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论文

一种解决约束优化问题的模糊粒子群算法

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摘要
该文针对复杂约束优化问题,提出了一种模糊粒子群算法(FPSO),设计了一个新的扰动算子,在此基础上定义了模糊个体极值和模糊全局极值,利用这两个定义改进了粒子群进化的方程,利用该方程更新粒子的速度与位置,可以避免早熟收敛问题;定义了不可行度阈值,利用此定义给出了新的粒子比较准则,该准则可以保留一部分性能较优的不可行解微粒。用概率论的有关知识证明了算法的收敛性。仿真结果表明,对于复杂约束优化问题,算法寻优性能优良,特别是对于超高维约束优化问题,该算法获得了更高精度的解。

关键词 粒子群算法 约束优化 模糊个体极值 模糊全局极值

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Fuzzy Particle Swarm Optimization for Constrained Optimization Problems

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Abstract
A fuzzy particle swarm optimization is proposed for solving complex constrained optimization problems. Firstly, a new perturbation operator is designed, and the concepts of fuzzy personal best value and fuzzy global best value are given based on the new operator. Particle updating equations are revised based upon the two new concepts to discourage the premature convergence. Secondly, a new comparison strategy is proposed based on the new concept of infeasible threshold value. It can preserve some infeasible solutions with high quality. Finally, the convergence of this algorithm is proved. The simulation results show that the proposed algorithm is effective, especially for the problems with high dimensions.

Key words Particle Swarm Optimization (PSO) Constrained optimization Fuzzy personal best value Fuzzy global best value

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