

Direct Products of Bounded Fuzzy Lattices and Ordinal Products of Linear Fuzzy Posets

Joseph McDonald (*University of Alberta*)

We continue the work of Chon, as well as Mezzomo, Bedregal, and Santiago, by studying algebraic operations on bounded fuzzy lattices arising from fuzzy partially ordered sets. Chon in [1] proved that fuzzy lattices are closed under taking direct products defined using the minimum triangular norm operator. Mezzomo, Bedregal, and Santiago in [3] introduced further operations on fuzzy lattices and extended Chon's result to the case of bounded fuzzy lattices under the same minimum triangular norm direct product construction. The first contribution of this study is to strengthen their result by showing that bounded fuzzy lattices are closed under a much more general construction of direct products; namely direct products whose underlying triangular norm operators have no zero divisors. We then introduce the concept of triangular norm based ordinal products of fuzzy posets, which is then investigated within the setting of linear (totally ordered) fuzzy posets. Time permitting, various applications of these results will be discussed.

References:

- [1] Chon, I.: Fuzzy partial order relations and fuzzy lattices. *Korean Journal of Mathematics*. 17, 361–374 (2009)
- [2] Klement, E., Mesiar, R., Pap, E.: *Triangular Norms*. Trends in Logic, vol. 8, Springer (2000)
- [3] Mezzomo, I., Bedregal, B., and Santiago, R.: On some operations on bounded fuzzy lattices. *The Journal of Fuzzy Mathematics*. 22, 853–878 (2014)

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