

一种改进非线性收敛方式的灰狼优化算法研究

谈发明¹，赵俊杰²，王琪²

(¹ 江苏理工学院 信息中心，江苏 常州 213001;

² 江苏理工学院 电气信息工程学院，江苏 常州 213001)

摘要: 针对灰狼优化算法在求解复杂优化问题时过早收敛和易陷入局部最优的缺点，提出一种改进型灰狼优化算法 (CGWO) 用于求解无约束优化问题。算法首先利用引入混沌映射策略的反向学习方法初始种群个体，为算法全局寻优奠定基础；从平衡全局和局部搜索能力角度考虑，对收敛因子的递减形式提出了改进型非线性函数形式；为避免算法陷入局部最优，对当前最优灰狼个体位置进行 Cauchy 变异操作。给出了改进的具体实现步骤，对 8 个标准测试函数进行仿真实验，实验结果表明，改进灰狼优化算法具有更好的求解精度和稳定性。

关键词: 灰狼优化；混沌；收敛因子；变异

A grey wolf optimization algorithm with improved nonlinear convergence

TAN Fa-ming¹，ZHAO Jun-jie²，WANG Qi²

(¹ Information Center, Jiang Su University of Technology, ChangZhou 213001, China;

² School of Electrical and Information Engineering, Jiang Su University of Technology, ChangZhou 213001, China)

Abstract: According to the premature convergence and easy to fall into local optimum of grey wolf optimization algorithm in solving complex optimization problems, a improved grey wolf optimization algorithm is proposed. The algorithm first uses the reverse learning method introducing the chaos mapping strategy to the initial population, and lays the foundation for the global search. Considering the balance global and the local search capability, the improved nonlinear function mode is proposed for the decrease of the convergence factor. In order to avoid the local optimal algorithm, the Cauchy mutation operation is carried out for the optimal location of the optimal gray wolf. The concrete implementation steps are given, and 8 standard test functions are simulated. The experimental results show that the improved grey wolf optimization algorithm has better accuracy and stability.

Key words: grey wolf optimization; chaos; convergent factor; mutation

作者简介:

谈发明 男，(1981-)，硕士，实验师。研究方向为电子与通信。E-mail:tfm@jsut.edu.cn.

赵俊杰 男，(1986-)，博士，讲师。研究方向为非线性系统控制理论研究。

王琪 男，(1987-)，博士，讲师。研究方向为混合动力汽车复合电源能量管理系统。