1

footnote

Matrix Code Equivalence

$$A = \begin{bmatrix} 0 & 0 & 5 & 7 \\ 5 & 1 & 2 & 7 \\ 0 & 4 & 4 & 0 \\ 4 & 3 & 7 & 7 \end{bmatrix} \in \mathrm{GL}_m(q)$$

$$B = \begin{bmatrix} 9 & 0 & 8 & 11 & 2 & 3 \\ 2 & 7 & 4 & 7 & 4 & 9 \\ 3 & 3 & 10 & 10 & 12 & 12 \\ 10 & 6 & 8 & 3 & 5 & 10 \\ 0 & 7 & 5 & 1 & 5 & 7 \\ 0 & 0 & 1 & 1 & 8 & 12 \end{bmatrix} \in \mathrm{GL}_n(q)$$

✓ we get $ACB \in \mathscr{D}$ for all $C \in \mathscr{C}$

✓ the map $\mu = (A, B)$ preserves rank!

$\mathscr{C}$

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

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

$\mathscr{D}$

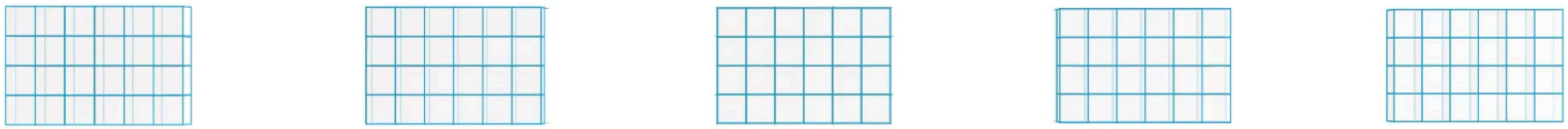
$$D = \lambda_1 \cdot \begin{bmatrix} 4 & 12 & 9 & 9 & 12 & 12 \\ 6 & 3 & 2 & 2 & 5 & 7 \\ 5 & 7 & 12 & 12 & 0 & 6 \\ 12 & 3 & 7 & 12 & 2 & 7 \end{bmatrix} + \lambda_2 \cdot \begin{bmatrix} 0 & 1 & 12 & 9 & 1 & 9 \\ 11 & 2 & 0 & 11 & 5 & 6 \\ 5 & 9 & 4 & 12 & 2 & 12 \\ 9 & 6 & 9 & 10 & 11 & 0 \end{bmatrix}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

Matrix Code Equivalence

footnote

3-tensor

Can think of a matrix code as a 3-tensor over $\mathbb{F}_q$



C_1 C_2 C_3 C_4 C_5