Linear Optimization

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Chapter 1

First Chapter

THEOREM 1.1. Let $A \in \mathbb{R}^{m \times n}$. Let $b \in \mathbb{R}^m$. Define $S \subseteq \mathbb{R}^n$ by $S := \{x \in \mathbb{R}^n : Ax \leq b\}$. Let $\bar{x} \in S$. Let $A^{=} \in \mathbb{R}^{p \times n}$ and $b^{=} \in \mathbb{R}^p$ be such that $A^{=}x = b^{=}$. Then $\bar{x}$ is an extreme point of S if and only if $\text{rank}(A^{=}) = n$.