Theorem (Lovász–Schrijver [1991])
(Sherali–Adams [1990]) (Balas [1974])

$$P \supseteq N(P) \supseteq N^2(P) \supseteq \cdots \supseteq N^n(P) = P_I$$

and

$$P \supseteq N_+(P) \supseteq N_+^2(P) \supseteq \cdots \supseteq N_+^n(P) = P_I.$$

Theorem (Lovász–Schrijver [1991])

If we have a poly. time weak separation oracle for K, then we have a poly. time algorithm to approximately optimize any linear function over $N^r(P)$ and $N_+^r(P)$ for all $r = O(1)$.

N-rank of an inequality $a^T x \leq \alpha$ valid for P_I, is the smallest $r \geq 0$ such that $a^T x \leq \alpha$ is valid for $N^r(P)$.

N_+-rank of an inequality relative to P ...

Stephen, T. [1999], Cook & Dash [1999], Lipták [1999], Goemans, T. [2000], Lipták, T. [forthcoming], Laurent [2000].

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