Fuzzy concept lattices in fuzzy rough set theory: basics of the theory and applications

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Formal concept analysis is a branch of mathematics, whose origins were layed in the last quater of the prvious century in the works of German mathematicians R. Willey and G. Ganter [1], [2]. An alternative version of concept analysis was developed by I. Düntch and G. Gediga [3] and Y.Y. Yao [4]. The basis for all versions of the concept analysis is a formal context, that is a triple (X, Y, R) where X and Y are sets and R is a relation between them. X is interpreted as the set of some objects, Y is interpreted as the set of some atributes and the entry xRy means "the object x has the property y". The principal notion of concept analysis are so called concepts, i.e. pairs (A, B) of interconnected sets $A \subseteq X$ and $B \subseteq Y$ of objects and properties respectively. On the family of all concepts of a given context (X, Y, R) a certain lattice structure is build, which leads to the notion of a concept lattice. At present the theory of concept lattices as well as its fuzzy versions is a well developed area of mathematics which has important applications in applied sciences, in particular in social sciences, in medicine in biology etc. The purpose of this report is to present the main notions of the theory of (fuzzy) concept lattices, outline the directions of its possible applications, and also discuss some topical problems related to the theory of fuzzy concept lattices.

References

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