

论文与报告

多模态函数优化的协同多群体遗传算法

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摘要

讨论了多模态函数优化的遗传算法(GA)求解方法.分析了传统的基于排挤选择模型和基于适应值共享的GA方法的特点和不足,应用模式理论研究了GA群体进化行为.提出了宏观小生境思想和协同多群体GA的基本框架和详细算法流程,并给出了一种自动小生境半径估计方法.采用典型函数进行了实例计算,结果表明了协同多群体GA的有效性.

关键词 [多模态函数优化](#) [遗传算法](#) [多群体](#) [小生境技术](#)

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Coordinate Multi-Population Genetic Algorithms for Multi-Modal Function Optimization

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Abstract

Traditional GA adopts crowding or fitness-sharing technique to evolve multi-solutions in a single population, which does not conform to the natural evolution of species and is also with the difficulty of parameters design. We analyze the characteristics of GA evolution of population and species evolution in nature, and formulate the logic of macro-niching method based on multi-populations, and describe its work flow in detail. Moreover, we design a new algorithm for calculating niche radius automatically. Finally, the coordinate multi-population GA is applied to the optimizations of typical multi-modal functions, and the experiments reveal its efficiency and effectiveness.

Key words [Multi-modal function optimization](#) [genetic algorithms](#) [multi-populations](#) [niching technology](#)

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