

Simple Mixed Integer Sets: Polyhedra and Algorithms

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Abstract

Starting from the simplest two variable, two constraint mixed integer set from which one derives the mixed integer rounding (MIR) inequality, we consider various extensions and in particular the mixing set of Günlük and Pochet and its generalizations, such as the continuous mixing set and the divisible capacity mixing set. For each model we describe the convex hull either via an extended formulation involving auxiliary variables or directly in the original variable space, and where possible we give algorithms for both optimization and separation.

We then consider the class of "network dual" mixed integer programs, and show how this provides an abstract model including several of the mixing set models described earlier. Finally applications to production planning and stochastic optimization are discussed briefly.