

Robust Optimisation Model and Simulation-Particle Swarm Optimisation Approach for Vehicle Routing Problem with Stochastic Demands

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Abstract : In this paper, a specific type of vehicle routing problem under stochastic demand (SVRP) is considered. This problem is of great importance because it models for many of the real world vehicle routing applications. This paper used a robust optimisation model to solve the problem along with the novel Simulation-Particle Swarm Optimisation (Sim-PSO) approach. The proposed Sim-PSO approach is based on the hybridization of the Monte Carlo simulation technique with the PSO algorithm. A comparative study between the proposed model and the Sim-PSO approach against other solution methods in the literature has been given in this paper. This comparison including the Analysis of Variance (ANOVA) to show the ability of the model and solution method in solving the complicated SVRP. The experimental results show that the proposed model and Sim-PSO approach has a significant impact on the obtained solution by providing better quality solutions comparing with well-known algorithms in the literature.

Keywords : stochastic vehicle routing problem, robust optimisation model, Monte Carlo simulation, particle swarm optimisation

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