

CORE DISCUSSION PAPER
2003/1

**LIFTING, SUPERADDITIVITY, MIXED INTEGER
ROUNDING AND SINGLE NODE FLOW SETS REVISITED**

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January 2003

Abstract

In this survey we attempt to give a unified presentation of a variety of results on the lifting of valid inequalities, as well as a standard procedure combining mixed integer rounding with lifting for the development of strong valid inequalities for knapsack and single node flow sets. Our hope is that the latter can be used in practice to generate cutting planes for mixed integer programs.

The survey contains essentially two parts. In the first we present lifting in a very general way, emphasizing superadditive lifting which allows one to lift simultaneously different sets of variables. In the second, our procedure for generating strong valid inequalities consists of reduction to a knapsack set with a single continuous variable, construction of a mixed integer rounding inequality, and superadditive lifting. It is applied to several generalizations of the 0-1 single node flow set.

Keywords: lifting, mixed integer rounding, single node flow sets.

JEL Classification: 90C11, 90C27.

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The first author is supported by the FNRS. This research was also supported by the European Commission GROWTH Programme, Research Project LISCOS, Large Scale Integrated Supply Chain Optimization Software Based on Branch-and-Cut and Constraint Programming Methods, Contract No. GRDI-1999-10056, and the project TMR-DONET nr. ERB FMRX-CT98-0202.

This paper presents research results of the Belgian Program on Interuniversity Poles of Attraction initiated by the Belgian State, Prime Minister's Office, Science Policy Programming. The scientific responsibility is assumed by the authors.