



Séminaire du CIRRELT Seminar

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EXACT AND HEURISTIC APPROACHES FOR AN INTEGRATED PROCESS CONFIGURATION, LOT SIZING AND SCHEDULING PROBLEM

Abstract: We study an integrated process configuration, lot sizing and scheduling problem, which appears in the context of a real production environment of packaging industry. In this problem, production quantities and capacity consumption depend on which process configurations are used, how long they are used, and in what sequence. For the particular case studied here, process decisions are generated at the same time as lot sizing and sequencing decisions, which involve sequence-dependent setup costs and times. Non-linear mathematical models of the problem are presented and symmetry-breaking constraints are applied to strengthen the formulations. A Branch-and-cut (B&C) algorithm with logic-based benders cuts is proposed to solve the problem and compare its performance with linearized models solved by a standard mixed integer programming (MIP) solver. Results show that in general, the B&C outperforms the linearized models for all the instances tested. To efficiently solve large instances, a MIP-based heuristic is then proposed to and good quality solutions in shorter computational times. Although the problem studied here is based on a particular production system in packaging industry, the logic of the B&C and the heuristic proposed can be adapted to other applications where lot sizing decisions must be determined simultaneously with processes configurations or operation mode selection.

Note: Karim Pérez Martinez is a PhD internship at CIRRELT, under the supervision of Professors Raf Jans and Yossiri Adulyasak.

MERCREDI / WEDNESDAY

12 avril 2017 /
April 12th, 2017
10h30

Salle / Room 5441
Pavillon André-Aisenstadt
Université de Montréal

Ouvert à tous / Open to all

Organisateur / Organizer
Raf Jans

