

Linguistic Modifiers : the Horizon Approach

Martine De Cock*

Martine.DeCock@rug.ac.be

University of Gent

Krijgslaan 281 (S9)

B-9000 Gent, Belgium

Etienne E. Kerre

Etienne.Kerre@rug.ac.be

University of Gent

Krijgslaan 281 (S9)

B-9000 Gent, Belgium

Abstract

Linguistic variables play a keyrole in fuzzy reasoning schemes. Recently Novák [1] developed a nice horizon approach for representing terms of linguistic variables in numerical universes in the inclusive interpretation. In this interpretation it is assumed that a term modified by a linguistic modifier corresponds to a fuzzy subset or a fuzzy superset of the fuzzy set associated with the original term : e.g. *extremely large* \subseteq *very large* \subseteq *large* \subseteq *more or less large* \subseteq *roughly large*.

In many fuzzy control applications however a modified term and the term itself denote two different, possibly overlapping fuzzy sets. The fuzzy set corresponding to the modified term is then neither a subset nor a superset of the original term. In this non-inclusive interpretation terms like *large* and *very large* are most often modelled by triangular or clockwise membership functions, while in the inclusive interpretation they are represented by means of monotonic membership functions.

In this paper we extend the horizon approach to the non-inclusive interpretation of linguistic terms, to make it suitable for fuzzy control applications. To this purpose we define the concepts of “horizon function” and “horizon generator”. Furthermore we generalize the approach in order to be able to apply it in numerical as well as in non-numerical universes, both in the inclusive and in the non-inclusive interpretation.

Keywords : *linguistic modifier, linguistic variable, horizon approach, inclusive and non-inclusive interpretation, fuzzy reasoning*

Reference :

[1] V. Novak, *A Horizon Shifting Model of Linguistic Hedges for Approximate Reasoning*, Proceedings I of the Fifth IEEE International Conference on Fuzzy Systems, New Orleans (1996)

*Supported by the Fund for Scientific Research Flanders (FWO)