



Aquifer management through a new multi-objective hybrid algorithm

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ABSTRACT

A multi-objective hybrid optimization algorithm is presented combining harmony search and the Nelder–Mead simplex algorithm, applied to the solution of a bi-objective groundwater management problem. The objective functions of the corresponding optimization problem include pumping and installation costs to be minimized, along with the sum of supply discharges that is to be maximized in an aquifer. The number and position of production wells is addressed as a special feature of the problem. Optimal trade-offs among these conflicting objectives are found by determining the corresponding Pareto front. The present multi-objective approach is compared with a harmony-based method of the literature. The comparison is performed both on the aquifer problem and two standard benchmark functions, with results that favor the present approach.

Keywords: Aquifer management; Harmony search; Optimization; Multi-objective; Nelder–Mead

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