Fuzzy Intensional Semantics and Its Applications

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Intensional semantics plays an important role in logical analysis of natural language and various kinds of modal logic. If such logical systems are to be applied to fuzzy propositions and predicates, fuzzy intensional semantics is needed.

In this talk, formal fuzzy intensional semantics is developed in the framework [1] of elementary fuzzy set theory FCT (which is in fact Henkin-style second-order fuzzy logic). Following the methodology of working in a theory over fuzzy logic (not in particular models), the semantics acquires the form of an interpretation (i.e., a direct syntactic model) of fuzzy logic in FCT. Metalanguage semantical notions of tautologicity and entailment can then be defined as certain formulae of FCT and the their properties investigated axiomatically. The completeness theorem for fuzzy intensional semantics and several properties of the entailment relation (e.g., its transitivity under certain conditions) are proved in FCT.

A wide range of both propositional and predicate fuzzy logics (including, i.a., all schematic extensions of BLΔ and sufficiently rich fragments of ŁΠ) is thus equipped with formal intensional semantics. Its utility is exemplified by an application to the logic of questions. Groenendijk-Stokhof erotetic logic GS [2] identifies questions with partitions of logical spaces and defines the notions of entailment between questions. Its fuzzification [3] generalizes this to fuzzy partitions of (possibly fuzzy) logical spaces and studies the fuzzy notion of entailment between them.

References

[1] Běhounek, L., Cintula, P.: *Fuzzy class theory.* (Submitted.)

[2] Groenendijk, J., Stokhof, M.: *Questions.* In J. van Benthem, A. ter Meulen (eds.): *Handbook of Logic and Language,* 1055–1124, Elsevier/MIT 1997.

[3] Běhounek, L.: *Fuzzification of Groenendijk-Stokhof propositional erotetic logic.* (Submitted.)