1. Basic Definitions

Let $f : \{0,1\}^n \to 0,1$ be a Boolean function. For any input $x \in \{0,1\}^n$, let $x^{(i)}$ be x with i^{th} bit flipped. Then the i^{th} bit is said to be *sensitive* for f if $f(x) \neq f(x^{(i)})$. The sensitivity of f on an input x, denoted by $s(f,x)$ is the number of sensitive bits for f on x.

Definition 1.1. The *sensitivity* of a Boolean function f, denoted by $s(f)$ is the maximum of $s(f,x)$ over all $x \in \{0,1\}^n$.

Similarly, given $x \in \{0,1\}^n$ and $B \subset [n]$, let x^B be x with i^{th} bit flipped for any $i \in B$. Then the "block" B is sensitive for f on x if $f(x) \neq f(x^B)$. And the *block sensitivity* of f on x, denoted by $bs(f,x)$ is the maximum number of *pairwise disjoint* sensitive blocks of f on x.

Definition 1.2. The *block sensitivity* of a Boolean function f, denoted by $bs(f)$ is the maximum of $bs(f,x)$ over all $x \in \{0,1\}^n$.

Obviously, for any Boolean function f, we have

$$bs(f) \geq s(f).$$

Definition 1.3. A Boolean function $f : \{0,1\}^{\binom{v}{2}} \to \{0,1\}$ is called a *graph property* if for every input $x = (x_{(1,2)}, ..., x_{(n-1,n)})$ and every permutation $\sigma \in S_v$, we have

$$f(x_{(1,2)}, ..., x_{(n-1,n)}) = f(x_{(\sigma(1),\sigma(2))}, ..., x_{(\sigma(n-1),\sigma(n))}).$$

Similarly, we can define k-uniform hypergraph property.

Definition 1.4. A Boolean function $f : \{0,1\}^{\binom{v}{k}} \to \{0,1\}$ is called a *k-uniform hypergraph property* if for every input $x = (x_{(1,2,...,k)}, ..., x_{(n-k+1,...,n-1,n)})$ and every permutation $\sigma \in S_v$, we have

$$f(x_{(1,2,...,k)}, ..., x_{(n-k+1...,n-1,n)}) = f(x_{(\sigma(1),\sigma(2),...,\sigma(k))}, ..., x_{(\sigma(n-k+1),...,\sigma(n-1),\sigma(n))}).$$