基于反向学习与机动爆炸烟花优化算法

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摘　要：针对烟花算法(Fireworks Algorithm，FWA)性能提升瓶颈和收敛速度较慢的问题，通过引入反向学习策略和机动爆炸的机制，提出了基于反向学习与机动爆炸烟花优化算法（Fireworks Algorithm based on Reverse learning and Maneuver explode，RLMEFWA）.该算法首先采用反向学习策略取代随机初始化生成初始种群以保证群体的多样性;然后每个烟花根据其在当前群体中的位置的优劣情况来选择不同爆炸的方式，处于较优位置的烟花选择机动爆炸方式，以当前种群最优位置为基准，改变自身位置信息向其靠近；处于较劣位置的烟花选择非机动爆炸方式，随机改变自身的位置信息.分别把烟花算法（FWA）、标准粒子群算法（SPSO）、增强烟花算法（EFWA）和RLMEFWA在10个典型的基准测试函数中进行仿真对比，结果表明在收敛速度和计算精度以及稳定性方面RLMEFWA均优于其他三种算法.

Fireworks Algorithm Based on Reverse Learning and Maneuver Explode

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Abstract：Aiming at the performance bottlenecks and slow convergence of fireworks algorithm (Fireworks Algorithm, FWA), By putting reverse learning and maneuver explode into FWA, this paper proposes fireworks algorithm based on reverse learning and maneuver explode (Fireworks Algorithm based on Reverse learning and Maneuver explode, RLMEFWA). In the algorithm, reverse learning strategy was introduced to generate initial population, which strengthened the diversity of population, then each firework applies the position in the current group to choose a different explode way. Fireworks in the better position to select maneuvering explosion mode whose random orbit closer to the optimum position. Fireworks in an inferior position explode select non-motorized mode with random orbit. In our simulation, we compare FWA, SPSO, EFWA and RLMEFWA with 10 typical benchmark functions. The results show that RLMEFWA is better than FWA, SPSO, and EFWA in terms of convergence speed and accuracy and stability.

Key words：fireworks algorithm; maneuver explode; benchmark functions; best position; reverse learning

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