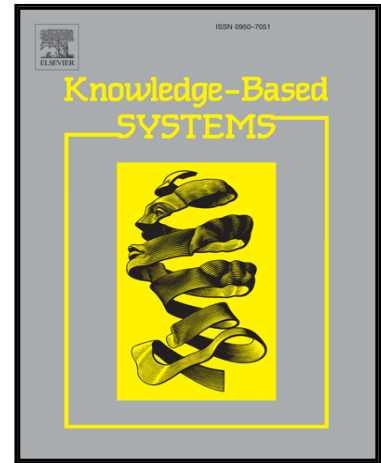


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Incremental approaches for updating reducts in dynamic covering information systems

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Abstract. In various real-world situations, there are actually a large number of dynamic covering information systems, and non-incremental learning technique is time consuming for updating approximations of sets in dynamic covering information systems. In this paper, we investigate incremental mechanisms of updating the second and sixth lower and upper approximations of sets in dynamic covering information systems with variations of attributes. Especially, we design effective algorithms for calculating the second and sixth lower and upper approximations of sets in dynamic covering information systems. The experimental results indicate that incremental algorithms outperform non-incremental algorithms in the presence of dynamic variation of attributes. Finally, we explore several examples to illustrate that the proposed approaches are feasible to perform knowledge reduction of dynamic covering information systems.

Keywords: Characteristic matrix; Covering information system; Dynamic covering information system; Rough set

1 Introduction

Covering-based rough set theory [62] as a generalization of Pawlak's rough sets [38] is a powerful mathematical tool in the field of knowledge discovery and rule acquisition. To deal with ambiguous knowledge, researchers [28, 31, 35, 37, 61, 69–71] have proposed many approximation operators and investigated their basic properties. Especially, these approximation operators are classified into three types as

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