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Integer programs with bounded sub-determinants

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Abstract

It is a well-known conjecture that integer programs with a totally Delta-modular integer constraint matrix, that is, a matrix whose all subdeterminants are bounded, could be solvable in polynomial time. Despite some recent progress, this question is still wide open.

I will start with providing the background and an overview of known results on such matrices from different fields of mathematics, such as combinatorics, geometry, and discrete optimization.

In the second part of the talk, I will present some recent progress on the special case where the constraint matrix is a totally unimodular matrix with k additional rows and columns. The tools which are used to obtain this progress include certain types of proximity results for integer programs and graph minor theory.