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Coauthors: Nanasiova Olga, Slovak University of Technology, Bratislava, Slovakia olga@math.sk

COMPARISON OF CONDITIONING ON MV-ALGEBRAS AND ORTHOMODULAR LATTICES

KALINA MARTIN

Both, orthomodular lattices and MV-algebras are generalizations of Boolean algebras. I.e, it is quite natural to ask what are common features of conditioning on these algebraic structures and in which properties they differ.

Examples of orthomodular lattices are, e.g., the system of all subspaces of a given Hilbert space, or Cartesian product of a system of Boolean algebras (the latter can be considered as a model of some time-series). The most important example of an MV-algebra is a system of $[0, 1]$-valued measurable function with their domain equal to X and closed under Lukasiewicz connectives.

Assume we have an orthomodular lattice L with a state m and an MV-algebra M with a state f.

We will discuss the properties of the above defined conditional states and show how we can define joint distributions and how they can be extended to more-dimensional cases. Finally we compare the results achieved on both algebraic structures. Below we give a (not exhaustive) list of papers with related topics.

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References

[1] CChang C.C., Algebraic analysis of many valued logics. *Trans. Amer. Math. Soc.* **88** (1958), 467–490.

[2] Chang C.C., A new proof of the completeness of the Łukasiewicz axioms. *Trans. Amer. Math. Soc.* **93** (1959), 74–80.

[3] Dvurečenskij A., Pulmannová S., Conditional probability on σ-MV algebras, *Fuzzy Sets and Systems*, **155** (2006), 102-118.

[4] Kalina M., Nánásiová O., Conditional states and joint distributions on MV-algebras, *Kybernetika* **42** (2006), 129-142.

[5] Kalina M., Nánásiová O., Modelling of conditional states on MV-algebras. *Submitted to Information Sciences*

[6] Khrennikov A. Yu., Representation of the Kolmogorov model having all distinguishing features of quantum probabilistic model, *Phys. Lett. A* **316** (2003), 279-296.

[7] Nánásiová O., On conditional probabilities on quantum logic, Int. Jour. of Theor. Phys., **25** (1987), 155 - 162.

[8] Nánásiová O., *Representation of conditional probability on a quantum logic*, Soft Comp. vol. 4 (2000) 36-40.

[9] Nánásiová, O., Map for simultaneous measurements for a quantum logic. *Internat. J Theoret. Phys.* **42** (2003) 1889–1903.

[10] Nánásiová, O., Principle conditioning, *Internat. J Theoret. Phys.*, **43**, No. 7 (2004) 1757-1767.

[11] Riečan, B., Mundici, D., Probability on MV-Algebras, In: *E. Pap ed., Handbook of Measure Theory*, Elsevier, Amsterdam 2002, 869-909.

Slovak University of Technology, Bratislava, Slovakia
E-mail address: kalina@math.sk