結合螞蟻演算法與插入法於車輛路線問題之研究

卓裕仁, 尤燕祺
運輸科技與物流管理學系
管理學院
m9203001@chu.edu.tw

摘要

The Ant Colony System (ACS) is a meta-heuristic approach for solving complicated combinatorial optimization problem. Based on the behavior of real ants, the ACS transfers the ants' pheromone to an efficient mechanism of information memory which is the core of ACS. In our opinion, the ACS could be considered as an intelligent and randomized version of the traditional Nearest Neighbor (NN) method. Therefore, we present an innovated concept to implement the famous ACS and identify its performance on solving the classical Vehicle Routing Problem (VRP). In this research, the Farthest Insertion (FI) method is introduced into the search process of ACS to substitute the NN method. Simultaneously, a modification of the pheromone function is designed to evaluate the candidate nodes. Moreover, we propose a randomization strategy at the first step of the first ant search. We select fourteen VRP benchmark instances and design fifteen sets of parameters to test the proposed modified ACS, named as MACS_VRP. The average percentage of accuracy error among these instances is 0.9%, which is slight superior to several known ACS for VRP. Additionally, the concept of adopting FI to ACS is proven to be effective and efficient.

關鍵字：Ant Colony System (ACS), Farthest Insertion Method, Vehicle Routing Problem (VRP).