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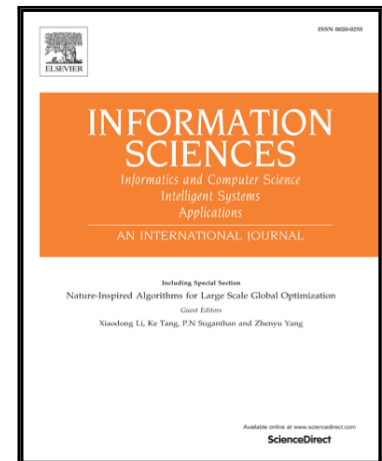
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Concept lattices with negative information: a characterization theorem

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Abstract

Classical Formal Concept Analysis (FCA) extracts, represents and manages knowledge from positive information, i.e., its fundamental data model is a binary relation between a set of objects and attributes indicating the *presence* of a property in an object. However, some applications require to treat the *absence* of some property in an object as a negative information to be explicitly represented and managed, too. Although mixed (positive and negative) information has been addressed in the past in FCA, such approaches maintain the standard framework, which hides the specific semantics and avoids the further use of direct techniques and methods for mixed information. In this work, the foundations of FCA are extended and, in particular, mixed concept lattices are studied in depth. The main result of this work is a characterization theorem specifying in lattice-theoretic terms which lattices are isomorphic to a mixed concept lattice.

Keywords: Formal concept analysis, lattice theory, negative information

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1. Introduction

Formal concept analysis (FCA) constitutes a very successful mathematical approach to knowledge representation, with a rich theory as well as numerous

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