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An implicit filtering algorithm for derivative-free multiobjective optimization with box constraints. (English) Zbl 1400.90269

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Summary: This paper is concerned with the definition of new derivative-free methods for box constrained multiobjective optimization. The method that we propose is a non-trivial extension of the well-known implicit filtering algorithm to the multiobjective case. Global convergence results are stated under smooth assumptions on the objective functions. We also show how the proposed method can be used as a tool to enhance the performance of the Direct MultiSearch (DMS) algorithm. Numerical results on a set of test problems show the efficiency of the implicit filtering algorithm when used to find a single Pareto solution of the problem. Furthermore, we also show through numerical experience that the proposed algorithm improves the performance of DMS alone when used to reconstruct the entire Pareto front.

MSC:

- 90C29 Multi-objective and goal programming
- 90C56 Derivative-free methods and methods using generalized derivatives
- 90C30 Nonlinear programming
- 65K05 Numerical mathematical programming methods

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Keywords:

multiobjective nonlinear programming; derivative-free optimization; implicit filtering

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