Def/ (slice, slice rank)

$f: A^k \to \mathbb{F}$ is called a __slice__ if

$$f(x_1, \dots, x_k) = h(x_i) \cdot g(x_1, \dots, x_{i-1}, x_{i+1}, \dots, x_k)$$

for some $i \in [k]$, $h: A \to \mathbb{F}$, $g: A^{k-1} \to \mathbb{F}$.

For $f: A^k \to \mathbb{F}$, the __slice rank__ of f is

the min. $m \in \mathbb{Z}$ s.t. f is a linear combination

of m slices. ($k=2$, normal rank of matrices)

$\boxed{\text{Lem}}$ (rank of diagonal tensors)

$k \in \mathbb{Z}$, $k \geq 2$; A: finite set; $\mathbb{F}$: field;

$f: A^k \to \mathbb{F}$ s.t. $f(x_1, \dots, x_k) \neq 0 \Rightarrow x_1 = x_2 = \cdots = x_k$

① $\Rightarrow sr(f) = |\{x \in A : f(x, \dots, x) \neq 0\}|$