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On the entailment problem for a logic of typicality

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Abstract

Propositional Typicality Logic (PTL) is a recently proposed logic, obtained by enriching classical propositional logic with a typicality operator. In spite of the non-monotonic features introduced by the semantics adopted for the typicality operator, the obvious Tarskian definition of entailment for PTL remains monotonic and is therefore not appropriate. We investigate different (semantic) versions of entailment for PTL, based on the notion of Rational Closure as defined by Lehmann and Magidor for KLM-style conditionals, and constructed using minimality. Our first important result is an impossibility theorem showing that a set of proposed postulates that at first all seem appropriate for a notion of entailment with regard to typicality cannot be satisfied simultaneously. Closer inspection reveals that this result is best interpreted as an argument for advocating the development of more than one type of PTL entailment. In the spirit of this interpretation, we define two primary forms of entailment for PTL and discuss their advantages and disadvantages.