

Rounds in Communication Complexity Revisited

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Abstract

The k -round two-party communication complexity was studied in the deterministic model by [14] and [4] and in the probabilistic model by [20] and [6]. We present new lower bounds that give (1) randomization is more powerful than determinism in k -round protocols, and (2) an *explicit* function which exhibits an exponential gap between its k and $(k-1)$ -round randomized complexity.

We also study the three party communication model, and exhibit an exponential gap in 3-round protocols that differ in the starting player.

Finally, we show new connections of these questions to circuit complexity, that motivate further work in this direction.