

MIP 2007:
Workshop on Mixed Integer Programming
July 30 – August 2, 2007

Simple-set cutting planes for mixed-integer programming

Ismael de Farias
Dept. of Industrial and Systems Engineering
University of Buffalo
438 Bell Hall
Buffalo, NY 14260-2050
USA
defarias@buffalo.edu

Abstract

Ever since Balas et al. established the computational importance of Gomory mixed-integer cutting planes, a flood of research followed on it and its close relatives: intersection, mixed-integer rounding (MIR), and split cuts. These cutting planes are of great interest for building general-purpose branch-and-cut solvers, as they make no assumption on the structure of the problem being tackled.

The most important question that still remains open is how to produce general-purpose cutting planes that are more powerful than Gomory cuts. An interesting alternative was suggested by Marchand and Wolsey and by Gunluk and Pochet. The first gave a new perspective on MIR inequalities that brought enlightenment on them and their relatives. The second introduced mixing-MIR sets and inequalities. Since then, several types of mixing-MIR sets and inequalities have been proposed and studied. We call such sets simple, since linear optimization over them is tractable, and the cutting planes implied by them simple-set.

We will present some of our new contributions to this topic. Among them, we will discuss the mixing-MIR set with nondivisible capacities, and the use of mixing-MIR on nonlinear and mixed-integer nonlinear programming.

Join work with Ming ZhaoMing Zhao.