Urban transit frequency setting using multiple tabu search with parameter control

ABSTRACT

Urban transit frequency setting is one of the multiobjective problems in public transportation system, which aims to find optimal time interval between subsequent buses along the routes. In this study, a Multiple Tabu Search (MTS) algorithm is employed to determine the bus frequency of the routes that minimize the number of buses, total waiting times and overcrowding simultaneously. The efficiency of the algorithm is tested on benchmark dataset by changing the value of the total domains. The chosen parameter gives considerable effect on the objective functions compared to other parameters such as the size of tabu list and the number of iterations. Using statistical hypotheses evaluation, the results indicate that the number of domains determines the quality of solutions for different instances of the problem. Additionally, the frequency setting problem is extended by revising the passenger assignment procedure and frequency optimization process with time-dependent demand in order to reflect a real-world scenario. The extended results from different size of routes are presented to show the effectiveness of the proposed algorithm.

Keyword : Transit frequency setting; Multiple tabu search; Parameter tuning