

Min-Domain ordering for Asynchronous Backtracking

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Abstract

Ordering heuristics are a powerful tool in CSP search algorithms. Among the most successful ordering heuristics are heuristics which enforce a fail first strategy by using the min-domain property [HE80, BR96, SG98, Dec 03]. Ordering heuristics have been introduced recently to Asynchronous backtracking (ABT), for distributed constraints satisfaction (DisCSP) [ZM05]. However, the pioneering study of dynamically ordered ABT, ABT DO, has shown that a straightforward implementation of the min-domain heuristic does not produce the expected improvement over a static ordering. The best ordering heuristic for asynchronous backtracking was found to be the No good-triggered heuristic. The present paper proposes an asynchronous dynamic ordering which does not follow the standard restrictions on the position of reordered agents in ABT DO. Agents can be moved to a position that is higher than that of the target of the backtrack (culprit). Combining the No good-triggered heuristic and the min-domain property in this new class of heuristics results in the best performing version of ABT DO. The new version of retroactively ordered ABT is faster by a large factor than the best form of ABT.