基于柯西变异的蚁狮优化算法

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摘　要：针对蚁狮优化算法较易陷入局部最优停滞，收敛精度低以及收敛速度较慢等问题，将自适应 t 分布的柯西变异融入到蚁狮优化算法中，提出了基于柯西变异的蚁狮优化算法（CALO）.该算法采用轮盘赌的方法挑选出精英蚁狮个体，改善蚁狮群体的适应性，提高种群的总体寻优效率；采用具有自适应的柯西变异算子使得蚁狮个体受局部极值点约束力下降，能够快速跳出局部最优，大大提高了全局搜索能力和收敛速度；通过 9 个单模态、多模态标准测试函数对 CALO、ALO、FPA 和 BA 四种算法进行函数测试对比，实验仿真结果表明该改进算法是切实可行的，具有更优的收敛速度和寻优精度

关键词：蚁狮优化算法；柯西变异算子；轮盘赌搜索方法；花授粉算法；蝙蝠算法

Ant lion optimization algorithm based on cauchy variation

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Abstract：In order to solve these problems that the ant lion optimization algorithm(ALO) is easy to fall into the local optimal stagnation, convergence precision is low and convergence speed is slow, an ant lion optimization algorithm based on cauchy variation is proposed. The adaptive t-distribution of cauchy variation is incorporated into the ant lion optimization algorithm to improve the effective. The elite ant lion individuals were selected by roulette to improve the adaptability of the ant lion population and the overall optimization efficiency of the population. The adaptive cauchy mutation operator makes the individual of the ant lion less constrained of the local extreme point, makes the search jump out of the local optimum quickly, and greatly improves the global search ability and convergence speed. Function test experiments were carried out on CALO, ALO, FPA and BA algorithms through 9 standard test functions of single mode and multi-mode. The simulation results show that the improved algorithm proposed in this paper is feasible and has better convergence speed and optimization precision.

Key words：ant lion optimization algorithm; cauchy mutation operator; Roulette search method; Flower pollination algorithm; bat algorithm

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