WILD T-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 we recommend [1]. Several algebraic properties of t-norms can be derived from the diagonal function $\varsigma(x) = T(x,x)$ (Archimedean property, idempotent elements, zero divisors). A similar analytical counterpart, namely whether the continuity of ς ensure the continuity of T, was for years an open problem. This problem was negatively solved recently by G. Krause (personal communication). The aim of this presentation is introducing of Krause's example of non-continuous wild t-norms with continuous diagonal in a transparent way. The construction is based on the Cantor set and the Farey sequence. Several properties of wild t-norms are investigated, including the characterization of all discontinuity points. A fractal-like structure of linear wild t-norm is illustrated by means of the derivative of the corresponding diagonal function.

References

[1] E. P. Klement, R. Mesiar, E. Pap: *Triangular Norms*, Kluwer Academy Publ., Dordrecht, 2000.