaborates on the previous work carried out in the field of Rough Sets. The author introduces sufficient conditions for the possibility of using lower and upper approximations of function values of graded ill-known sets instead of their complex exact calculations.

The paper *Discriminating between Causal Structures in Bayesian Networks given Partial Observations* by Moritz, Reichardt, and Ay is devoted to a tight upper bound on the mutual information in a partially observed Bayesian network factoring according to a dependence graph G. This bound can be used for discriminating between different causal hypotheses underlying a system.

The rapidly growing field of algebraic statistics is represented by the contribution *Scaling of Model Approximation Errors and Expected Entropy Distances* by Montúfar, and Rauh. It shows the expected value of the Kullback-Leibler divergence in various statistical models with respect to Dirichlet priors. The results serve as a reference to rank the approximation capabilities of other statistical models.

Counterparts of Bayesian networks in Evidence Theory are reflected in *A Comparison of Evidential Networks and Compositional Models* by Vejnarová. The author presents a new system based on a recently introduced concept of conditional independence together with the respective conditioning rule. The discussion reveals that the new rule has a sensible relationship with conditional independence, which allows us to define evidential networks in a way analogous to Bayesian networks. The weaknesses and strengths of this solution are discussed.

The paper *Degradation in Probability Logic: When more information leads to less precise conclusions* by Wallmann and Kleiter deals with probability logic and phenomena when argument forms with two premises usually lead from precise probabilities of the premises to imprecise or interval probabilities of the conclusion. The authors define different types of such a degradation and they study various inference rules.

We thank Lucie Fajfrová for supporting us in a number of stages during the preparation of this issue. We would also like to thank the referees, whose interesting comments and constructive remarks often helped the authors to substantially improve their papers.

May 16, 2014.

Jiřina Vejnarová, Institute of Information Theory and Automation — Academy of Sciences of the Czech Republic, Pod Vodárenskou věží 4, 182 08 Praha 8. Czech Republic.
e-mail: vejnar@utia.cas.cz

Václav Kratochvíl, Institute of Information Theory and Automation — Academy of Sciences of the Czech Republic, Pod Vodárenskou věží 4, 182 08 Praha 8. Czech Republic.
e-mail: velorex@utia.cas.cz