

proposition sujet de mémoire **2014 - 2015**  
MASTER Recherche 2<sup>ème</sup> année  
Management, Innovation, Technologie  
spécialité « Génie industriel »

**Rolling horizon heuristics for the crossdock truck  
scheduling problem with time windows**

**Contenu du sujet proposé :**

In a cross-docking platform or crossdock, the goods are unloaded from the incoming trucks, sorted, dispatched and directly reloaded in outbound trucks. The inventory is kept to a minimum, since typically the goods do not spend more than 24 hours inside the platform.

We focus on a crossdock truck scheduling problem with time windows. Knowing the preferences of the transportation providers regarding the arrival time and departure time of the trucks operating at the crossdock, the problem is to schedule the actual truck arrivals and departures, as well as the detailed pallet transfer plan. The objective is to maximize the transportation provider's satisfaction regarding the presence time window that is finally allocated to the different trucks (they should not be too different from what he asked for), as well as minimizing the temporary storage within the platform. The problem has been proven to be NP-hard.

In a previous work (Ladier & Alpan, 2014), we proposed an integer program and several heuristics in order to solve the problem. The integer program, run with C-PLEX, gives the optimal solution -- but cannot solve instances of realistic size in a reasonable amount of time. Two of the heuristics proposed are based on decomposition into smaller sub-problems (separating the inbound and outbound sides), the third one solves the problem with a tabu search.

Reducing the length of the planning horizon is another promising way of reducing the computation time. But to solve problems of realistic sizes, we cannot just blindly split the problem in sub-problems with shorter horizons, because what happens at each time period influences what happens next. This Master project aims at proposing new heuristics based on rolling horizons, implementing and testing them on a set of provided instances, and comparing their performances with the heuristics that have already been developed.

The candidate should have strong programming skills (preferably in Java), a good knowledge of integer programming and C-PLEX, and a taste for problem-solving and optimization.

**Références**

Ladier, A.-L., & Alpan, G. (2014). Crossdock truck scheduling with time windows -- Earliness, tardiness and storage policies. Submitted to *Journal of Intelligent Manufacturing*.

Quel parcours conseillez-vous : Supply Chain

Pour mener à bien le stage, il est souhaitable de suivre en cours optionnels le (s) enseignement(s) suivant(s) :  
[UE Methods in Tactical and Operational Supply Chain Management](#)

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