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NEW RESULTS IN ORTHOMODULAR LATTICES AND IMPLICATION ALGEBRAS

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Summary

In this talk I shall present the following new results, I arrived at this year:

- there is an implication algebra with a unique primitive implication which is coextensive with an orthomodular lattice.
- there is an implication algebra with a unique primitive implication which gives either quantum or classical logic (orthomodular or distributive lattice) depending on the mapping of the implication onto the lattice operations.
- 5 implications definiable in an orthomodular lattice (Kalmbach '83) not only make an ortholattice orthomodular (Pavicic '87) but also can define a nonorthomodular ortholattice. The latter is decidable iff orthomodular lattice is decidable.
- there is a quantum logic which is determined by modus ponens (in the standard quantum logic the modus ponens does not even determine orthologic).

I show how the results can be important for quantum computers and their logic with a special reference to the recent result of M. P. Solér and the way we define superposition in quantum logic.