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1. INTRODUCTION

Abstract: We consider the problem of finding the maximum value of the function $f(x) = \sum_{i=1}^n x_i^2$ over the set $S = \{x \in \mathbb{R}^n : x_i \geq 0, \sum_{i=1}^n x_i = 1\}$. The function $f(x)$ is convex and the set S is a convex polytope. The maximum value of $f(x)$ is attained at the vertex $(1, 0, \dots, 0)$ of S . The minimum value of $f(x)$ is attained at the center $(\frac{1}{n}, \dots, \frac{1}{n})$ of S .

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2. THEOREM 1

Let $f(x) = \sum_{i=1}^n x_i^2$ and $S = \{x \in \mathbb{R}^n : x_i \geq 0, \sum_{i=1}^n x_i = 1\}$. Then the maximum value of $f(x)$ over S is 1, and the minimum value is $\frac{1}{n}$.

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3. THEOREM 2

Let $f(x) = \sum_{i=1}^n x_i^2$ and $S = \{x \in \mathbb{R}^n : x_i \geq 0, \sum_{i=1}^n x_i = 1\}$. Then the maximum value of $f(x)$ over S is 1, and the minimum value is $\frac{1}{n}$.

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4. THEOREM 3

Let $f(x) = \sum_{i=1}^n x_i^2$ and $S = \{x \in \mathbb{R}^n : x_i \geq 0, \sum_{i=1}^n x_i = 1\}$. Then the maximum value of $f(x)$ over S is 1, and the minimum value is $\frac{1}{n}$.

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