



A New Competitive Travelling Salesmen Problem Based on Metaheuristics

Taiser Samer Jasim^{1, a)}, Esam Taha Yassen^{2, b)} and Sudad H. Abed^{2, c)}

¹College of Computer Science and Information Technology, University of Anbar, Iraq.

²Computer Center, University of Anbar, Iraq.

a) zahrataliraq1232@gmail.com

b) co.esamtaha@uoanbar.edu.iq

c) Corresponding author: shabed@uoanbar.edu.iq

Abstract. Competitive travelling salesman problem (CTSP) is a combinatorial optimization problem in which number of salesmen compete among themselves to find an optimal solution with larger benefit and shortest path. Despite the importance of this problem and its many applications in real life, the instances that had been studied are few in number; hence, this paper is focused on designing and constructing more instances to reflect many real life situations. The proposed instances simulate the vehicle routing problem with time windows and the team orienteering problem with time windows. One of the recent swarm intelligence algorithms is salp swarm algorithm (SSA), which is characterized as being simple and flexible, is developed to handle CTSP. Finally, the experimental results illustrate that the new designed instances simulating various real life case are suitable to represent CTSP and the proposed hybridized SSA is better than the standard SSA in solving variant CTSP instances.

INTRODUCTION

The travelling salesman problem (TSP) is considered as one of the perplexing optimization problems in transportation and distribution systems. Thus, it has been a fertile area of research which has drawn researching efforts from various communities such as operation research and artificial intelligence. There are many of variations of TSP. Some of them are Symmetric TSP, Asymmetric TSP, Multiple TSP, Competitive TSP and many others [1,2]. This study focuses on CTSP which is considered more realistic problem than other variations [3]. In this problem, number of travelling salesmen competes with one another to visit a number of cities. Any salesman ought to acquire a payoff whenever he visits a city at first and is required to pay a cost for the distance he traveled [3]

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