

Duality in Resolution

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Abstract

The main purpose of this paper is to present a new algorithm (NEW-SAT) for deciding the (un) satisfiability of propositional formulae. It is based on a - somewhat dual (versus resolution) - idea: if we start with a propositional formula (i.e. with a set of propositional clauses), the computation tree is constructed in a bottom-up manner. This means that we successively **add** complementary literals to already obtained clauses instead of solving them. Hence, the unsatisfiability of a formula is detected by reaching "a complete set of maximal clauses" instead of reaching the empty clause.

Original (numerical) notations are used for clauses, resolvents, formulae, etc., to improve the description and the performance of the algorithm.

(NEW-SAT) - under some computational measures - may be viewed as a "better" algorithm (Section 4) than the classical one ([Sch89]). Some open problems are also emphasized.

Our paper can be viewed as a basis for developing a real **duality theory for resolution**.

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