

عنوان مقاله:

The Special Application of Vehicle Routing Problem with Uncertainty Travel Times: Locomotive Routing Problem

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خلاصه مقاله:

This paper aims to study the locomotive routing problem (LRP) which is one of the most important problems in railroad scheduling in view of involving expensive assets and high cost of operating locomotives. This problem is assigning a fleet of locomotives to a network of trains to provide sufficient power to pull them from their origins to destinations by satisfying a rich set of operational constraints and minimizing the total operational cost. This problem is the special application of vehicle scheduling and it is modeled by using the vehicle routing problem with time windows (VRPTW) to optimal assignment of locomotives to assembled trains. Almost all of the prior models were deterministic and an important issue, widely ignored in prior research in locomotive optimization, is the presence of significant sources of uncertainty in transit times, travel times and changes to the train schedule. Therefore, in this paper unlike most of the work where all the times are deterministic, uncertainty in travel time is considered. Because travel times in reality fluctuate due to a variety of factors and its understanding and management in transportation networks is very important. The concepts of fuzzy sets and fuzzy control systems are considered to model the uncertainty in travel times. Besides, a genetic algorithm (GA) with various heuristics is proposed to tackle the proposed model and its performance is evaluated in different steps on various test problems generalized from a set of instances in the literature. The computational experiments on data sets illustrate the efficiency and effectiveness of the proposed approach.

کلمات کلیدی:

Locomotive Routing Problem, Vehicle Routing and Scheduling, Fuzzy Travel Time, Genetic Algorithm

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