

IMPLICATION ALGEBRAS

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Abstract

We introduce the concepts of pre-implication algebra and implication algebra based on orthosemilattices which generalize the concepts of implication algebra, orthoimplication algebra defined by J.C. Abbott [2] and orthomodular implication algebra introduced by the author with his collaborators. For our algebras we get new axiom systems compatible with that of an implication algebra. This unified approach enables us to compare the mentioned algebras and apply a unified treatment of congruence properties.

Keywords: implication algebra, pre-implication algebra, orthoimplication algebra, orthosemilattice, congruence kernel.

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REFERENCES

- [1] J.C. Abbott, *Semi-Boolean algebra*, *Matem. Vestnik* **4** (1967), 177–198.
- [2] J.C. Abbott, *Orthoimplication Algebras*, *Studia Logica* **35** (1976), 173–177.
- [3] L. Beran, *Orthomodular Lattices, Algebraic Approach, Mathematic and its Applications*, D. Reidel Publ. Comp., 1985.
- [4] I. Chajda and R. Halaš, *An Implication in Orthologic*, submitted to *Intern. J. Theor. Phys.* **44** (2006), 735–744.

- [5] I. Chajda, R. Halaš and H. Länger, *Orthomodular implication algebras*, Intern. J. Theor. Phys. **40** (2001), 1875–1884.
- [6] G.M. Hardegree, *Quasi-implication algebras, Part I: Elementary theory*, Algebra Universalis **12** (1981), 30–47.
- [7] G.M. Hardegree, *Quasi-implication algebras, Part II: Structure theory*, Algebra Universalis **12** (1981), 48–65.
- [8] J. Hedlková, *Relatively orthomodular lattices*, Discrete Math., **234** (2001), 17–38.
- [9] M.F. Janowitz, *A note on generalized orthomodular lattices*, J. Natural Sci. Math. **8** (1968), 89–94.
- [10] N.D. Megill and M. Pavičić, *Quantum implication algebras*, Intern. J. Theor. Phys. **48** (2003), 2825–2840.

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