A finite algorithm for disjoint bilinear programs

Hyun-Ju Oh
Postdoctoral Fellow
School of Mathematical and Statistical Sciences
Clemson University

December 8, 2023

Talk will take place in Martin M-103, from 11:15am - 12:05pm

Abstract: In this talk, we focus on disjoint bilinear programs (DBPs) whose objective function includes bilinear terms of two vectors of variables lying in separate convex polyhedral sets. Due to the nonconvexity resulting from bilinear terms, branch-and-bound algorithms have been widely used to solve them, and as a result, developing tight convex relaxations is one of the most important tasks. We first devise a hierarchy of convex relaxations for disjoint bilinear programs by using the double-description method on the corner polytope structure and deriving RLT relaxations. This hierarchy finitely converges to the convex hull of bilinear terms. We propose a branch-and-bound framework that splits the search space into simplicies in the branching step. We demonstrate that our splitting scheme ensures a global optimum of the problems in a finite number of iterations. The computational results show that our algorithm performs better than state-of-the-art techniques for large-scale problems. This is a joint work with Mohit Tawarmalani.

Bio: Hyun-Ju Oh is a postdoctoral fellow in the School of Mathematical and Statistical Sciences at Clemson University. She received her Ph.D. in Management with a specialization in Quantitative Methods from Purdue University under the direction of Mohit Tawarmalani. Before that, she received her bachelor's degree in Industrial Management Engineering and Mathematics and master's degree in Industrial Management Engineering from Korea University. Her research interests include global optimization algorithms and parametric optimization.