

Retroactive Ordering for Dynamic Backtracking

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Abstract. Dynamic Backtracking (DBT) is a well known algorithm for solving Constraint Satisfaction Problems. In DBT, variables are allowed to keep their assignment during backjump, if they are compatible with the set of eliminating explanations. A previous study has shown that when DBT is combined with variable ordering heuristics it performs poorly compared to standard Conflict directed Backjumping (CBJ) [1]. The special feature of DBT, keeping valid elimination explanations during backtracking, can be used for generating a new class of ordering heuristics. In the proposed algorithm, the order of already assigned variables can be changed. Consequently, the new class of algorithms is termed Retroactive DBT.

In the proposed algorithm, the newly assigned variable can be moved to a position in front of assigned variables with larger domains and as a result prune the search space more effectively. The experimental results presented in this paper show an advantage of the new class of heuristics and algorithms over standard DBT and over CBJ. All algorithms tested were combined with forward-checking and used a Min-Domain heuristic.