

# Fundamental Study

## New methods for 3-SAT decision and worst-case analysis<sup>1</sup>

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### Abstract

We prove the worst-case upper bound  $1.5045 \cdot n^a$  for the time complexity of 3-SAT decision, where  $n$  is the number of variables in the input formula, introducing new methods for the analysis as well as new algorithmic techniques. We add new 2- and 3-clauses, called “blocked clauses”, generalizing the extension rule of “Extended Resolution.” Our methods for estimating the size of trees lead to a refined measure of formula complexity of 3-clause-sets and can be applied also to arbitrary trees. © 1999 Elsevier Science B.V. All rights reserved.

**Keywords:** 3-SAT; Worst-case upper bounds; Analysis of algorithms; Extended resolution; Blocked clauses; Generalized Autarkness

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