# 融合牛顿-最速下降算子的自适应粒子群算法

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摘　要：针对粒子群算法容易陷入局部最优、收敛精度低、后期收敛速度缓慢的问题，将牛顿-最速下降算子、动态惯性权重、影响度决策引入到粒子群的更新中，提出了融合牛顿-最速下降算子的自适应粒子群算法(NSWPSO).将改进后的算法、标准粒子群算法、自适应惯性权重粒子群算法、线性递减惯性权重粒子群算法同时应用于不同维度的 12 个测试函数，对搜索结果进行对比分析，T-test 差异分析、10 维测试函数达到期望值时的寻优率和平均迭代次数分析，可得改进后的算法能够稳定快速准确地搜索到全局最优解.

关键词：粒子群算法；牛顿-最速下降算子；动态惯性权重；影响度决策

## An adaptive particle swarm optimization algorithm with

### newton-steepest descent operator

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Abstract： In order to solve the problem that particle swarm optimization is easy to fall into local optimal solution， low convergence accuracy and convergence-rate slowly in the later stage， the Newton-steepest descent operator， dynamic inertia weight and influence degree decision are introduced into the updating of particle swarm optimization. An adaptive particle swarm optimization algorithm combines with Newton-steepest descent operator (NSWPSO) is proposed. The improved algorithm， standard particle swarm optimization algorithm， adaptive inertia weight particle swarm optimization algorithm and linear decreasing inertia weight particle swarm optimization algorithm are applied to 12 test functions of different dimensions at the same time，by the comparing and analyzing search results， the analysis of T-test difference and the analysis of the optimization rate with average iteration times ，where the 10-dimensional test function reaches the expected value. It can make the improved-algorithm stable and fast to find the global optimum-solution.

Key words： PSO; Newton-steepest descent operator; Dynamic adjustment of inertia weight; Influences decision

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