Chang, Zheng; Chen, Haoxun; Yalaoui, Farouk; Dai, Bo
Adaptive large neighborhood search algorithm for route planning of freight buses with pickup and delivery. (English) [Zbl 07394164]

Summary: Freight bus is a new public transportation means for city logistics, and each freight bus can deliver and pick up goods at each customer/supplier location it passes. In this paper, we study the route planning problem of freight buses in an urban distribution system. Since each freight bus makes a tour visiting a set of pickup/delivery locations once at every given time interval in each day following a fixed route, the route planning problem can be considered a new variant of periodic vehicle routing problem with pickup and delivery. In order to solve the problem, a Mixed-Integer Linear Programming (MILP) model is formulated and an Adaptive Large Neighborhood Search (ALNS) algorithm is developed. The development of our algorithm takes into consideration specific characteristics of this problem, such as fixed route for each freight bus, possibly serving a demand in a later period but with a late service penalty, etc. The relevance of the mathematical model and the effectiveness of the proposed ALNS algorithm are proved by numerical experiments.

MSC:
58F15 Hyperbolic structures (expanding maps, Anosov systems, etc.) (MSC2000)
58F17 Geodesic and horocycle flows (MSC2000)
53C35 Differential geometry of symmetric spaces

Keywords:
adaptive large neighborhood search algorithm; route planning; freight bus; joint distribution

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References:


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