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IS ALGEBRAIC LOGIC A CHAPTER OF FUNCTIONAL ANALYSIS?

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There is a striking resemblance between the properties of an existential quantifier on a Boolean algebra well-known in algebraic logic and those of an averaging operator on an associative f-ring (see [3; 5] and, respectively, [1]). A natural question arises, which characteristic properties of Boolean algebras and f-rings permit the usual quantifier axioms to work properly. As shown in [2], a suitable common generalisation of Boolean algebras and f-rings, which also covers some other useful structures, is provided by certain sum-ordered semirings called there semiring-like logics.

Functional monadic algebras of [3] is a standard tool for investigating predicate logic with only one variable algebraically (they are to this logic just as Boolean algebras are to propositional logic). We discuss in this talk how, and in what extent, the theory of these algebras can be generalised to a theory of spaces of functions with values in a semiring-like logic. In particular, infinite summation in the underlying semiring (see [4]) is required.

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