Talk

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Thm [chan]

If f LTF and g is a Boolean function such that for $S = \phi$ and $|S| = 1$ $\hat{f}(S) = \hat{g}(S)$ then $f(x) = g(x)$ $\forall x$

AM: Assuming UGC If $\exists \mu$ over $f^{-1}(1)$ which is balanced and pairwise independent, then f is approximation resist

Fourier expansion $f(x) = \sum_S \hat{f}(S) \prod_{i \in S} x_i$

$Adv(x) = \sum C_i(X)$ $\qquad$ $\#sat - \#vst = m$

$$Adv(x) = \frac{1}{m} \sum_i \sum_{T \subset \{i_1, \dots i_k\}} \hat{f}(T) \cdot \prod x_j \cdot \prod s_j$$

$= \sum B_T \prod_j x_j$ where B_T is the difference in positive sign appearance of $(x_j)_{j \in T}$ - negative sign scaled by $\hat{f}(T)$

Thm [C.H.I.S.H]

If f balanced LTF and I is an instance of CSP with $Adv(x) = \sum B_T \prod x_j$ if $\sum_{|T|=1} |B_T| > \delta$ $\exists$ prob poly algo. A st. $E_A(Adv(x)) \geq \dfrac{\delta^{3/2}}{8k^{3/4}}$

Coro f γ-robust If an instance is ______ satisfaction then $E(Adv(x)) = \dfrac{(\gamma(1-\phi))^{3/2}}{8k^{3/4}}$

Alg [Hastard] : Set $\alpha = \dfrac{\delta^{1/2}}{2k^{3/4}}$ Set x_j to 1 w/ prob $\frac{1}{2} + \alpha \cdot \frac{Sgn(B_{\{j\}})}{2}$