SIZE OF PROJECTION OF VECTOR SPACE OVER Z_p^d

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Abstract. The goal of the paper is to find the size of projection of vector space over Z_p^d by using the similar proof of Marstrand's projection theorem for one-dimensional projections.

1. Introduction

We discuss a special case of Marstrand's projection theorem in this paper. Let e be a unit vector in R^n and E R^n a compact set. The projection $P_e(E)$ is the set $\{x \cdot e : x \quad E\}$

Proof. Suppose $\sum_{t \in \mathbb{Z}_p} \lambda_v(t) f(t) = \sum_{x \in \mathbb{Z}_p^2} f(x \cdot v$

Consider $\frac{y}{t} = \frac{y}{t^2}$. To make this equal to r, we must find t such that $\frac{y}{r} = t^2$. Since y and r is not in ζ, $\frac{y}{r}$ ζ.
Therefore $V = S_1$ S_r. □

Remark 4.1. We have the fact that $\sum_{y \; Z_p^2} |\hat{E}(y)|^2 = p^{-2}|E|$

Theorem 4.5. $|P_v(E)| = p \cdot \dfrac{1}{1 + \frac{p^2}{(p+1)|E|} - \dfrac{1}{p+1}}$, *if* $|E|$