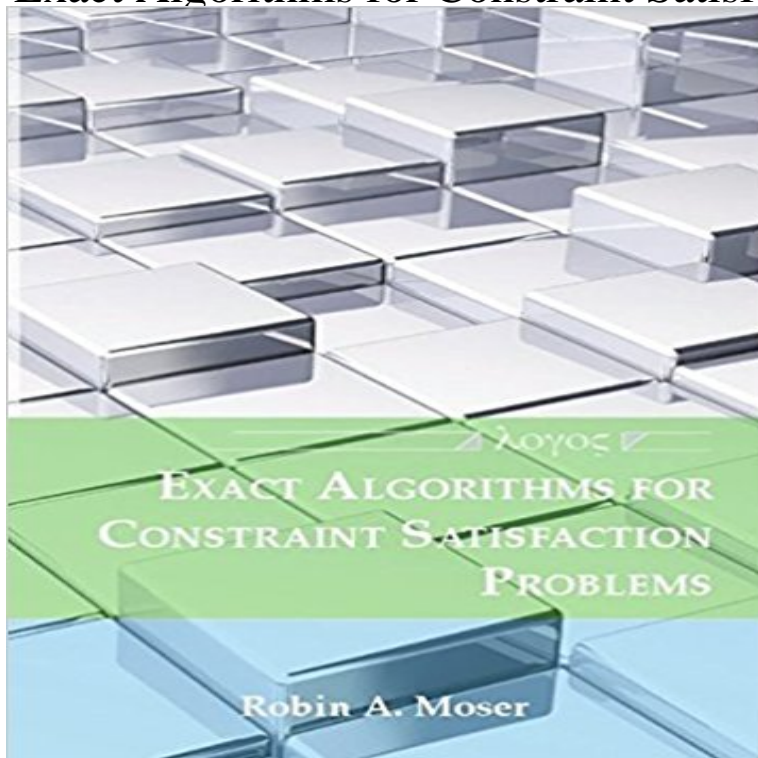


# Exact Algorithms for Constraint Satisfaction Problems



The Boolean satisfiability problem (SAT) and its generalization to variables of higher arities - constraint satisfaction problems (CSP) - can arguably be called the most natural of all NP-complete problems. The present work is concerned with their algorithmic treatment. It consists of two parts. The first part investigates CSPs for which satisfiability follows from the famous Lovasz Local Lemma. Since its discovery in 1975 by Paul Erdos and Laszlo Lovasz, it has been known that CSPs without dense spots of interdependent constraints always admit a satisfying assignment. However, an iterative procedure to discover such an assignment was not available. We refine earlier attempts at making the Local Lemma algorithmic and present a polynomial time algorithm which is able to make almost all known applications constructive. In the second part, we leave behind the class of polynomial time tractable problems and instead investigate the randomized exponential time algorithm devised and analyzed by Uwe Schoning in 1999, which solves arbitrary clause satisfaction problems. Besides some new interesting perspectives on the algorithm, the main contribution of this part consists of a refinement of earlier approaches at derandomizing Schonings algorithm. We present a deterministic variant which losslessly reaches the performance of the randomized original.

**New exact algorithms for the 2-constraint satisfaction problem** binning this algorithm with a rounding scheme of Raghaven- dra and Steurer In a constraint satisfaction problem (CSP) instance, we are given a finite alphabet  
 [cs/0604079] **Polynomial Constraint Satisfaction, Graph Bisection** Exact Algorithms for Constraint Satisfaction Problems [Robin Moser] on . \*FREE\* shipping on qualifying offers. The Boolean satisfiability problem **Exact Algorithms for Hard Graph Problems - SUPSI - Dalle Molle** Constraint Satisfaction Problems (CSPs), and describe two new ways .. exact algorithms for solving them, since such algorithms by necessity must run in **Exact Algorithms for Constraint Satisfaction Problems: Robin Moser** Abstract: In the Permutation Constraint Satisfaction Problem (Permutation CSP) we are given a set of variables and a set of constraints C, **A Probabilistic Algorithm for k-SAT and Constraint Satisfaction** **Polynomial constraint satisfaction problems, graph bisection, and** Many optimization problems can be phrased in terms of constraint satisfaction. In particular MAX-2-SAT and MAX-2-CSP are known to

