RELATION BETWEEN THE COVERING RADIUS AND RANK DISTANCE OF INDECOMPOSABLE BINARY CYCLIC CODES OVER 2-GROUPS

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Let \( F \) be a finite field and \( G \) a group of order \( n \). Each right (left) ideal \( M \) of the group algebra \( FG \) is called an \( FG \)-code of length \( n \). If \( G \) is a cyclic group then the corresponding \( FG \)-code \( M \) is called a cyclic code of length \( n \). We define the concept of weight of an element indecomposability and minimum distance.

Suppose \( M \) is a linear code of length \( n \) and dimension \( k \) in \( \mathbb{Z}_2^G \). Then the covering radius \( R \) of \( M \) is the weight of the coset leader of greatest weight where a coset of \( M \) is the set \( x + M = \{ x + m \mid m \in M \} \) for \( x \in \mathbb{Z}_2^G \), and any element of minimum weight in a coset is called a leader of that coset. We mainly prove. Let \( C \) be an indecomposable cyclic code of length \( 2^n \). Let the minimum distance of \( C \) be 2 and that of its orthogonal code \( C^\perp \) be \( 2^r \); \( 1 \leq r \leq m \). Then the covering radius of \( C \) is \( 2^{m-r} \) and that of \( C^\perp \) is \( 2^{m-1} \).