Top-k based adaptive enumeration in constraint programming

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Constraint programming effectively solves constraint satisfaction and optimization problems by basically building, pruning, and exploring a search tree of potential solutions. In this context, a main component is the enumeration strategy, which is responsible for selecting the order in which variables and values are selected to build a possible solution. This process is known to be quite important; indeed a correct selection can reach a solution without failed explorations. However, it is well known that selecting the right strategy is quite challenging as their performance is notably hard to predict. During the last years, adaptive enumeration appeared as a proper solution to this problem. Adaptive enumeration allows the solving algorithm being able to autonomously modifying its strategies in solving time depending on performance information. In this way, the most suitable order for variables and values is employed along the search. In this paper, we present a new and more lightweight approach for performing adaptive enumeration. We incorporate a powerful classification technique named Top- k in order to adaptively select strategies along the resolution. We report results on a set of well-known benchmarks where the proposed approach noticeably competes with classical and modern adaptive enumeration methods for constraint satisfaction. © 2015 Ricardo Soto et al.