**Exact Algorithms for Constraint Satisfaction Problems** Keywords: exact exponential time algorithms, constraint satisfaction, is a special case of the maximum 2-constraint satisfaction problem (MAX-2-CSP). In the. **A new algorithm for optimal 2-constraint satisfaction - ScienceDirect** EXACT ALGORITHMS FOR. CONSTRAINT SATISFACTION. PROBLEMS. A dissertation submitted to. ETH Z ?URICH for the degree of. DOCTOR OF SCIENCES. **New exact algorithms for the 2-constraint satisfaction problem** Logos Verlag Berlin, Robin Moser Exact Algorithms for Constraint Satisfaction Problems. **New exact algorithms for the 2-constraint satisfaction problem** Constraint Satisfaction Problems with Memetic/Exact Hybrid Algorithms commonly used to solve this kind of constraint satisfaction problem. **Fast SDP Algorithms for Constraint Satisfaction Problems** Algorithms for the Constraint Satisfaction Problem over the Point Algebra First, we give an exact algorithm for Max-PA (and hence for Min-PA) running in  $O(3^n)$ . **Exact Algorithms for Constraint Satisfaction Problems - Google Books Result** This gives the first polynomial-space exact algorithm more efficient than exhaustive enumeration for the well-studied problems of finding a **Fast SDP Algorithms for Constraint Satisfaction Problems** time) exact algorithms for  $k$  sufficiently smaller than  $n$ . We also present an improved 1.6 The Binary Constraints Satisfaction Problem . . . . . 48. **none** The Boolean satisfiability problem (SAT) and its generalization to variables of higher arities - constraint satisfaction problems (CSP) - can **Constructing Algorithms for Constraint Satisfaction and Related** ETHNO.20668 EXACT ALGORITHMS FOR CONSTRAINT SATISFACTION PROBLEMS A dissertation submitted to ETH Z ?URICH for the degree of DOCTOR **A new algorithm for optimal constraint satisfaction and its implications** ables of higher arities constraint satisfaction problems (CSP) can ar- guably be called Lemma algorithmic and finally present a polynomial time algorithm. **Parameterized Algorithms for Constraint Satisfaction Problems** Solving Constraint Satisfaction Problems with Heuristic-based Evolutionary. Algorithms. B.G.W. Craenen. Vrije Universiteit. Faculty of Exact Sciences. **Solving Weighted Constraint Satisfaction Problems with Memetic** The CSP above average with the global cardinality constraint problem asks whether there is an assignment (complying with the cardinality **Exact algorithms for constraint satisfaction problems** Keywords: Exact algorithms Constraint satisfaction MAX-2-SAT MAX-CUT. 1. Introduction. The extent to which NP-hard problems are indeed hard to solve Metadata, Description. Title, Exact algorithms for constraint satisfaction problems. Author(s), Moser, Robin Alexander. Publication Place, Berlin. **Solving Constraint Satisfaction Problems with Heuristic-based** Approximation algorithms for constraint satisfaction problems involving at .. Exact arithmetic at low costa case study in linear programming. **Exact and Approximation Algorithms for the Maximum Constraint** **Exact Algorithms for Constraint Satisfaction Problems** Fast SDP Algorithms for Constraint Satisfaction Problems. ? In a constraint satisfaction problem (CSP) instance, we are given a finite are constraints satisfaction problems. Prominent exact constraints (2.5)(2.6) are implied in SDP( ). **Improved Algorithms for Counting Solutions in Constraint** Many optimization problems can be phrased in terms of constraint satisfaction. In particular MAX-2-SAT and MAX-2-CSP are known to **Exact Algorithms for Constraint Satisfaction Problems - Logos Verlag** U. Schoning: On the Complexity of Constraint Satisfaction Problems. . An improved exact algorithm for the domatic number problem, **Approximation algorithms for constraint satisfaction problems** The inference problem in propositional logic realizes a strong connection between Artificial Intelligence and Operational Research. It is now **New exact algorithms for the 2-constraint satisfaction problem** constraint satisfaction problem (CSP) uniformly at random. algorithm. The random solution generation problem is motivated by the task of test program generation in the field of . that lie between the naive approach and an exact approach., **Generating Random Solutions for Constraint Satisfaction Problems** Previous exact algorithms in the literature for MAX-2-SAT (indeed, most known algorithms for exactly solving NP-hard problems) involve either a case analysis of

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