论文与报告

基于近似动态规划的微粒群系统参数优化研究

康琦, 汪镭, 安静, 吴启迪

1. 同济大学电子与信息工程学院　上海　201804

2. 同济大学教育部嵌入式与服务计算重点实验室　上海　201804

3. 上海应用技术学院机械与自动化工程学院　上海　200235

摘要
从系统最优控制的角度对微粒群参数的动态优化问题进行探讨. 针对离散动态规划的``维数灾"问题, 将群体启发式随机搜索机制引入动态规划的最优策略求解, 提出了一种群体智能近似动态规划模式; 基于该模式给出简化的确定型微粒群反馈控制系统参数优化的近似计算方法, 并扩展应用于具有随机变量的微粒群系统; 仿真计算得到了微粒群加速因子的近似最优动态规律, 并将所得策略与一种时变加速因子(Time-varying acceleration coefficients, TVAC)策略进行了函数优化性能的比较与分析, 初步实验结果表明该近似动态规划模式可有效地用于微粒群系统参数的动态优化设置.

关键词　群体智能　近似动态规划　微粒群系统　参数优化

分类号

扩展功能

本文信息

▸ Supporting info
▸ PDF(2314KB)
▸ [HTML全文](0KB)
▸ 参考文献[PDF]
▸ 参考文献

服务与反馈

▸ 把本文推荐给朋友
▸ 加入我的书架
▸ 加入引用管理器
▸ 复制索引
▸ Email Alert

相关信息

▸ 本刊中 包含"群体智能"的 相关文章

▸本文作者相关文章
· 康琦
· 汪镭
· 安静
· 吴启迪

Approximate Dynamic Programming Based Parameter Optimization of Particle Swarm Systems

KANG Qi, WANG Lei, AN Jing, WU Qi-Di

1. College of Electronics and Information Engineering, Tongji University, Shanghai 201804

2. Key Laboratory of Embedded System and Computer-service of Ministry of Education, Tongji University, Shanghai 201804

3. College of Mechanical and Automation Engineering, Shanghai Institute of Technology, Shanghai 200235

Abstract
From the perspective of optimal control, parameter dynamic optimization of particle swarm optimization (PSO) is addressed in this paper. This work is based on a type of simplified PSO and corresponding convergence conditions. First, to overcome the ``curse of dimensionality'', a novel swarm approximate dynamic programming (SADP) is proposed by introducing the heuristic stochastic search mechanism of swarm intelligence. Second, grounded on SADP, parameter dynamic optimization and computation are studied in detail for a deterministic PSO feedback system and a stochastic PSO system, respectively. Further, numerical experiments are performed to show the effectiveness of SADP in parameter dynamic optimization of PSO systems through computing optimal dynamics of acceleration coefficients, as well as comparing the optimized strategies with a time-varying acceleration coefficients (TVAC) strategy based on several benchmarks.

Key words　Swarm intelligence　approximate dynamic programming　particle swarm system　parameter optimization

---

通讯作者　康琦 qkang@tongji.edu.cn

作者个人主页　康琦; 汪镭; 安静; 吴启迪