Does more Communication help ???

Let $s_1, s_2 \in \{0,1,2\}^N$

$s_1 \geq s_2 \Rightarrow s_2$ can be obtained from s_1 by setting some elements of s_1 to zero.

e.g. $s_1 = [1\ 1\ 2\ 2]$ & $s_2\ [1\ 0\ 2\ 0]$

then $s_1 \geq s_2$

$S_{\tilde{\Sigma}}$: Set of all TI state models whose dimensions are the same as that of $\tilde{\Sigma}$.

$$S_{\tilde{\Sigma}} := \left\{ \left(A, [B_1, B_2], \begin{bmatrix} C_1 \\ C_2 \end{bmatrix}, \begin{bmatrix} D_{11} & D_{12} \\ D_{21} & D_{22} \end{bmatrix} \right) : A \in \mathbb{R}^{n \times n},\ B_j \in \mathbb{R}^{n \times m_j N},\ C_i \in \mathbb{R}^{p_i N \times n},\ D_{ij} \in \mathbb{R}^{p_i N \times m_j N},\ ij = 1,2 \right\}$$

metric $d(\cdot,\cdot)$ on $S_{\tilde{\Sigma}}$

$$d((A,B,C,D),(\check{A},\check{B},\check{C},\check{D})) := \left\| \begin{bmatrix} A-\check{A} & B-\check{B} \\ C-\check{C} & D-\check{D} \end{bmatrix} \right\|$$

$\|\cdot\|$ denotes maximum singular value.

Let $U_{\tilde{\Sigma}} \subseteq S_{\tilde{\Sigma}}$ be the set of all systems having at least one DFM.

Now <u>Assignability measure</u> for a TI state model $(A,B,C,D) \in S_{\tilde{\Sigma}}$ is its distance from $U_{\tilde{\Sigma}}$ defined by

$$d((A,B,C,D), U_{\tilde{\Sigma}}) := \inf_{(A_u,B_u,C_u,D_u) \in U_{\tilde{\Sigma}}} d((A,B,C,D),(A_u,B_u,C_u,D_u))$$