Constraint Hierarchy and Stochastic Local Search for Solving Frequency Assignment Problem

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Abstract: One approach for modeling over-constrained problems is using constraint hierarchies. In the constraint hierarchy framework, constraints are grouped into levels, and appropriate solutions are selected using a comparator which takes into account the constraints and their levels. Finite domain Constraint Hierarchy is one of the NP-hard optimization problems that has been studied for a long time due to its relevance to various application areas. Nevertheless, stochastic local search method for solving finite domain constraint hierarchies remains largely unexplored. In this work, we develop a variant of WSAT algorithm that can solve constraint hierarchies over finite domains. We experiment this generic algorithm in a case study: solving Frequency Assignment Problem in the area of wireless communication. Experiments on benchmark Philadelphia Instances of realistic sizes show that the proposed algorithm is an efficient heuristic to find good approximate solutions.

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