

Joint MIMO and MAI Suppression for the HSDPA

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Abstract. We consider the use of a specific type of Clipped Soft Decision (CSD) – Parallel Interference Cancellation (PIC), optimized for Multiple-Input-Multiple-Output (MIMO) operation. It is shown that the use of the MIMO combined with the proposed PIC scheme can achieve a high performance improvement over the correspondent schemes, and hence, the High Speed Downlink Packet Access (HSDPA) is able to increase the data rate, also with a performance improvement in the Bit Error Rate (BER).

1 Introduction

The main purpose in UMTS is to allow high data rates, low delays, high capacity and flexibility in services. Direct Sequence Code Division Multiple Access (DS-CDMA) technology is the main key to reach this convergence, once we develop systems that combat the interferences.

To combat the fading and also taking advantage of fading in order to provide diversity, the current work considers a MIMO scheme. Furthermore, once all spectrum is available to all users at the same time, there is MAI, which is caused because several spreading codes are used by several users and they are not received by one reference user perfectly orthogonal. This happens because, even with the use of orthogonal spreading codes and for a synchronous network, the multipath environment breaks the orthogonality, generating MAI. Thus, in addition to the MIMO scheme, we also consider a specific type of PIC to cancel the MAI.