

ON COVERING RADIUS OF RANK DISTANCE CODES

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This paper studies the covering radius of rank distance codes. Codes with reasonably small covering radius are known as covering codes and these codes have wide applications in source coding and data compression.

$$\begin{bmatrix} n \\ m \end{bmatrix}$$

denotes the number

$$\frac{(2^n - 1)(2^n - 2) \dots (2^n - 2^{m-1})}{(2^m - 1)(2^m - 2) \dots (2^m - 2^{m-1})}$$

where $m \leq n$ and m, n are positive integers.

The number of vectors of rank i in the containing space V^n is

$$L_i(n) = \begin{bmatrix} n \\ i \end{bmatrix} (2^N - 1)(2^N - 2) \dots (2^N - 2^{i-1}) \text{ and } L_0(n) = 1.$$

$t(n, k) \leq n - k$ is proved and

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$$t(n, k) \geq R = \left\lceil \frac{(N+n)}{2} - \sqrt{\frac{(N+n)^2}{4} - N(n-k)} \right\rceil$$

where $\lceil x \rceil$ is the least integer greater than or equal to x . We further prove suppose $m < n - k$ is an integer such that

$$n < \frac{N(m+1) + (k+m+1)^2}{k+m+1}$$

Then $n - k < (-n, k) < n - k..$

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