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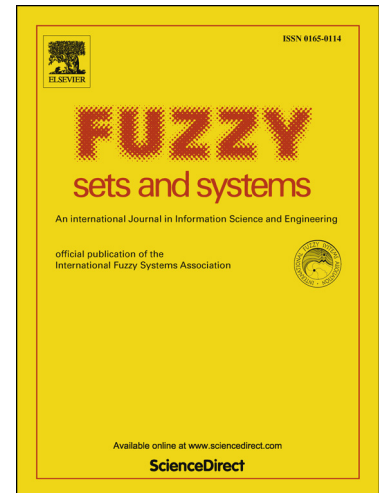
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Radial Fuzzy Systems

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Abstract

The class of radial fuzzy systems is introduced. The fuzzy systems in this class use radial functions to implement membership functions of fuzzy sets and exhibit a shape preservation property in antecedents of their rules. The property is called the radial property. It enables the radial fuzzy systems to have their computational model mathematically tractable under both conjunctive and implicative representations of their rule bases. Coherence of radial implicative fuzzy systems is discussed and a sufficient condition for coherence is stated.

Keywords: fuzzy systems, radial functions, coherence

1. Introduction

In applications of fuzzy computing, the notion of a fuzzy system plays a key role [22, 29, 31, 16]. On a general level, the fuzzy system represents a function from an input set into an output set. What is special about the fuzzy system is how this function is implemented.

The implementation draws on the four building blocks of the fuzzy system, namely: *a fuzzifier, a rule base, an inference engine and a defuzzifier*. The fuzzifier and defuzzifier are peripheral blocks. The heart of the fuzzy system comprises the rule base, which stores knowledge incorporated in the fuzzy system, and the inference engine that constitutes a processing unit of the fuzzy system.

The knowledge stored in the rule base is canonically represented by a set of IF-THEN *rules* [5, 2]. Each rule consists of *the antecedent* (the IF part)

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