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A note on the first-order logic of complete BL-chains. (English) Zbl 1152.03019

Math. Log. Q. 54, No. 4, 435-446 (2008).

The relationship of the set of predicate tautologies of all BL-chains and the set of predicate formulas valid in all standard BL-algebras (i.e., the set of all standard tautologies) is discussed. This paper is a continuation of the papers of *F. Montagna* and *L. Sacchetti* [ibid. 49, No. 6, 629–641 (2003; [Zbl 1035.03010](#))] and [ibid. 50, No. 1, 104–107 (2004; [Zbl 1039.03013](#))], and its main result shows that a cocomplete BL-chain B satisfies all standard BL-tautologies if and only if for any transfinite sequence $(b_i : i \in I)$ in B , there holds $\bigwedge_{i \in I} (b_i^2) = (\bigwedge_{i \in I} b_i)^2$. Another equivalent condition is this one: the formula

$$\forall x(\varphi(x) \& \varphi(x)) \rightarrow ((\forall x \varphi(x)) \& (\forall x \varphi(x)))$$

is valid in B .

Reviewer: [Radko Mesiar](#) (Bratislava)

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[03B52](#) Fuzzy logic; logic of vagueness

[03B50](#) Many-valued logic

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