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Prime Spectrum of a Tetravalent Modal Algebra

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1 Introduction Tetravalent modal algebras were introduced by Monteiro in 1978 as an example of DeMorgan algebras. They also provide a very interesting generalization of the three-valued Łukasiewicz algebras. The aim of this paper is to characterize the prime spectrum of a tetravalent modal algebra.

2 Tetravalent modal algebras Let us consider the following definition.

2.1 Definition: A tetravalent modal algebra $(A, \wedge, \vee, \sim, \nabla, 1)$, or simply A, is an algebra of type (2,2,1,1,0) which satisfies the following axioms:

A1 $x \wedge (x \vee y) = x$
A2 $x \wedge (y \vee z) = (z \wedge x) \vee (y \wedge x)$
A3 $\sim\sim x = x$
A4 $\sim(x \wedge y) = \sim x \vee \sim y$
A5 $\sim x \vee \nabla x = 1$
A6 $x \wedge \sim x = \sim x \wedge \nabla x$.

It immediately follows that A is a distributive lattice [7] and a DeMorgan algebra [4], [5].

We assume that the reader is familiar with the basic notions of lattice theory.

Of the properties which can be derived from the definition axioms, the following should be retained, since it will be needed later:

B $x \leqslant \nabla x$ (cf. [2])

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