

# What should a logic of vagueness be useful for?

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## Abstract

I propose to broaden the field of mathematical fuzzy logic, not (only) using a formal definition as a basis but (also) taking the intended purpose into account. To specify this purpose, however, is already a challenge.

The field of mathematical fuzzy logic (MFL) goes back to an approach that was created in order to overcome the difficulties of reasoning about vague properties. In the sequel, it has developed more and more independently from the original motivations. Accordingly, the discussion about the suitability of MFL for reasoning under vagueness has become more and more tricky. In the discussion about the future of MFL, it might be helpful to separate the two aspects. On the one hand, we may wonder about reasonable ways of enhancing the results about logics that are based on a linearly ordered set of truth degrees. On the other hand, we may have a look back to the roots.

I focus on the latter aspect, thus joining the discussion about a framework suitable for the formalisation of reasoning under vagueness. I propose to tackle the problem in a practical way. I do not say so to follow a common fashion. I rather think that it would be useful to learn more about the aims: what kind of reasoning do we actually want to formalise? It seems to be amazingly difficult to find real-world examples of chains of arguments that a logic of vagueness should reproduce. But a need is certainly given. A field of potential applications is the representation of medical facts and processes.

Having a look at a specific practical problem could prove useful to bring an overly theoretic discussion back to the essential points. Before searching a formalism suitable to deal with vague properties, we should have an idea about its contents and purposes. A calculus should certainly be “tested” as regards the sorites paradox. However, paradoxes are not real-world arguments. Another question is its ability to represent the correlation between the development of a patient’s body temperature and the course of an infectious disease in a qualitative way.

The contents of MFL could, accordingly, be understood more flexibly. The field of qualitative spatio-temporal reasoning, e.g., deals very directly with vagueness but from a viewpoint different from fuzzy set theory, and offers logic-related challenges as well.