Parallel implementation of a modular, population based global optimizer package

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In the world of optimization the problems are very different. Therefore it is impossible to give a single solution method to find the global optimum for all of them. The best way is to create a package of various optimization methods, which contains solvers for a wide range of problems. The other issue is that sometimes much CPU time is necessary to compute the objective function in a point. For example, when the objective values come from simulations, which is very common in physics problems. In this case the running time of the optimization method is very high. A suitable solution for this is to compute the function evaluations simultaneously. In this case the algorithm have to handle the objective values simultaneously. Hence the trivial simple deterministic methods is not fitting for this problem.

In our presentation we parallelize the GLOBAL optimization method which is developed by in the Institute of Informatics, University of Szeged. GLOBAL is a stochastic technique that is a sophisticated composition of sampling, clustering, and local search.

The talk presents the architecture of the stochastic global optimization algorithm GLOBAL and the single thread Java implementation. Then we present the parallel clustering method which applied in our solution. After this, we show the sampling, clustering, and local search methods working in parallel. We applied a technique which is based on the priority of the earlier mentioned methods, and all threads determine alone the next methods to complete.

Finally we illustrate the efficiency of our method on large scale popular test functions.