Liddell, G. F.

A logic for propositions with indefinite truth values. (English) Zbl 0564.03020

Stud. Log. 41, 197-226 (1982).

The purpose of this paper is to report results connecting the system of a logic for propositions with indefinite probabilities as truth values and based on game theory. In this logic, propositions are asserted by some speaker called the proponent and are directed against another speaker called the opponent. A simple position consists of a collection (with repetitions allowed) of propositions asserted by the opponent and a collection of propositions asserted by the proponent. The debates between the two speakers may be viewed as games (with perfect information) on the graph whose vertices are positions and whose edges are moves. It is shown that the Lindenbaum algebra of positions is a lattice and, moreover, is isomorphic to a completely free lattice. The results concerning propositions are special cases of the results for positions, so we have a logic PR which is non-distributive and Post's axiom is false. The author establishes that PR is a lattice under conjunction and disjunction but it is not modular or even orthomodular and a free lattice can be embedded in PR; to date, no axiom system is known for PR or for the logical identities in propositional variables.

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MSC:

03B50 Many-valued logic
03G10 Logical aspects of lattices and related structures

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