The Semantics of Rational Contractions

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Abstract

This paper is concerned with the revision of beliefs in the face of new and possibly contradicting information. In the *Logic of Theory Change* developed by Alchourron, Gärdenfors and Makinson this nonmonotonic process consists of a contraction and an expansion of a set of formulas. To achieve minimal change they formulated widely accepted postulates that rational contractions have to fulfill.

Contractions as defined by Alchourron, Gärdenfors and Makinson only operate on deductively closed sets of formulas. Therefore they cannot be used in practical applications, eg. knowledge representation, where only finitely representable sets can be handled.

We present a semantical characterization of *rational finite contractions* (the class of rational contractions maintaining finite representability) which provides an insight into the true nature of these operations. This characterization shows all possibilities to define concrete functions possessing these properties.

When regarding concrete contractions known from literature in the light of our characterization we have found that they are all defined according to the same semantical strategy of *minimal semantical change*. As this strategy does not correspond to the goal of keeping as many important formulas as possible in the contracted set, we suggest a finite contraction defined according to the new strategy of *maximal maintenance*.

Keywords

Nonmonotonic Logic, Logic of Theory Change, Knowledge Representation