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On the Complexity of Input/Output Logic

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Abstract

Input/output logic is a formalism in deontic logic and normative reasoning. Unlike deontic logical frameworks based on *possible-world semantics*, input/output logic adopts *norm-based semantics* in the sense of (Hansen, 2014), specifically *operational semantics*. It is well-known in theoretical computer science that complexity is an indispensable component of every logic. So far, previous literature in input/output systems focuses on proof theory and semantics, while neglects complexity. This paper adds the missing component by giving the complexity results of main decision problems in input/output logic. Our results show that input/output logic is coNP hard and in the 2nd level of the polynomial hierarchy.

Keywords: input/output logic, decidability, complexity, deontic logic, norm-based semantics

1 Introduction

Deontic logic is the logic of deontic modalities, such as obligation, permission, and prohibition. It has been used since the 1950s as a formal instrument for modeling normative reasoning (von Wright, 1968). Deontic logic has been studied in several research areas, including philosophy, linguistics, and computer science; for a recent survey, we address

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