

Drossos, Costas A.; Markakis, George; Shakhathreh, M.

A nonstandard approach to fuzzy set theory. (English) Zbl 0861.03041
Kybernetika 28, Suppl., 41-44 (1992).

Summary: The nonstandard approach to fuzzy sets [the first author, Fuzzy Sets Syst. 37, No. 3, 287-307 (1990; [Zbl 0712.03045](#))] is based on a Boolean generalization of Infinitesimal Analysis [see, e.g., the first two authors, Math. Slovaca 44, No. 1, 1-19 (1994; [Zbl 0789.03038](#))]. This paper, gives a short review of this approach, describes some applications to mathematical structures and indicates the way for an extension using fuzzy partitions. In addition, we prove that the theory is general, since for any ordinary fuzzy set $f : X \rightarrow [0, 1]$ there exists a unique Boolean probability algebra (\mathbb{B}, p) and a \mathbb{B} -possibility distribution $\pi : X \rightarrow \mathbb{B}$, such that $f = p \circ \pi$.

MSC:

[03E72](#) Theory of fuzzy sets, etc.
[03H05](#) Nonstandard models in mathematics

Cited in **1** Review
Cited in **1** Document

Keywords:

possibility distribution; nonstandard approach to fuzzy sets; Boolean generalization of Infinitesimal Analysis; fuzzy partitions; Boolean probability algebra

Full Text: [Link](#) [EuDML](#)

References:

- [1] C. Drossos: Foundations of fuzzy sets: A nonstandard approach. Fuzzy Sets and Systems · [Zbl 0712.03045](#) · [doi:10.1016/0165-0114\(90\)90027-4](#)
- [2] C. Drossos, G. Markakis: Boolean powers and stochastic spaces (submitted 1988).
- [3] C. Drossos, G. Markakis: Boolean fuzzy sets. Fuzzy Sets and Systems · [Zbl 0760.03016](#) · [doi:10.1016/0165-0114\(92\)90269-A](#)
- [4] C. Drossos G. Markakis, G. Tzavelas: A non-standard approach to a general theory of random and B-fuzzy sets I. · [Zbl 0760.03016](#)
- [5] C. Drossos, M. Shakhathreh: Fuzzy Boolean powers and fuzzy probability (in preparation). · [Zbl 0795.03093](#)
- [6] G. Markakis: A Boolean Generalization of Infinitesimal Analysis with Application to Fuzzy Sets. Ph.D. Thesis in Greek 1990.
- [7] K. Piasecki: A remark on the definition of fuzzy P/Measures and the Bayes formula. Fuzzy Stes and Systems 27 (1988), 379-383. · [Zbl 0655.60004](#) · [doi:10.1016/0165-0114\(88\)90063-2](#)
- [8] A. Sgarro: Fuzziness measures for fuzzy rectangles. Fuzzy Sets and System 34 (1990), 39-45. · [Zbl 0683.94019](#) · [doi:10.1016/0165-0114\(90\)90125-P](#)
- [9] H. Störmer: A probability approach to fuzzy sets. Beiträge zur Angewandten Math. und Statist., Hanser. Munich 1987, pp. 275-296.

This reference list is based on information provided by the publisher or from digital mathematics libraries. Its items are heuristically matched to zbMATH identifiers and may contain data conversion errors. It attempts to reflect the references listed in the original paper as accurately as possible without claiming the completeness or perfect precision of the matching.