

The Complexity of Satisfiability for Fragments of CTL and CTL^{*}¹

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Abstract

The satisfiability problems for CTL and CTL^{*} are known to be EXPTIME-complete, resp. 2EXPTIME-complete (Fischer and Ladner (1979), Vardi and Stockmeyer (1985)). For fragments that use less temporal or propositional operators, the complexity may decrease. This paper undertakes a systematic study of satisfiability for CTL- and CTL^{*}-formulae over restricted sets of propositional and temporal operators. We show that restricting the temporal operators yields satisfiability problems complete for 2EXPTIME, EXPTIME, PSPACE, and NP. Restricting the propositional operators either does not change the complexity (as determined by the temporal operators), or yields very low complexity like NC¹, TC⁰, or NLOGTIME.

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