

A Novel Solution Methodology for Transit Route Network Design Problem

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Abstract : Transit Route Network Design Problem (TrNDP) is the most important component in Transit planning, in which the overall cost of the public transportation system highly depends on it. The main purpose of this study is to develop a novel solution methodology for the TrNDP, which goes beyond previous traditional sophisticated approaches. The novelty of the solution methodology, adopted in this paper, stands on the deterministic operators which are tackled to construct bus routes. The deterministic manner of the TrNDP solution relies on using linear and integer mathematical formulations that can be solved exactly with their standard solvers. The solution methodology has been tested through Mandl's benchmark network problem. The test results showed that the methodology developed in this research is able to improve the given network solution in terms of number of constructed routes, direct transit service coverage, transfer directness and solution reliability. Although the set of routes resulted from the methodology would stand alone as a final efficient solution for TrNDP, it could be used as an initial solution for meta-heuristic procedures to approach global optimal. Based on the presented methodology, a more robust network optimization tool would be produced for public transportation planning purposes.

Keywords : integer programming, transit route design, transportation, urban planning

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