PSO-MEA 混合优化算法及其收敛性分析

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摘　要：鉴于单一的优化算法存在收敛精度低、收敛速度慢的不足，将思维进化算法(Mind Evolutionary Algorithm，MEA)和粒子群优化算法(Particle Swarm Optimization, PSO)相结合，提出了 PSO-MEA 混合优化算法.该算法将粒子群优化算法应用于思维进化算法的趋同操作来寻找子群体内的最优解，再对整个群体中的各个子群体进行异化操作找到全局最优解，并通过混合优化算法全局收敛性证明其全局收敛性.最终通过三个常用测试函数的仿真分析，验证了 PSO-MEA 算法在算法性能方面有较明显的改善，并且具有收敛精度高和收敛速度快的特点.

关键词：混合优化算法；思维进化算法；粒子群优化算法；收敛性分析

PSO-MEA Hybrid Optimization Algorithm and Its Convergence Analysis

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Abstract：In view of the disadvantages of low convergence precision and slow convergence rate of the single optimization algorithm, this study combined the mind evolutionary algorithm (MEA) and the particle swarm optimization (PSO) and proposed the PSO-MEA hybrid optimization algorithm. The similar-taxis operation of the mind evolutionary algorithm used the particle swarm optimization algorithm to search the optimal solution of the sub population. The sub populations in the whole population used the dissimilation operation of the mind evolutionary algorithm to find the global optimal solution. And the global convergence of hybrid optimization algorithm is used to proof the convergence of the algorithm. Finally, through the simulation analysis of three commonly used test functions, the PSO-MEA hybrid optimization algorithm has obvious improvement in the performance of the algorithm and has the characteristics of high convergence precision and fast convergence speed.

Key words：Hybrid optimization algorithm; Mind evolutionary algorithm; Particle swarm optimization; Convergence analysis

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