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17. Control Theory and Optimization

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On the Chvátal rank of polytopes in the 0/1 cube

Given a polytope $P \subseteq \mathbb{R}^n$, the Chvátal-Gomory procedure computes iteratively the integer hull P_I of P. The Chvátal rank of P is the minimal number of iterations needed to obtain P_I. It is always finite, but already the Chvátal rank of polytopes in $\mathbb{R}^2$ can be arbitrarily large. We prove an $\mathrm{O}(n^3 \log n)$ upper bound of the Chvátal rank of polytopes in the 0/1 cube, which are of particular interest in combinatorial optimization.

Reference: Alexander Bockmayr, and Friedrich Eisenbrand, On the Chvátal Rank of Polytopes in the 0/1 Cube, *Research Report , MPI-I-97-2-009* (1997)