SEMANTIC OF LINGUISTIC TRUTH-VALUED INTUITIONISTIC FUZZY PROPOSITION CALCULUS

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ABSTRACT. *Linguistic truth values are always used to express true or false of natural language propositions. In this paper, based on a linguistic truth-valued lattice implication algebra and academic idea of intuitionistic fuzzy sets, we construct a linguistic truth-valued intuitionistic fuzzy algebra. Then, we introduce valuations of natural language propositions calculus based on the linguistic truth-valued intuitionistic fuzzy algebra. Finally, we discuss the satisfiability of the propositions calculus.*
Keywords: Lattice implication algebra, Intuitionistic fuzzy sets, Linguistic truth values, Semantic, Satisfiability

1. **Introduction.** In our real life, we often use knowledge gained from our experience to understand our surroundings, to learn new things, and to make plans for the future. On the one hand, limited by our capability to perceive the world and how profoundly we infer, we find ourselves everywhere confronted with uncertainty about the adequacy of our information and inferences. On the other hand, we almost always use natural languages to describe and communicate our gained knowledge recognition, decision and execution processes [13, 14, 30, 31]. Natural languages can be formalised by Zadeh's linguistic variables [26], in which, a linguistic value is consisted of atomic linguistic value and linguistic hedge, *e.g.*, very true (true is the atomic linguistic value and very is linguistic hedge). In computing with words (CWW), very true is expressed by a fuzzy set on $[0, 1]$, *i.e.*, semantic of very true. Information processing corresponding linguistic values is translated to their semantics, and fuzzy sets theory becomes main tool for CWW. Nowadays, there exist many alternative methods to linguistic valued based intelligent information processing, *e.g.*, Huynh proposed a new model for parametric representation of linguistic truth-values [2]-[4]. Turksen studied the formalization and inference of descriptive words, substantive words and declarative sentence based on type-2 fuzzy sets [5]-[7]. Ho discussed the ordering structure of linguistic hedges, and proposed hedge algebra to deal with CWW [9]-[12]. Xu, et al. proposed linguistic truth-valued lattice implication algebra