CORE DISCUSSION PAPER
2000/23

ON THE WAGNER-WHITIN LOT-SIZING POLYHEDRON

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March 2000

Abstract

We study a family of unbounded polyhedra arising in the study of uncapacitated lot-sizing problems with Wagner-Whitin costs. With n the number of periods, we completely characterize the bounded faces of maximal dimension, and derive an $O(n^2)$ algorithm to express any point within the polyhedron as a convex combination of extreme points and extreme rays. We also study adjacency on the polyhedra, and give a simple $O(n)$ test for adjacency. Finally we observe that if we optimize over these polyhedra, the face of optimal solutions can be found in $O(n^2)$.

Keywords: Polyhedra, Adjacency, Maximal Faces, Dual Algorithm, Lot-Sizing, Wagner-Whitin costs.

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Research carried out as part of the project TMR-DONET nr. ERB FMRX-CT98-0202 of the European Union.
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.