CONTINUOUS DIAGONALS OF TRIANGULAR NORMS

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Triangular norms are important operations applied in several fields such as probabilistic metric spaces, fuzzy sets and fuzzy logic, etc. Recall that $T : [0,1]^2 \to [0,1]$ is called a t-norm if it is associative, commutative, non-decreasing and 1 is neutral element. For more details see also [1]. Several algebraic properties of t-norms can be derived from the diagonal function $\delta(x) = T(x,x)$ (Archimedean property, idempotent elements, zero divisors). This work is dedicated to the comparison between the set of diagonal functions of continuous t-norms D^c and the set of continuous diagonal functions of non-continuous t-norms D^n. The structure of the set D^c is described, see also [2], and the hypothesis on the structure of the set of all continuous diagonal functions of t-norms is introduced. Also the following problem introduced in [1] is solved: can there exist a t-norm with the next diagonal function?

$$\delta(x) = \begin{cases} x/2 & \text{if } x \in [0, 0.5], \\ 0.25 & \text{if } x \in]0.5, 0.75], \\ 3x - 2 & \text{else.} \end{cases}$$

It will be shown that there is no t-norm having the above described diagonal function.

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References

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