

Differential evolution with improved sub-route reversal repair mechanism for multiobjective urban transit routing problem

ABSTRACT

The urban transit routing problem (UTRP) deals with public transport systems in determining a set of efficient transit routes on existing road networks to meet transit demands. The UTRP is a complex combinatorial optimization problem characterized with a large search space, multi-constraint, and multiobjective nature where the likelihood of generating infeasible route sets is high. In this paper, an improved sub-route reversal repair mechanism is proposed to deal with the infeasibility. A population-based metaheuristic, namely, Differential Evolution (DE) algorithm is then proposed to handle the multiobjective UTRP with the aim of devising an efficient transit route network that optimizes both passengers' and operators' costs. Computational experiments are performed on well-known benchmark instances to evaluate the effectiveness of the proposed repair mechanism and the DE algorithm. The computational results are reported to have better parameter values in most cases when compared to other approaches in the literature.

Keyword: Urban transit; Routing; Multiobjective; Repair mechanism; Differential evolution