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SOUTENANCE DE THÈSE DE DOCTORAT DE PHUONG KHANH NGUYEN

ÉTUDIANTE AU DIRO, UNIVERSITÉ DE MONTRÉAL

DIRECTEURS : TEODOR GABRIEL CRAINIC ET MICHEL TOULOUSE

Titre : **HEURISTIC SOLUTION METHODS FOR RICH VEHICLE ROUTING PROBLEMS**
Date et heure : Le mardi 10 juin 2014, à 14h
Salle : 3195, Pavillon André-Aisenstadt

Abstract

For more than half of century, the Vehicle Routing Problem (VRP) has been one of the most extensively studied problems in operations research due to its methodological interest and practical relevance in many fields such as transportation, logistics, telecommunications, and production. The practical applications of the VRP may have a variety of constraints, and obviously, the larger the set of constraints that need to be considered, i.e., corresponding to "richer" VRPs, the more difficult the task of problem solving.

The first part of the talk addresses the Periodic Vehicle Routing Problem with Time Windows (PVRPTW) which generalizes the classical Vehicle Routing Problem with Time Windows (VRPTW) by extending the planning horizon to several days where customers generally do not require delivery on every day, but rather according to one of a limited number of possible combinations of visit days. The major contribution of this part is the development of a population-based hybrid meta-heuristic in which a set of local search procedures and neighborhood-based meta-heuristics cooperate with the genetic algorithm population evolution mechanism to enhance the solution quality as well as to promote diversity of the population.

The second part aims to present, model and solve two rich vehicle routing problems which further extend the VRPTW with time-dependent pickup and delivery demands and hard time synchronization restrictions. They are called Time-dependent Multi-zone Multi-Trip Vehicle Routing Problem with Time Windows (TMZT-VRPTW), and Multi-zone Multi-Trip Pickup and Delivery Problem with Time Windows and Synchronization (MZT-PDTWS), respectively. These two problems originate from planning the operations of two-tiered City Logistics systems. The difficulty of these problems lies in handling two intertwined sets of decisions: the routing component which aims to determine the sequences of customers visited by each vehicle, and the scheduling component which consists in planning arrivals of vehicles at facilities within hard time synchronization restrictions. We propose meta-heuristics that address the two decisions simultaneously, in a comprehensive and efficient way.

5 juin 2014