融合动态概率阈值和自适应变异的鲸鱼优化算法

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摘　要：针对基本鲸鱼优化算法在非线性优化问题中存在的收敛精度低、易陷入局部最优解的问题，提出一种融合动态概率阈值和自适应变异的鲸鱼优化算法.首先，利用 Fuch 混沌和反向学习生成均匀的初始种群；其次，设计基于双曲余弦函数的动态调整概率阈值以协调算法全局搜索与局部开采能力，采用可变权重对鲸鱼位置更新公式修正，提高收敛速度和精度；最后，对鲸鱼精英个体引入自适应变异策略，以避免算法陷入局部最优解而搜索停滞.对 13 个基准测试函数仿真实验，结果表明，与基本 GWO 算法、PSO 算法以及鲸鱼优化算法相比，该算法具有更好的求解精度、收敛速度.

关键词：　鲸鱼优化算法；Fuch 混沌映射；动态概率阈值；自适应变异

Whale optimization algorithmcombined with dynamic probability threshold anda adaptive mutation

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Abstract：To overcome the deficiencies in optimizing the nonlinear problem of traditional whale optimization algorithm(WOA), including Low convergence accuracyand Easily falling into local optimum in late iteration., an whale optimization algorithm combined with dynamic probability threshold and adaptive mutation (PTMWOA) is proposed. Fuch chaos and opposition-based learning are used to initialize the population which can generate a population of uniform distribution．Dynamic probability threshold of adaptive adjustment is designed to coordinate the exploration and exploitation ability, and variable weight is applied to revise the updating formula for more precise search. Adaptive mutation strategy based is introduced to the optimum whale location to avoid falling into local optimum. Simulation results on 13 benchmark functions show that the proposed algorithm has better performance on solution, and convergence rate than GWO , PSO and WOA algorithms

Key words： whale optimization algorithm; fuch chaotic mapping; dynamic probability threshold; adaptive mutation

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