

基于自适应动态改变的粒子群优化算法

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摘 要：粒子群算法在处理优化问题时缺乏有效的参数控制，易陷入局部最优，导致收敛精度低.提出一种新的改进粒子群优化算法，算法根据粒子的适应度值动态自适应地调整算法中惯性权重和学习因子的取值，其中惯性权重采用非线性指数递减，有利于平衡算法的全局搜索与局部搜索能力，避免算法陷入局部极值；学习因子采用异步变化的策略，以增强算法的学习能力，进而提高算法的性能.数值实验结果表明，与 SPSO、PSO-DAC 算法相比较，改进后的算法无论在收敛速度、稳定性以及收敛精度上都有显著提高.

关键词：粒子群算法；惯性权重；学习因子；自适应

Particle Swarm Optimization Algorithm Based on

Adaptive Dynamic Change

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Abstract: The particle swarm algorithm lacks efficient parameter control when dealing with the optimization problems, and it's easy to get into a local optimal and it causes a low convergence. A new kind of particle swarm optimization algorithm is proposed. Based on the adaptive value of particle, the algorithm adaptively adjusts the value of inertia weight and learning factor in the algorithm, in which the inertial weight is reduced by the nonlinear exponential, which is beneficial to the global search and local searching ability of the balanced algorithm, so that the algorithm can avoid falling into local extreme values. The learning factor adopts the strategy of asynchronous change to enhance the learning ability of the algorithm and improve the performance of the algorithm. The results of numerical experiments show that compared with SPSO and PSO-DAC algorithms, the improved algorithm has a significant improvement in convergence speed, stability and convergence accuracy.

Key words: particle swarm algorithm; inertia weight; learning factor; adaptive

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