

MULTIGLODS: CLEVER MULTISTART IN MULTIOBJECTIVE DIRECTIONAL DIRECT SEARCH

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Abstract: The optimization of multimodal functions is a challenging task, in particular when derivatives are not available for use. Recently, in a directional direct search framework, a clever multistart strategy was proposed for global derivative-free optimization of single objective functions. The goal of the current work is to generalize this approach to the computation of global Pareto fronts for multiobjective multimodal derivative-free optimization problems. The proposed algorithm alternates between initializing new searches, using a multistart strategy, and exploring promising subregions, resorting to directional direct search. Components of the objective function are not aggregated and new points are accepted using the concept of Pareto dominance. The initialized searches are not all conducted until the end, merging when start to be close to each other. We will describe the algorithmic structure considered, present the main associated theoretical results, and report related numerical experience that evidences the quality of the final solutions generated by the new algorithm and its capability in identifying approximations to global and local Pareto fronts of a given problem.