

Study of Terminal Selection Scheme Using Reliability of Replica in Terminal Collaborated MIMO Reception

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In terminal-collaborated multiple-input multiple-output (MIMO) reception, a virtual terminal with a large number of reception antennas receives multiple signal streams from a base station. This virtual terminal consists of multiple mobile terminals sharing their signals with other terminals. The number of these collaborated terminals can be reduced by selecting an appropriate set of mobile terminals as long as the performance criterion can be satisfied [1].

In this paper, frequency-domain iterative equalization is employed, which combines three processes: i) frequency-domain equalization in SC-FDE, ii) update of likelihood in belief propagation decoding of a low-density parity-check code, iii) subtraction of soft replica signals from the received signals [2]. This paper studies an adaptive terminal selection scheme based on the residual interference power β . This β is an indicator of reliability of replicas, and can be calculated by subtracting the power of soft replica signals from the received signal power. This adaptive terminal selection scheme is given as

$$a^* = \arg \min_{a \in \mathcal{A}} \left(\sum_{i=1}^s \beta_i^{(a)} \right), \quad (1)$$

where a^* is the selected terminal set, \mathcal{A} is the set of all candidate terminals, s is the number of streams, and $\beta_i^{(a)}$ is the residual interference power of i -th stream in the set a .

The performance of terminal collaborated MIMO reception with several terminal selection schemes is studied using the actual received signals obtained by a measurement campaign in Kyoto city. In our system, four out of six terminals are selected. As shown in Figure 1, cumulative distribution function (CDF) of bit error rate (BER) with adaptive terminal selection can offer better BER performance over the conventional [1] and fixed terminal selection. However, there is still room for improvement as the perfect terminal selection has much better performance.

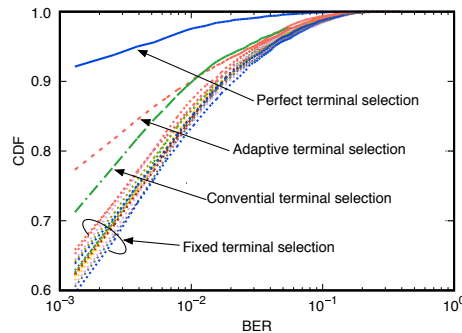


Figure 1. CDF of BER with terminal selection schemes.

References

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