

Algebras and logics for the treatment of probability over fuzzy events

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Abstract

In several concrete situations it makes sense to use probabilities over fuzzy events. The most used mathematical structure for the treatment of such probabilities are the states on MV-algebras. These constitute a natural generalization of probability measures to many-valued events. States have been studied by several authors (Mundici, Dvurecenskij, Leustean, Di Nola, Panti, Kroupa, Marra, Aguzzoli, Gerla and others). However, one also might look for a logic for reasoning about probability. Several logics have been investigated by Hjek, Godo, Flaminio and others, but none of them is algebraizable in the sense of Blok-Pigozzi. To this purpose, in a recent paper with Flaminio, we have introduced an algebraizable modal logic and we have studied its algebraic semantics. Then I have extended this logic to a stronger logic which is suitable for the treatment of conditional probability over fuzzy events. We have investigated the connections between these logics and the de Finetti coherence problem, and we have found a characterization of coherence in terms of logical consistency. At the moment, I am investigating lower and upper probabilities over fuzzy events. If I will be successful, I will also present my results on this topic in Darmstadt