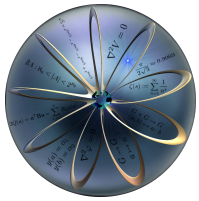

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theorems of special linear group over a finite field

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Let $\mathbb{F}_q$ be the finite field with q elements, and consider the special linear group $\mathrm{SL}(n, \mathbb{F}_q)$ over the field $\mathbb{F}_q$.

1. $\mathrm{SL}(n, \mathbb{F}_q)$ is finite. Furthermore, $|\mathrm{SL}(n, \mathbb{F}_q)| = \frac{1}{q-1} \prod_{i=0}^{n-1} (q^n - q^i)$.

2. $\mathrm{SL}(n, \mathbb{F}_q)$ is a perfect group, meaning that $[\mathrm{SL}(n, \mathbb{F}_q), \mathrm{SL}(n, \mathbb{F}_q)] = \mathrm{SL}(n, \mathbb{F}_q)$, where $[,]$ is the commutator bracket with two exceptions: $\mathrm{SL}(2, \mathbb{F}_2)$ and $\mathrm{SL}(2, \mathbb{F}_3)$.