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GENERATORS IDEMPOTENT IN SEMI-SIMPLE RING FC_{16p^n}, FOR THE IDEALS CORRESPONDING TO THE MINIMAL CYCLIC CODES OF LENGTH $16p^n$ AND THE CODES

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Abstract: In semi-simple ring $R_{16p^n} \equiv \frac{GF(q)[x]}{<x^{16p^n}-1>}$, where p is prime and q is some prime power (of type $16k+1$), n is a positive integer, subject to order of q modulo p^n is $\frac{\phi(p^n)}{2}$, expression for primitive idempotents are obtained. Generating polynomials, dimensions and minimum distance bounds for the cyclic codes generated by these idempotents are also calculated.

Keywords and Phrases: Cyclotomic cosets, primitive idempotents, generating polynomials, minimum distance.

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1. Introduction

The group algebra FC_{16p^n}, F is field of order q and C_{16p^n} is cyclic group of order $16p^n$ such that $g.c.d.(q, 16p) = 1$, is semi-simple having finite cardinality of collection of primitive idempotents which equals the cardinality of collection of q-cyclotomic cosets modulo $16p^n$ [11]. The primitive idempotents of minimal cyclic codes of length m in case, when order of q modulo m is $\phi(m)$ for $m = 2, 4, p^n, 2p^n$ were computed in [6, 9]. The primitive idempotents of length p^n with order of q