Abstract of

Nonmonotonic Fuzzy Inference

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In this thesis we study nonmonotonic fuzzy inference operators. We use for this Gerla's abstract notion of fuzzy logic as a basic tool. This notion allows us to integrate many approaches for reasoning with uncertain or vague information known from the literature under a unifying point of view, in that *fuzzy deduction operators* are closure operators on a fuzzy power set of formulas.

Our aim is to study *inference operators* that take as premises fuzzy sets of formulas and return fuzzy sets of formulas as conclusions. But contrary to the fuzzy deduction operators we abandon monotonicity and require some weaker properties instead, inspired from similar properties that have turned out to be desirable for two-valued nonmonotonic inference.

To construct fuzzy inference operators we use selection functions on the abstract fuzzy semantics. This passage from the monotonic to nonmonotonic has been studied already for two-valued logic. Interestingly, several of the existing results for inference operators based on selection functions in the context of classical propositional logic can be proven in our broader context.

In the two-valued logic the construction of "relatively maximally consistent sets" is often used to define nonmonotonic inference operators. But while in classical logic there is a one-to-one correspondence between those sets and models it turned out that this in general is not the case in abstract fuzzy logic. We will see that this has strong consequences for the properties of fuzzy inference operators that are defined by such sets. To find what is responsible for this lack we study several properties of fuzzy semantics. It turns out that the missing link is that not in every fuzzy semantics the elementary classes form a topological space.

Closely related to nonmonotonic reasoning is the area of belief revision. In this thesis we will study *fuzzy* belief revision. We show how the spirit of the AGM-approach for classical logic can be kept while generalising the framework to abstract fuzzy logic. We examine two cases, arbitrary base revision and theory revision, and give representation theorems for both. For theory revision topologicality of the semantics plays again a crucial role.