
New Classes of Facets for Complementarity Knapsack Problems

Alberto Del Pia^{1,2}, Jeff Linderoth¹, and Haoran Zhu^{*†3}

¹University of Wisconsin Madison – United States

²Wisconsin Institute for Discovery – United States

³University of Wisconsin Madison – United States

Abstract

The complementarity knapsack problem (CKP) is a knapsack problem with real-valued variables and complementarity conditions between pairs of its variables. We extend the polyhedral studies of De Farias et al. for CKP, by proposing three new families of cutting-planes that are all obtained from a combinatorial concept known as a pack. Sufficient conditions for these inequalities to be facet-defining, based on the concept of a maximal switching pack, are also provided. Moreover, we answer positively a conjecture by De Farias et al. about the separation complexity of the inequalities introduced in their work.

^{*}Speaker

[†]Corresponding author: hzhu94@wisc.edu