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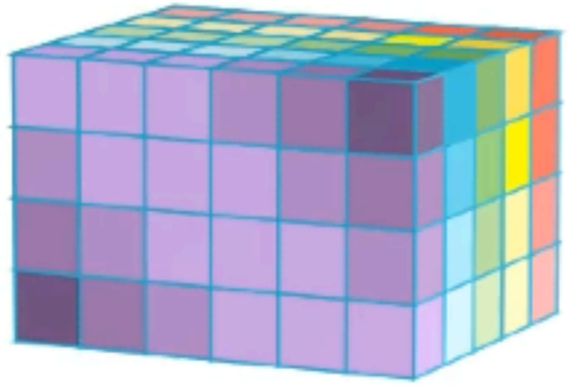
# Matrix Code Equivalence



$$\mathcal{C} \subseteq \mathbb{F}_q^{m \times n \times k}$$

## 3-tensor

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

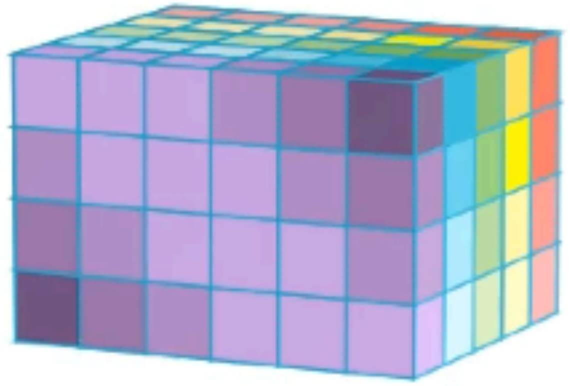
*Equivalence* then becomes *tensor isomorphism*

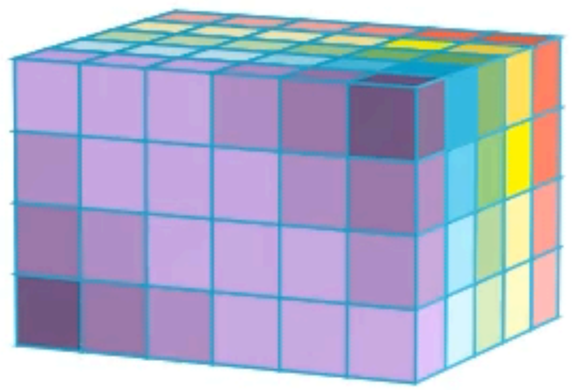
$$\mathscr{D} \subseteq \mathbb{F}_q^{m \times n \times k}$$

$$A \in \mathrm{GL}_m(q)$$

$$B \in \mathrm{GL}_n(q)$$

$$T \in \mathrm{GL}_k(q)$$





## Matrix Code Equivalence

**3-tensor**

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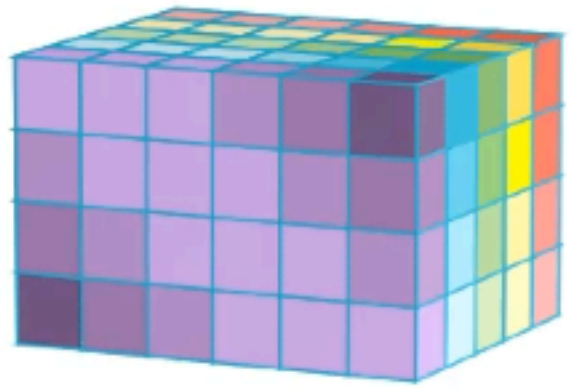

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## Matrix Code Equivalence

**symmetry**

Viewed as a 3-tensor, we can see $\mathscr{C}$ from three directions

- a $k$-dimensional code in $\mathbb{F}_q^{m \times n}$
- an $m$-dimensional code in $\mathbb{F}_q^{n \times k}$
- an $n$-dimensional code in $\mathbb{F}_q^{m \times k}$