

工程与应用

基于Kriging代理模型的自适应序贯优化方法

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摘要 提出了一种基于Kriging代理模型的自适应序贯优化算法。首先分析了代理模型使用不当引发的局部收敛问题, 然后采用小生境微种群遗传算法求解EI函数来得到校正点, 用以更新Kriging模型。这种选择校正点的方法使得优化过程避免陷入局部极值点。通过对4个典型函数优化实例进行实验, 并与其他算法的结果作比较, 其结果表明, 新算法在解的精度、收敛性和收敛速度上表现出很好的性能, 并且对所优化的问题没有特殊的要求, 具有很强的工程实用价值。

关键词 [序贯优化算法](#) [Kriging模型](#) [全局优化](#) [小生境微种群遗传算法](#)

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Adaptive sequential optimization algorithm based on Kriging surrogate model

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Abstract

An adaptive sequential optimization algorithm based on the Kriging surrogate model is proposed in this paper. First, detailed analysis is made to demonstrate the local convergence induced by improper application of surrogate model. Then niching micro genetic algorithm is used to optimize the expected improvement function, the optimal as the sampled point updates the Kriging model. The method of sampled point selection avoids the risk of falling the local pitfall in the optimization process. Finally, four representative functions are used to test the algorithm's performance. Comparison of different algorithms is conducted from the aspects of convergence efficiency and accuracy. The result shows that the algorithm is more efficient, it can be used in the complicated engineering optimization problems conveniently.

Key words [sequential optimization algorithm](#) [Kriging model](#) [global optimization](#) [niching micro genetic algorithm](#)

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