New polyhedral results for the three-index assignment problem

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Abstract

The Multi-index axial assignment problem (MAP) is defined as follows: given m disjoint sets, $S_1, S_2, \ldots, S_m$, each of cardinality n, a set of m-tuples defined on $T \subseteq S_1 \times \ldots \times S_m$ and a cost for each member of T, the objective is to find a collection $M \subset T$ of n disjoint m-tuples such that the sum of cost of tuples in M is minimized. The MAP's have applications in target-tracking, wafer manufacturing and many other applications. The convex hull of $0\backslash 1$ solutions to 3AP is called the three-index assignment polytope or in short 3AP polytope, P_I. There have been many studies on polyhedral methods for the 3AP and then similar results obtained for MAP, however there are still many questions unanswered. In my talk I will focus on some open questions posed in the survey by Qi et al. More specifically, I will

- review some interesting classes of facet-defining inequalities for P_I,
- discuss a natural lifting strategy to obtain new non-trivial inequalities,
- present a new class of facet-defining inequalities and an efficient separation algorithm for this class.