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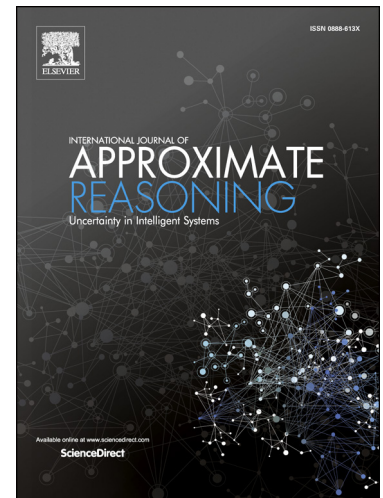
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A multiple-valued logic approach for multigranulation rough set model*

Yanhong She^{1,2}, Xiaoli He²

1 School of Computer and Information Technology, Shanxi University Taiyuan, 030006, China

2 College of Science, Xi'an Shiyou University Xi'an 710065, China.

e-mail: Y.H.She(yanhongshe@gmail.com, yanhongshe@xsyu.edu.cn.)

Huixian Shi[†]

College of Mathematics and Information Sciences, Shaanxi Normal University Xi'an 710062, China.

Yuhua Qian

School of Computer and Information Technology, Shanxi University Taiyuan, 030006, China

ABSTRACT Rough sets have often been studied under a three-valued logic framework. In this paper, we attempt to extend the previous study in two ways. Firstly, we extend the previous study from single-granulation to multigranulation. Secondly, we study multigranulation rough set theory from the viewpoint of three-way decision. More precisely, we embody the idea of three-way decision theory in the definition of multigranulation rough set theory. This leads to an axiomatic definition of decision-oriented aggregation operators on $\mathbf{3} = \{0, \frac{1}{2}, 1\}$, which are quite different from those conjunctions proposed so far. Moreover, considering that a multigranulation rough set also divides the universe into five disjoint subsets, we present a five-valued semantics for multigranulation rough set model, and a kind of non-deterministic matrices is thus given.

Keywords : Multigranulation rough set, three-valued logic, three-way decision, five-valued logic

1 Introduction

The notion of multigranulation rough set model^[20,28] is derived from a multigranulation space (U, \mathbf{E}) , which consists of a universe U and a family of equivalence relations \mathbf{E} on U . To date, rough set models in multigranulation spaces have become a subject of growing interests in artificial intelligence and the related areas. According to the combination strategies used in the existing studies, the existing rough set models in multigranulation spaces can be classified into the following

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[†]Corresponding author. Tel: +86-29-88383975; E-mail address: rubyshi@163.com (H.X.Shi)

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