

# A Tabu Search Algorithm for the Vehicle Routing Problem

陳勝男、林燦煌

E-mail: 8515667@mail.dyu.edu.tw

## ABSTRACT

The purpose of this thesis is to develop a tabu search algorithm (CTS) for a special vehicle routing problem. The problem is based on Classical Vehicle Routing Problem with a special constraint considering the truck size limit for each demand point which reflects the narrow-street phenomena in Taiwan. The algorithm uses a two-phase approach. In the first stage, an initial solution is generated by spacefilling curve heuristic. In the second stage, a tabu search method is used as the framework. Within the framework, the combination of insertion and 1-vertex interchange methods between routes was used as move method to improve the solution. Ten test problems from literature are adopted to evaluate the performance of the algorithm for the vehicle routing problem considering single truck type. With four of ten problems, the solutions generated by CTS are the same as the best published ones. When problem size increases, the effectiveness of CTS decreases. Sensitivity analysis is performed to investigate the relationship between number of trucks for each type and the total travel distance. The result shows that more utilization of smaller trucks and less utilization of bigger trucks will cause longer total travel distance.

Keywords : Vehicle Routing Problem ; Tabu Search ; Spacefilling Curve

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