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Séminaire du CIRRELT Seminar

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MONOTONIC BOUNDS FOR A STOCHASTIC MULTISTAGE MIXED-INTEGER SUPPLY TRANSPORTATION PROBLEM

Abstract: Multistage stochastic programs bring computational complexity which may increase exponentially in real case problems. For this reason approximation techniques which replace the problem by a simpler one and provide lower and upper bounds to the optimal solution are very useful. In this talk monotonic lower and upper bounds for the optimal objective value of a multistage stochastic program are provided [2]. These results also apply to stochastic multistage mixed integer linear programs and also to the non-linear case [4]. Monotonic chains of bounds are shown on a stochastic multistage mixed-integer linear supply transportation problem [3], inspired by a real case of chalk replenishment provided by the primary Italian cement producer, with stochastic demand. The problem is to determine the number of vehicles to book at the beginning of each week to replenish chalk at all the cement factories of the producer in order to minimize the total cost, given by the sum of the transportation costs and buying cost from external sources in extreme situations. Monotonic chains of inequalities among the new bounds, are provided in terms of percentage deviation from optimal stochastic objective value and relative computational complexity. Relations to classical lower and upper bounds [1] like the wait-and-see solution and the expected result of using the expected value solution are also presented showing the advantage of the procedure proposed.

[1] Maggioni, F., Allevi, E. & Bertocchi, M. (2014) Bounds in multistage linear stochastic programming J. Optim. Theory Appl., 163(1), 200-229
[2] Maggioni, F., Allevi, E. & Bertocchi, M. (2014) Monotonic bounds in multistage mixed-integer linear stochastic programming (submitted)
[3] Maggioni, F. (2014) Monotonic bounds for a stochastic multistage mixed-integer supply transportation problem (submitted)
[4] Maggioni, F., Pflug, G. (2014) Bounds and approximations for multistage stochastic programs (submitted).

Note: Francesca Maggioni is Assistant Professor in Mathematics at the Department of Management, Economics and Quantitative Methods at the University of Bergamo. Her research interests are stochastic programming and geometric, topological and energetic aspects associated with application to elastic filaments, magnetic relaxation of magnetic flux tubes and vortex knots and unknots.

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VENDREDI / FRIDAY

17 octobre 2014 / October 17th, 2014
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Salle / Room 5441
Pavillon André-Aisenstadt
Université de Montréal

Ouvert à tous / Open to all

Organisateur / Organizer
Teodor Gabriel Crainic

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