

A method of estimating the p-adic sizes polynomials

Abstract

The exponential sum associated with f is defined as $S(f; q) = \sum_{x \bmod q} \chi(x)$, where the sum is taken over a complete set of residues modulo q . The value of $S(f; q)$ depends on the estimate of cardinality in the set $V = \{x \bmod q \mid f(x) \equiv 0 \pmod{q}\}$ where f_x is the partial derivatives of f with respect to x . In order to determine the cardinality, the p-adic sizes of common zeros of the partial derivative polynomials need to be obtained. This paper will give an estimation of the p-adic sizes of common zeros of partial derivative polynomials of degree eight in p by using Newton polyhedron technique.

Keyword: Exponential sums; Cardinality; p-adic sizes; Newton polyhedron