Modifiers based on Connectives

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Here we give a general form of hedges based on connectives that build DeMorgan classes. It is an important corollary that hedges depend on the class of operator. We will prove that our proposals fulfil the most important features of hedges.

We will show that the (strengthening) hedge is associated with the conjunctive and the (weakening) hedge is associated with the disjunctive operator. The form of the two hedges are identical if they belong to the Pliant operator class, i.e. $f_c(x)f_d(x) = 1$, where $f_c(x)$ ($f_d(x)$) is the generator function of the conjunctive (disjunctive) operator. This common form of the modifiers is identical to the necessity and possibility operators, which is based on infinitely many negations.

Besides strengthening and weakening operators, we will introduce a new type of operator responsible for the sharpness. The principles that by repeating the arguments of an operator, we can get unary operators can be applied to any aggregative operator (representable uninorm). By doing this in the Pliant system, so we can get the sharpness operators. With this approach we have four different unary operators, i.e. the weakening-strengthening, negation and sharpness operators. The first two are called hedges or modalities.

We give a general form for modifiers that includes negation, different types of hedges and the sharpness operators. We will show that the four operators have a common form in the Pliant system and they will be called modifier operators. By changing the parameter value of a modifier we get the modality, negation and the sharpness operators. Then we characterise the general form of all unary operators (negation, modalities, sharpness operators) by a differential equation.

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