



## SÉMINAIRE conjoint avec / Joint Seminar with

La Chaire de recherche du Canada en distributique et La Chaire de recherche du Canada en logistique et en transport /  
The Canada Research Chair in Distribution Management and The Canada Research Chair in Logistics and Transportation

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## “Simultaneous Column and Row Generation for Large Scale Linear Programs with Column Dependent Rows”

### Résumé / Abstract

In this study, we develop a simultaneous column-and-row generation algorithm that could be applied to a general class of large-scale linear programming problems. These problems typically arise in the context of linear programming formulations with exponentially many variables. The defining property for these formulations is a set of linking constraints, which are either too many to be included in the formulation directly, or the full set of linking constraints can only be identified, if all variables are generated explicitly. Due to this dependence between columns and rows, we refer to this class of linear programs as problems with column-dependent-rows. To solve these problems, we need to be able to generate both columns and rows on-the-fly within an efficient solution approach. We emphasize that the generated rows are structural constraints and distinguish our work from the branch-and-cut-and-price framework. We first characterize the underlying assumptions for the proposed column-and-row generation algorithm. These assumptions are general enough and cover all problems with column-dependent-rows studied in the literature up until now to the best of our knowledge. We then introduce in detail a set of pricing subproblems, which are used within the proposed column-and-row generation algorithm. This is followed by a formal discussion on the optimality of the algorithm. To illustrate our approach, the proposed framework is applied to the multi-stage cutting stock, the quadratic set covering and time-constrained routing problems.

**Note :** Ibrahim Muter effectue présentement un stage postdoctoral au CIRRELT sous la direction de Gilbert Laporte et Jean-François Cordeau. Il a obtenu son doctorat à l'Université Sabanci, Turquie. / Ibrahim Muter is doing a postdoctoral fellowship at CIRRELT under the supervision of Gilbert Laporte and Jean-François Cordeau. He has received his Ph.D. degree at Sabanci University, Turkey.

**MERCREDI / WEDNESDAY**

**25 janvier 2012 /  
January 25th, 2012**

**10h30**

**Salle / Room 5441  
Pavillon André-Aisenstadt  
Université de Montréal**

**Bienvenue à tous / Welcome to all**

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