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# A comparative study of three simulation optimization algorithms for solving high dimensional multi-objective optimization problems in water resources

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Some real-world optimization problems in water resources have a high-dimensional space of decision variables and more than one objective function. In this work, we compare three general-purpose, multi-objective simulation optimization algorithms, namely NSGA-II, AMALGAM, and CMA-ES-MO when solving three real case Multi-objective Optimization Problems (MOPs): (i) a high-dimensional soil hydraulic parameter estimation problem; (ii) a multipurpose multi-reservoir operation problem; and (iii) a scheduling problem in deficit irrigation. We analyze the behaviour of the three algorithms on these test problems considering their formulations ranging from 40 up to 120 decision variables and 2 to 4 objectives. The computational effort required by each algorithm in order to reach the true Pareto front is also analyzed.