Simulation-optimization approach for the stochastic location-routing problem

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Abstract

The location routing problem with stochastic transportation cost and vehicle travel speeds is considered in this paper. A hybrid solution procedure based on Ant Colony Optimisation (ACO) and Discrete-Event Simulation (DES) is proposed. After using a sequential heuristic algorithm to solve the location subproblem, the subsequent capacitated vehicle routing problem is solved using ACO. Finally, a DES model evaluates those vehicle routes in terms of their impact on the expected total costs. The approach is tested using well-known randomly generated datasets. Since no previous works in the literature studied exactly the same SLRP, the proposed procedure is compared against its deterministic version. Numerical results show the efficiency and efficacy of the hybrid ACO-DES approach.