Smetanin, Yu. M.
Verification of the logical sequence in nonclassical multivalued logic. (Russian. English summary) Zbl 1388.03028

Summary: The article discusses the use of the proposed nonclassical multivalued logics L_{S_2}. The interpretation of the formulae of this logic is constructed using the algebraic system. $\Sigma(\Omega)$ is a set support, a collection of subsets of the universe Ω. This collection can be created using the operations $\{\cdot, +, '\}$ from the model of sets $\tilde{\aleph}_n = \langle \aleph_1, \aleph_2, \ldots, \aleph_n \rangle$. This work illustrates the use of multiple-valued logic L_{S_2} to solve the problem of the verification of reasoning. It is shown that if the task of verification can be formulated in terms of a correspondence between sets, then the verification of a logical sequence can be made using the extremal properties of the Galois-correspondence. It is necessary to use semantic values of formulas of L_{S_2}. The semantic value of a formula is a single or multi-element family of constituency sets. The proposed approach allows one to significantly reduce the computational complexity of verification of reasoning in comparison with the algorithms used for the logic of predicates of first order. The paper illustrates the possibility of an algebraic approach laid down by Aristotle, Gergonne, Boole, and Poretsky.

MSC:

03B50	Many-valued logic
03G25	Other algebras related to logic
03B70	Logic in computer science
06A15	Galois correspondences, closure operators (in relation to ordered sets)

Keywords:

logical equations; syllogistic; algebraic ontology; algebraic system; nonparadoxical logical consequence; Boolean algebra; Galois correspondence

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