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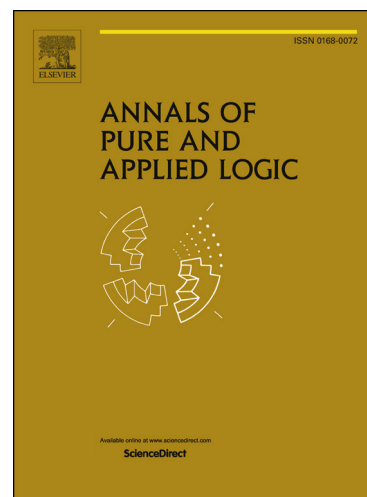
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# Logic for abstract hoop twist-structures

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**Abstract:** In this paper, we introduce and study a logic that corresponds to abstract hoop twist-structures and present some results on this logic. We prove the local deductive theorem for this logic and show that this logic is algebraizable with respect to the quasi-variety of abstract hoop twist-structures.

**Keywords:** Algebraizable logic, Twist structure, AHT-algebra, Hoop.

**MSC(2000):** 03B99, 03B22, 03B50, 03C07.

## 1 Introduction

Büchi and Owens introduced hoops in an unpublished manuscript [8] in the mid-1970s. Hoops are an important class of logical algebras. They have interesting algebraic and logical properties. Hoops have closely related to some important logical algebras such as Heyting algebras, Wajsberg algebras and BL-algebras. It was proved in [1], the variety of basic hoops is generated as a quasi-variety by all algebras of the form  $([0, 1], *, \rightarrow, 1)$ , where  $*$  is a continuous t-norm on  $[0, 1]$  and  $\rightarrow$  is its residual.

Recently, twist-structure construction has also been used to represent algebras related to non-classical logics as a special kind of power of some other algebraic structure. Also, it helps mathematician to solve logical and algebraic problems by using results on better known structures, such as Heyting or Boolean algebras. For instance, Odinstov [18] introduced the algebraic models of paraconsistent Nelson logic under the name of N4-lattices. These lattices can be represented by twist-structures of generalized Heyting algebras. Rivieccio [22] introduced the implicative twist-structures corresponding on a logical level, to the negation-implication fragment of the Arieli-Avron logic and, on an algebraic level, to the negation-implication subreducts of implicative bilattices [11, 20]. In [14], we used hoop to build a new algebra which we call hoop twist structure and obtained some related results. We studied the relation between hoop twist-structures and

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