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论文

基于Kriging 模型的改进协同优化算法

1. 西南交通大学牵引动力国家重点实验室, 四川成都610031; 2. 成都理工大学核技术与自动化工程学院, 四川成都610059; 3. 西南交通大学机械工程学院, 四川成都610031

摘要:

为了提高协同优化算法的求解效率,利用Kriging 模型,构造系统级近似优化模型,提出了基于Kriging 模型的改进协同优化算法. 该算法采用置信域与均匀设计相结合的方法,完成近似模型的更新;采用序列二次规划算法,完成优化问题的求解. 以经典函数和减速器设计为例,验证了改进协同优化算法. 结果表明:该算法能提高计算效率,在减速器设计中,迭代次数减少50%左右.

关键词: 多学科设计优化 协同优化 Kriging 模型

Improved Collaborative Optimization Algorithm

1. Traction Power State Key Laboratory, Southwest Jiaotong University, Chengdu 610031, China; 2. School of Nuclear
Technology and Automation, Chengdu University of Technology, Chengdu 610059, China; 3. School of Mechanical
Engineering, Southwest Jiaotong University, Chengdu 610031, China

Abstract:

In order to improve the computational efficiency of the conventional collaborative optimization (CO), an improved collaborative optimization algorithm based on the Kriging model (Kriging-CO for short) was proposed. In this algorithm, the approximate optimization model at the system level is constructed with the Kriging model, and is updated by uniform design combined with confidence regions. The Kriging-CO was verified through the optimization of a classical function and the design of a speed reducer, and the optimization models were solved using the sequential quadratic programming algorithm. Numerical results show that the Kriging-CO can improve the computational efficiency. For the complex speed reducer design, the Kriging-CO, compared with the CO, reduced the number of iterations in the optimization computation by about 50%.

Keywords: multidisciplinary design optimization collaborative optimization Kriging model

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