R-OBDD is a new Cook-Reckhow propositional proof system based on combination of OBDD proof system and resolution proof system. R-OBDD has the strength of OBDD proof system – hard tautologies for resolution like PHPn or Tseitin contradictions have polynomially sized proofs in R-OBDD (R-OBDD p-simulates OBDD proof system as well as resolution). On the other hand, inference rules of R-OBDD are designed to be similar to
inference rules of resolution, thus allowing to create a modified version of DPLL algorithm and possibly using heuristics used in various DPLL-like algorithms. This gives a possibility for a SAT solver more efficient than SAT solvers based on resolution proof system. We present design of a SAT solver, which is an adaptation of DPLL algorithm for the R-OBDD proof system. The algorithm is accompanied with proof of its correctness and we show that the run of the algorithm on an unsatisfiable formula can be transformed into tree-like refutation in the R-OBDD proof system.