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A Learning Tabu Search Combined with a Flow Algorithm for a Location-Distribution Problem in a Railway Network

Résumé / Abstract

The two-level problem studied in this paper consists in optimizing the refueling costs of a fleet of locomotives over a railway network. On the one hand, the goal consists in determining the number of trucks contracted for each yard (truck assignment problem denoted TAP), and on the other hand to determine the refueling plan of each locomotive (fuel distribution problem denoted FDP). Various costs (e.g., fuel, fixed cost associated with each refueling, weekly operating costs of refueling trucks) have to be minimized while satisfying a set of constraints (e.g., limited capacities of the locomotives and the refueling trucks). This problem was initially motivated by the Railway Applications Section of INFORMS. But in contrast with the existing literature on this problem, nonlinear costs will also be considered. The FDP is tackled with a flow model combined with a repairing process and a descent procedure. Various methods are proposed for the TAP: a descent local search, a tabu search, and a learning tabu search (LTS). The latter is a new type of local search algorithm, involving a learning process relying on a trail system. Results are reported and discussed for a large set of instances, and show the good performance of LTS.

Note : Nicolas Zufferey est professeur associé en gestion des opérations à l'Université de Genève. Il a obtenu un doctorat en recherche opérationnelle à l'École polytechnique fédérale de Lausanne (EPFL). Il est membre associé au CIRRELT. / Nicolas Zufferey is professor in Operations Management at Université de Genève. He completed his Ph.D. in Operations Research at EPFL. He is a CIRRELT associate member.

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MERCREDI / WEDNESDAY

26 juin 2013 / June 26th, 2013
10h30
Salle / Room 5441
**Pavillon André-Aisenstadt
Université de Montréal**

Bienvenue à tous / Welcome to all

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