

ON ORTHOGONAL IDEALS IN GROUP RINGS

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In this paper we define orthogonal ideals in group rings and prove:

In the group ring Z_pG (where $Z_p = \{0, 1, \dots, p-1\}$ prime field of characteristic p and $G = \langle g \mid g^n = 1 \rangle$, cyclic group of order n) there exists a pair of orthogonal ideals I_1 and I_2 such that $Z_pG = I_1 \cup I_2 \cup S$ where S is a semigroup under multiplication. Further $I_1 \cap S = \{0\}$, $I_2 \cap S = \{0\}$ if $p \nmid n$ and $I_2 \subset S$ if $p \mid n$.

In Z_pG , the ideal defined by

$$I_1 = \left\{ \sum_{i=0}^{n-1} a_i g^i \mid \sum a_i = 0 \pmod{p}; g_i \in G \right\}$$

is a cyclic code generated by $(g-1)$ and has dimension.

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