Some notes on inverted fuzzy implications

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Abstract. In this paper, we will address the problem of inverting fuzzy implications in the context of their domain and preserving monotonicity.

Keywords: Fuzzy conjunction · Fuzzy implication · Natural negation · Inverse implication.

1 Abstract

In this paper, we will discuss and generalize the problem considered in the papers [10, **?**,**?**]. Specifically, we are looking for an inverse implication that will be defined over the entire unit square and a formula that will describe such a fuzzy implication with a single expression, allowing us to adjust the values without dividing the domain into subsets.

We will consider the construction of the inverse implication with respect to the antecedent and the consequent. When we consider basic examples of implication (see [2], Table 1.3), we obtain a proper subset of the unit square as the domain of the inverse implication (e.g., for the Kleene-Dienes implication, we get a triangle above the main diagonal, see [4, 5]).

When we consider the implications generated by representable uninorms (see [4, 13]), this problem is resolved, but the issue of classifying the resulting operations arises. In some cases, we obtain implications, while in others, there is a problem with the monotonicity of the obtained operations.

During the presentation, we would like to explain some of the emerging problems and present a few questions that may help solve the remaining issues. Additionally, we will present potential applications of our theoretical considerations (see [12, 9, 1, 3, 8]).

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