

Zhu, William; Wang, Shiping

Rough matroids based on relations. (English) Zbl 1293.05036
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Summary: Rough sets provide an efficient tool for attribute reduction and rule extraction. However, many important problems in rough set theory, including attribute reduction, are NP-hard and therefore the algorithms for solving them are usually greedy. As a generalization of linear independence in vector spaces, matroids have wide applications in diverse fields, particularly in greedy algorithm design. In this paper, we propose an integration of rough sets and matroids to exploit the advantages of both theories. Specifically, we present definitions of lower and upper rough matroids based on relations from the viewpoint of approximation operators. It is interesting that lower rough matroids based on partial orders coincide with poset matroids, which are a well-known generalization of matroids. A matroid is represented by the lower rough matroid based on both a partial order and an equivalence relation. Lower and upper rough matroids based on equivalence relations coincide with each other. Finally, we present some special types of examples of rough matroids from the viewpoints of approximations and graphs. These interesting results demonstrate the potential for the combination between rough sets and matroids.

MSC:

05B35 Combinatorial aspects of matroids and geometric lattices

Cited in **26** Documents

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[rough set](#); [rough matroid](#); [poset matroid](#); [graph](#)

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