Direct multiSearch: a new DFO approach for multiple objective functions

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Direct MultiSearch (DMS) is a novel derivative-free algorithm for multiobjective optimization, which does not aggregate any of the objective functions. Inspired by the search/poll paradigm of direct-search, DMS uses the concept of Pareto dominance to maintain a list of nondominated points, from which the new poll centers are chosen. The aim is to generate as many points in the Pareto frontier as possible from the polling procedure itself, while keeping the whole framework general to accommodate other disseminating strategies, in particular when using the (here also) optional search step.

We provide a convergence analysis for the algorithm and report computational results, which show that our methodology has an impressive capability of generating the whole Pareto frontier even without using a search step.