SVA-MinConf : a new heuristic for dynamically changing problems

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Abstract

For a better reuse of solutions in Dynamic Constraints Satisfaction Problems (DCSPs), several techniques have been developed to be used in repair algorithms. We can mention as example, minimal perturbations approaches and local search techniques.

Recently, R. Zivan and al. have proposed HS-MPP algorithm (Hybrid search for minimal perturbation) able to find an optimal solution, as close as possible to the previous one, to the changed problem. To reach the optimal Solution, HS-MPP approach selects variables lexicographically. This arbitrary choice can dramatically lead the algorithm to intensive calculations. To overcome this drawback, we suggest in this work to choose the variable that forbids a minimum solution value assignments for the other variables. Thus, in this paper, we propose a new static variable ordering heuristic, called SVA-MinConf (Solution Value Assignments with minimum conflicts), based on the MinConf heuristic of the solution value assignments of each variable. This approach is conservative and the optimal solution is reached with an optimal effort. Our experimental results demonstrate the advantage of the proposed heuristic over original algorithm. The evaluation of performance is on random binary problems, with the criteria of computation time, number of constraints checks and Hamming distance between the former and the new solution.

Keywords : combinatorial optimisation, constraint programming.