On Uncensored Global Stochastic Optimization in $\mathbb{R}^p / \mathbb{D}^p$ and Multi-Walk Algorithms under Problem-Specific Tableau Formulations

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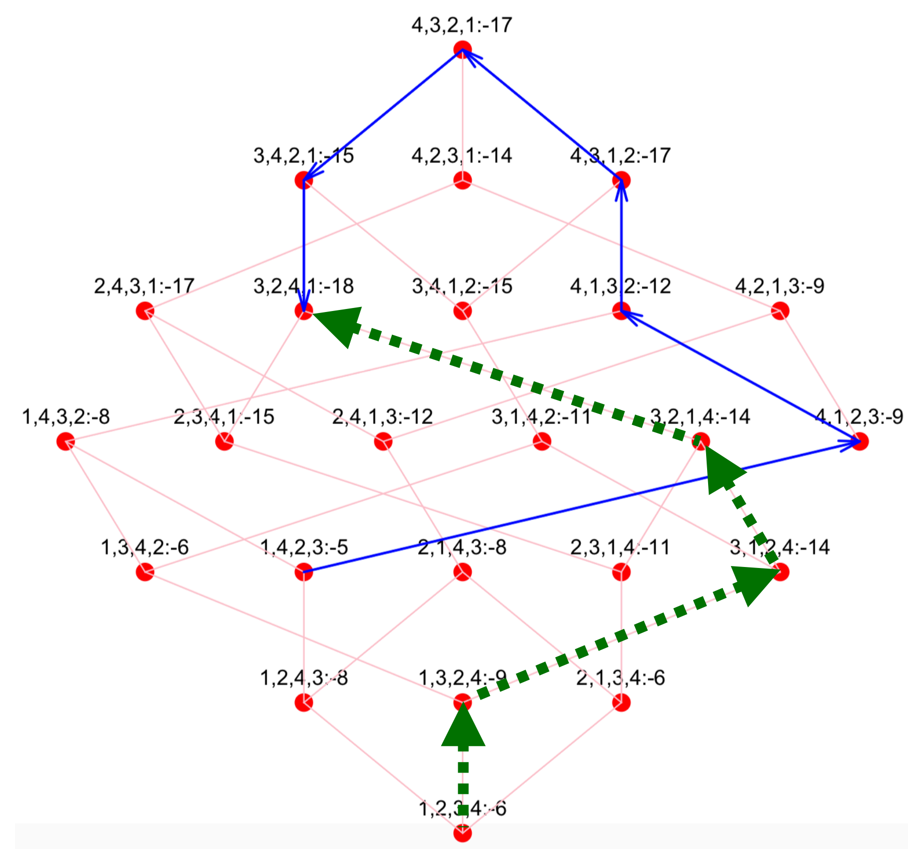

There are numerous stochastic optimization algorithms in both the continuous domain *R^p* and the discrete domain *D^p* . We use the generic symbol *D^p* to denote domains where coordinates can be binary strings in *[0,1]^p* , ternary strings in *[0,1,2]^p*, permutations of a *p*-tuple *[1,2,3,...,p]*, concatenations of binary and ternary coordinates, separated by a '.', etc. While graph problems such as the minimum vertex cover are frequently solved without the use of binary coordinates, the efficiency of the proposed multi-walk algorithm is significantly improved when we recursively:

(1) implement the multi-walk as tracking the movement of a set of *p bots* defined by coordinates in *D^p* ;

(2) compute, for each bot, a *distance=1* neighborhood of *r <= p* adjacent coordinates; and

(3) devise an efficient method not only to probe the objective function at each of *p* bot coordinates but also an effective method to determine the best coordinate for the next step of each bot.

We consider problems and solutions in both the continuous and the discrete domain. In *R^p* , we examine a number of standard hard instances where neighborhood radius is defined by tableaus of coordinate differences. In *D^p*, we consider tableau-based solutions defined by binary coordinates as well as permutation coordinates. For coordinates in *[0,1]^p*, we outline tableau formulations for set cover, set packing, graph vertex cover and maximum clique, Golomb ruler, and lights-out puzzle. For permutation coordinates in *[1,2,3,..,p]*, we examine tableau-based solutions for the linear ordering problems, including the instances of Paley tournament graphs that are progressively increasing in size.

Informacije: Dr. Janez Konc