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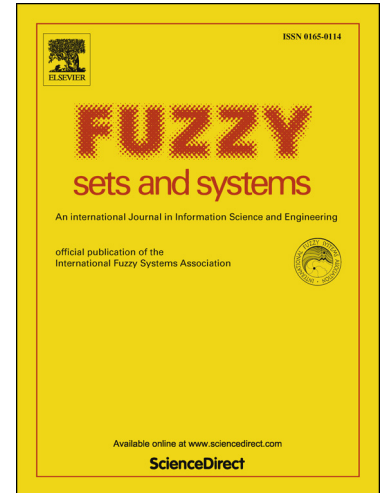
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On stability of fuzzy formal concepts over randomized one-sided formal context

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Abstract

We propose a probabilistic approach to the issue of one-sided fuzzy formal concepts stability. The modified Rice-Siff algorithm represents a crisp index how to select the relevant concepts from the set of all one-sided fuzzy formal concepts. We suggest to explore the formal concepts stability affected by the random fluctuation of values in a formal context. We describe the algorithm and study the properties of the concept stability using random variables with the Gaussian normal distribution. In combination with the modified Rice-Siff algorithm, the Gaussian probabilistic index improves the analysis of the most relevant one-sided formal concepts from the original one-sided formal context. The connections to recent works in the related directions are presented.

Keywords: Stability; Fuzzy formal concept; Randomized formal context; Normal distribution

1 Introduction

The concept lattice construction forms the scope of formal concept analysis, which is a method for knowledge discovery tasks with the close scrutiny of the object-attribute database table as a starting point. Since its inception [63], research efforts focus on theoretical developments and simultaneously on applications in many areas [31]. The parallel lines of generalizations from the viewpoint of fuzzy logic and fuzzy set theory are intensively studied. The solid theoretical foundations for dealing with fuzzy data are served by [1, 5, 8, 12, 13, 36] in order to assign the fuzzy membership functions to the objects or/and attributes. Several worthwhile findings intended to the intercontextual relationships [43, 44],

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