Matrix Code Equivalence

matrix code

A k-dimensional subspace $\mathscr{C} \subseteq \mathbb{F}_q^{m \times n}$ equipped with the *rank metric*

$$d(C_1, C_2) = \mathrm{Rank}(C_1 - C_2) \qquad C_1, C_2 \in \mathscr{C}$$

footnote

1

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$\mathscr{C}$

$q = 13, \quad m = 4, \quad n = 6, \quad k = 5$

$$C = \lambda_1 \cdot \begin{bmatrix} 2 & 8 & 10 & 4 & 5 & 7 \\ 1 & 11 & 7 & 9 & 6 & 12 \\ 3 & 0 & 13 & 5 & 4 & 8 \\ 9 & 6 & 3 & 2 & 10 & 11 \end{bmatrix} + \lambda_2 \cdot \begin{bmatrix} 12 & 0 & 4 & 11 & 9 & 3 \\ 5 & 6 & 8 & 13 & 2 & 1 \\ 10 & 7 & 3 & 9 & 4 & 6 \\ 2 & 5 & 11 & 8 & 1 & 10 \end{bmatrix} + \lambda_3 \cdot \begin{bmatrix} 5 & 2 & 9 & 11 & 4 & 8 \\ 3 & 7 & 1 & 10 & 12 & 0 \\ 6 & 9 & 2 & 13 & 11 & 8 \\ 1 & 5 & 6 & 3 & 10 & 7 \end{bmatrix} + \lambda_4 \cdot \begin{bmatrix} 9 & 4 & 6 & 1 & 13 & 2 \\ 8 & 0 & 5 & 12 & 6 & 11 \\ 3 & 7 & 10 & 9 & 4 & 5 \\ 2 & 8 & 11 & 3 & 7 & 1 \end{bmatrix} + \lambda_5 \cdot \begin{bmatrix} 7 & 10 & 4 & 6 & 8 & 3 \\ 1 & 5 & 2 & 11 & 9 & 0 \\ 13 & 7 & 6 & 4 & 12 & 2 \\ 8 & 3 & 1 & 9 & 5 & 10 \end{bmatrix} \qquad \lambda_i \in \mathbb{F}_q$$