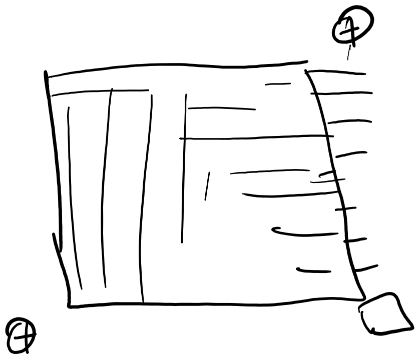
TI-Ex-19-5-2020

19 May, 2020 15:47



(n_1, k_1, d_1) (n_2, k_2, d_2)

G_1, G_2 $k_1 = k_2$

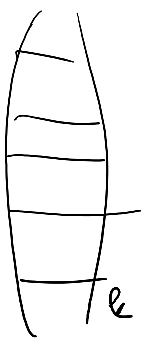
$\begin{pmatrix} G_1 & 0 \\ 0 & G_2 \end{pmatrix}$ $(G_1\ G_2)$

$G_1 \otimes G_2$

$(n_1+n_2, 2k, \min d_1, d_2)$

$\beta = (\beta_1, \beta_2) \to (\beta_1 G_1, \beta_2 G_2)$

(n_1+n_2, k, d_1+d_2)



G_2

$$G_1 \otimes G_2 = \begin{pmatrix} (G_1)_{11} G_2 & & \\ & \ddots & \\ & & (G_1)_{kn} G_2 \end{pmatrix}$$

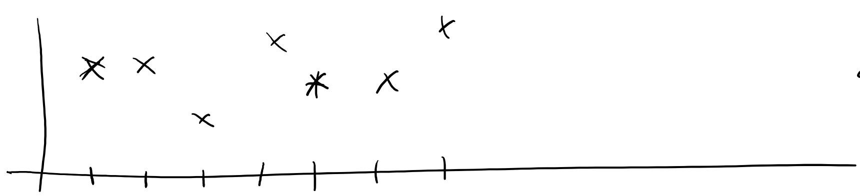
$(n_1 \cdot n_2, k^2, d_1 \cdot d_2)$

$m = m_1 \dots m_k$

$\underline{p_m'(\alpha_i) = m_i}$ $i = 1, \dots, k$

$(p_m'(\alpha_1), p_m'(\alpha_2), \dots \quad p_m'(\alpha_n))$

$(m_1, m_2, \dots m_k, \underline{p_m'(\alpha_{k+1})}, \underline{p_m'(\alpha_{k+2})} \dots \underline{p_m'(\alpha_n)})$



dg $k-1$

Lagrange polynomials

$L_{j, \alpha_1 \dots \alpha_k} = \prod \frac{(x - \alpha_i)}{}$

$i = 1 \dots k$

C A

$\alpha_j, \alpha_1, \ldots \alpha_k$ — "

$i = 1, \ldots, k$

$$G_{RS} = \begin{pmatrix} \alpha_1^0 & \alpha_2^0 & \cdots & \alpha_n^0 \\ \alpha_1^1 & \alpha_2^1 & & \alpha_n^1 \\ \vdots & & & \\ \alpha_1^{k-1} & \alpha_2^{k-1} & \cdots & \alpha_n^{k-1} \end{pmatrix}$$

$$\overbrace{}^{C}\ \overbrace{}^{A}$$

$$\underbrace{}_{k}\ \underbrace{}_{n-k}$$

$$\boxed{G_{\overline{RS}}} = \left(\begin{array}{ccccc|c} 1 & & & & & \\ & 1 & & 0 & & \\ & & 1 & & & A' \\ & & & 1 & & \\ & 0 & & & 1 & \\ & & & & & 1 \end{array}\right)$$

$$A' = C^{-1} \cdot A$$

$$G_X : \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ & 1 & & & & & & \\ & & 1 & & & & & \\ & & & 1 & & 0 & & \\ & & & & 1 & & & \\ & 0 & & & & 1 & & \\ & & & & & & 1 & \\ & & & & & & & 1 \end{pmatrix}$$

$$\left[\begin{pmatrix} 1 & & & \\ -1 & \ddots & & \\ -1 & & 0 & \\ -1 & & & 1 \end{pmatrix}\right]$$

$(-1, 1, -1, \ldots, -1)$

$\downarrow \ \downarrow \ \downarrow$

$(0, 1, 0, 1, 0, 0, 0, 1, 0)$

$-1 \quad 1$

$\downarrow \quad \downarrow$

$0 \quad 1$

$\cancel{2 d_{Ham}(u, v)}$

$$\langle u, v \rangle = n - 2\, d_{Ham}(\overline{u}, \overline{v})$$

$$d_{Ham} = \frac{n - \langle u, v \rangle}{2} \geq \underline{\left(\frac{1}{2} + \varepsilon\right) n}$$

$$n - \langle u, v \rangle \geq (1 + 2\varepsilon) n$$

$$n - n - 2\varepsilon n \geq \langle u, v \rangle$$

$$-\alpha = 1 - \ldots - \underline{2\varepsilon} \geq \langle u, v \rangle$$

$$\frac{v_1}{n}, \frac{v_2}{n}, \ldots \frac{v_k}{n}$$

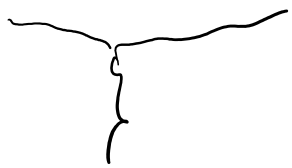
$-\alpha = 1 - \ldots$

$-2\varepsilon \geq \langle u, v \rangle$

$\alpha = 2\varepsilon$ $\qquad$ #rounds $\leq 1 + \frac{1}{2\varepsilon}$

Alice $\qquad\qquad\qquad\qquad$ Bob

$x \in \{0,1\}^n$ $\qquad\qquad$ $y \in \{0,1\}^n$



Charlie

$z \in \{0,1\}^n$

$f(x, y, z)$

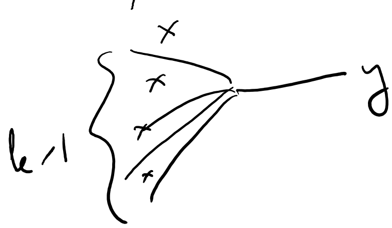
k ... players

- broadcast model
- black board model

$EQ_n^k[x_1, \ldots x_k] = [\forall i,j \;\; x_i = x_j]$

$n + (k-1)$ $\qquad\qquad$ $n + 2$ $\qquad\qquad$ k is fixed $= 3$

Alice $\qquad$ Bob $\qquad$ $\geq n+1$



$NE_n^k[x_1, \ldots x_k] = [\forall i \neq j \;\; x_i \neq x_j]$

$O(kn)$ $\qquad\qquad$ $O(k \lg k)$

? $\qquad\qquad$?

?

out rand

$(k-1)n + k$

$\simeq$

$$NE_{k,n}(\underbrace{x_1, x_2, \ldots x_k}_{\text{Alice}}, \underbrace{y_1, y_2, \ldots y_k}_{\text{Bob}}) = [\forall i \;\; x_i \neq y_i]$$

$\leq kn + 1$

$\geq k + 1$

$\Omega(kn)$