

研究、探讨

求解TSP问题的改进模拟退火遗传算法

王银年, 葛洪伟

江南大学 信息工程学院, 江苏 无锡 214122

收稿日期 2008-9-4 修回日期 2008-12-22 网络版发布日期 2010-2-8 接受日期

摘要 巡回旅行商问题 (TSP) 是最典型的NP的难题, 遗传算法 (GA) 是解决这类问题的有效方法之一。由于该问题的解是一种特殊的序列, 一般的交叉算子在该问题的求解效果方面并不理想, 提出了贪心的3PM交叉算子, 同时又引入退火选择方法, 形成一种新的模拟退火遗传算法GCBSAGA (Greed Cross-3PM Based on Simulated Annealing Genetic Algorithms)。该算法还将模拟退火算法与遗传算法相结合, 使得遗传算法在前期发挥着全局搜索的强大功能, 很容易收敛到全局较优解; 后期用模拟退火算法来处理遗传算法前期的全局较优解, 充分利用模拟退火算法后期局部搜索的强大功能, 最终收敛到全局最优解。经过国际公认的TSPLIB提供的实验数据的验证, GCBSAGA在实例eil76、eil101、pr144、st70均找到了比TSPLIB提供的最优路径更优的解。

关键词 [巡回旅行商问题](#) [遗传算法](#) [模拟退火算法](#) [贪心交叉算子](#) [退火选择](#)

分类号 [TP18](#)

Improved simulated annealing genetic algorithm for solving TSP problem

WANG Yin-nian, GE Hong-wei

School of Information Engineering, Jiangnan University, Wuxi, Jiangsu 214122, China

Abstract

The Traveling Salesman Problem (TSP) is a well-known NP complete problem, while the Genetic Algorithm (GA) is one of the ideal methods in solving it. Because the problem is a special sequence, the general cross-operator in the problem solving effect is not ideal. The greedy cross-3PM operator is proposed, while the annealing selection method is introduced, and a new simulated annealing genetic algorithm GCBSAGA (Greed Cross-3PM Based on Simulated Annealing Genetic Algorithms) is formed. The algorithm combines simulated annealing and genetic algorithm together, making genetic algorithm in the early stage play a powerful global search function. It is easy to converge to the global optimum solution; In the later stage, the simulated annealing genetic algorithms are used to deal with the overall situation of pre-optimum solution. And it makes full use of simulated annealing's latter part of the power of local search and eventually converges to the global optimal solution. After the experimental data verification provided by the internationally recognized TSPLIB, GCBSABA in the case eil76, eil101, pr144, st70 are found to provide better optimal path solution than TSPLIB.

Key words [Traveling Salesman Problem \(TSP\)](#) [genetic algorithms](#) [simulated annealing](#) [greed cross-operator](#) [annealing choice](#)

DOI: 10.3778/j.issn.1002-8331.2010.05.014

通讯作者 王银年 wyn2008boy@126.com

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(831KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [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](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ 本刊中 [包含“巡回旅行商问题”的相关文章](#)
- ▶ 本文作者相关文章
- [王银年](#)
- [葛洪伟](#)