Séminaire conjoint avec / Joint Seminar with
Chaire en logistique et en transport / Chair in Logistics and Transportation
HEC MONTRÉAL

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A BRANCH-AND-CUT EMBEDDED MATHEURISTIC FOR THE INVENTORY ROUTING PROBLEM

ZOOM : https://hecmontreal.zoom.us/j/89521759084 / ID de réunion : 895 2175 9084

Abstract: This seminar will introduce a new matheuristic for the inventory routing problem (IRP). In the IRP, a supplier is in charge of replenishing goods to several customers and can decide when and in what order these customers should be visited over a finite and discrete time horizon. The goal is to minimize transportation costs and inventory holding costs for both the supplier and the customers. The IRP is a hard combinatorial optimization problem. Our solution method, a branch-and-cut embedded matheuristic, is based on a state-of-the-art branch-and-cut method, where a matheuristic is called every time a primal solution is found. The matheuristic consists of a construction heuristic and an improvement heuristic. The construction heuristic uses a giant tour method and a shifting assignments method to generate a set of promising routes, which in turn are combined into a feasible solution to the problem by solving a route-based mathematical program. The improvement heuristic then solves a series of extended route-based mathematical programs where clusters of customers may be inserted and/or removed from the routes of the initial feasible solution. When tested on benchmark instances from the literature, the proposed method found the best-known solution for 740 out of 878 multi-vehicle instances. The method also won the IRP track of the recent DIMACS vehicle routing implementation challenge. In this talk, we will focus on the process of developing the algorithm and discuss whether what we have learned from solving the IRP can be used on other routing problems.

Bio: Simen Tung Vadseth is a Ph.D. candidate from the Norwegian University of Science and Technology (NTNU). He previously obtained a Master's degree in Industrial Engineering at NTNU. He is currently involved in a project where the overall goal is to find better solution methods for hard combinatorial optimization problems, and he is focusing on rich vehicle routing problems. His supervisors are Henrik Andersson and Magnus Stålhane from NTNU. In addition to working on his Ph.D., Simen has a part-time job in the operations research group at the University Hospital in Trondheim, Norway.

Jeudi / Thursday
1er décembre 2022, 10h30
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Salle / Room 5441
Pavillon André-Aisenstadt
Université de Montréal
et
Lien Zoom

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Responsable / Organizer

Jean-François Cordeau