Title:

Modeling and Solving the Pickup and Delivery Problem with Time Windows and Last-in-First-Out Loading

Abstract:

In this presentation, we model and solve the pickup and delivery problem with time windows and last-in-first-out (LIFO) loading. This policy ensures that no handling is required while unloading items from the vehicle. To solve this problem, we propose three exact branch-price-and-cut (BPC) algorithms and one population-based metaheuristic. The first BPC algorithm incorporates the LIFO constraints in the master problem, the second one handles the LIFO constraints directly in the shortest path subproblem, and the third one is a hybrid between the first two methods. The population-based metaheuristic is done as follows. First, a set of initial solutions are generated with a greedy randomized adaptive search procedure, and local search is applied for each of these solutions in order to first decrase the total number of vehicles and then the total traveled distance. Two different strategies are used to create offspring. The first selects vehicle routes from the solution pool. The second selects two parents to create an offspring with an adapted order crossover. For both strategies, local search is then performed on the child solution. Finally, the offspring is added to the population and the best survivors are kept. Computational results are presented.