

Facet inducing inequalities of multiple at-least

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Constraint programming is a powerful tool for modeling various problems in operations research. Its strength lies in the use of predicates, or global high-level constraints, on a few variables to efficiently model complex and varied problem structures. In this paper, we consider the interactions of multiple instances of the predicate **at-least**. Each predicate ensures that a subset of integer variables takes on a specified value. The convex hull of a single such predicate is known but the the hull of intersecting predicates is still an open question. We have completely determined the convex hull representation of two intersecting predicates and provide a polynomial separation algorithm for inclusion in branch-and-bound integer programming software. We also characterize a number of facets of the intersection of multiple predicates.

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