

Conflict Directed Backjumping for Max-CSPs*

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Abstract

Max-CSPs are Constraint Optimization Problems that are commonly solved using a Branch and Bound algorithm. The *B&B* algorithm was enhanced by consistency maintenance procedures [Wallace and Freuder, 1993; Larrosa and Meseguer, 1996; Larrosa *et al.*, 1999; Larrosa and Schiex, 2003; 2004]. All these algorithms traverse the search space in a chronological order and gain their efficiency from the quality of the consistency maintenance procedure. The present study introduces Conflict-directed Backjumping (CBJ) for Branch and Bound algorithms. The proposed algorithm maintains *Conflict Sets* which include only assignments whose replacement can lead to a better solution. The algorithm backtracks according to these sets. CBJ can be added to all classes of the Branch and Bound algorithm, in particular to versions of Branch & Bound that use advanced maintenance procedures of local consistency levels, *NC**, *AC** and *FDAC* [Larrosa and Schiex, 2003; 2004]. The experimental evaluation of *B&B CBJ* on random *Max-CSPs* shows that the performance of all algorithms is improved both in the number of assignments and in the time for completion.