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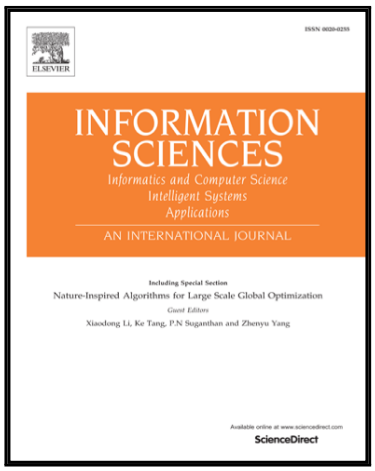

Interval-Valued Fuzzy Morphological Associative Memories: Some Theoretical Aspects and Applications

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Interval-Valued Fuzzy Morphological Associative Memories: Some Theoretical Aspects and Applications

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Abstract

Fuzzy morphological associative memories (FMAMs) are generalizations of many well-known fuzzy associative memory (FAM) models from the literature and have been employed to implement fuzzy rule-based systems. Inspired by the advent of type-2 fuzzy systems and in particular interval type-2 fuzzy systems, we present some theoretical foundations of interval-valued fuzzy morphological associative memories (IV-FMAMs), whose weight matrices can be constructed using representable interval-valued fuzzy operators, and we introduce a novel IV-FMAM approach towards interval type-2 fuzzy inference systems. The paper also includes some experimental results in non-linear function identification as well as time series prediction. These results are compared with the ones produced by some interval and general type-2 fuzzy models from the recent literature.

Keywords: Interval type-2 fuzzy systems, interval-valued fuzzy associative memories, interval-valued fuzzy mathematical morphology, representable interval-valued fuzzy logical operators, non-linear function identification, time series prediction.

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