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New worst-case upper bounds for SAT. (English) Zbl 0960.03009

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Summary: In 1980 Monien and Speckenmeyer proved that satisfiability of a propositional formula consisting of K clauses (of arbitrary length) can be checked in time of the order $2^{K/3}$. Recently, Kullmann and Luckhardt proved the worst-case upper bound $2^{L/9}$, where L is the length of the input formula. The algorithms leading to these bounds are based on the splitting method, which goes back to the Davis-Putnam procedure. Transformation rules (pure literal elimination, unit propagation, etc.) constitute a substantial part of this method. In this paper we present a new transformation rule and two algorithms using this rule. We prove that these algorithms have the worst-case upper bounds $2^{0.30897K}$ and $2^{0.10299L}$, respectively.

MSC:

03B35 Mechanization of proofs and logical operations
03D15 Complexity of computation (including implicit computational complexity)
68Q25 Analysis of algorithms and problem complexity

Keywords:

satisfiability of a propositional formula; transformation rule; algorithms; worst-case upper bounds

Full Text: DOI