LOGICAL APPROXIMATION OF FORMULAS USING NORMAL FORMS BASED ON REFLEXIVITY

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We will introduce special logical formulas which we call normal forms and we will use them for the approximate representation of extensional formulas in (fuzzy) BL-logic. By the approximate representation in logical framework we mean that any extensional formula is equivalent of its normal form (disjunctive or conjunctive) under the special condition. The schematic representation to which we refer as $conditional equivalence$ or $logical approximation$, looks as follows:

$$Condition \to (ExtensionalFormula \equiv NormalForm).$$

In essence, normal forms representing a certain formula can be viewed as an aggregated description of an available local information about a fuzzy relation corresponding to this formula in a given interpretation. The local information consists of two parts combined by conjunction: the first part characterizes a local domain by its membership function, and the second part describes a value of the fuzzy relation provided that its arguments lie inside the respective local domain.

Here, we will present the condition which implies the equivalence of normal forms and initial formula. The rest of the contribution will be divided into the following two parts. The first will be devoted to the construction of reflexive binary predicate(R) which characterizes a local domain by its membership function. And finally, we will find a sufficient finite domain covering by the membership functions of R_i such that normal forms approximate the initial formula(its membership function) with given accuracy.

References

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