Free Łukasiewicz Implication Algebras

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Abstract

Łukasiewicz implication algebras are the $\{\rightarrow, 1\}$-subreducts of MV-algebras. They are the algebraic counterpart of Super-Łukasiewicz Implicational Logics. We give a description of free Łukasiewicz implication algebras in the context of McNaughton functions. More precisely, we show that the $|X|$-free Łukasiewicz implication algebra is isomorphic to $\bigcup_{x \in X} [x_\theta)$ for a certain congruence θ over the $|X|$-free MV-algebra. As corollary we describe the free algebras in all subvarieties of Łukasiewicz implication algebras.