Formal Methods for Vagueness and Uncertainty in a Many-Valued Realm

Special Session Proposal for the International Conference IPMU 2014 - Information Processing and Management of Uncertainty

Description of the Topics

The study of logical, algebraic, proof theoretical tools for the management of vagueness and uncertainty is a well-established line of research, whose development has significantly influenced many areas of applied research, from Economics and Game Theory, to Artificial Intelligence. This special session titled

Formal Methods for Vagueness and Uncertainty in a Many-Valued Realm,

aims at collecting papers about formal approaches to the theories of vagueness, uncertainty and imprecise information management that can be treated in the realm of many-valued logics. In fact, in several real-world situations, we need to evaluate the degree of uncertainty, or to estimate the feasibility of a sentence (or a class of sentences) that cannot be exactly regarded as completely true or false, without a sensible lack of precision. Many-valued logics, fuzzy logics, and their algebraic semantics represent, among others, the formal tools to deal with vague and imprecise phenomena, whose truth comes in degrees. Theories of uncertainty built over those logico-algebraic structures that model many-valued events are adequate tools for modeling those situations in which a quantitative evaluation of the combination of uncertainty and imprecision is needed.

This special session will focus on (but will not be limited to) the following topics:

(1) Algebraic and game-theoretical semantics for many-valued logics;
(2) Topological and categorical methods in many-valued logics;
(3) Uncertainty measures on many-valued events (in particular, states, conditional states, Demspter-Shafer belief functions, possibility and necessity measures);
(4) Betting-protocols for uncertainty measures on many-valued events;
(5) Philosophical foundations for vagueness and uncertainty on many-valued logics.

Organizers

The special session will be organized by the following three proponents (in alphabetical order):

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