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Decidable subsets of open logic and an algorithm for R-calculus.

Summary: Open logic is an attractive logic theory that can describe the growth and evolution of knowledge. However, related studies show that open logic is undecidable in first-order logic and thus is hard to be programmed. This paper proposes that open logic should be implemented with constraints, and provides a set of syntax constraints under which open logic is decidable. Furthermore, it is shown that the constraints are necessary and sufficient for the decidable formulas of open logic. A Domino problem-based algorithm R-CP that implements the R-calculus of the constrained open logic is presented and its reachability is proved.

Keywords: open logic; decidability; maximal contraction; R-calculus; mechanical theorem proving
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