Channel Estimation with HARQ on MIMO HSDPA System Using QSTBC Codes

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Abstract. In High Speed Downlink Packet Access (HSDPA), the majority of results assumes that perfect channel estimation is available and does not consider a suitable method of channel estimation or its effect on system performance. In this paper, we present a channel estimation based on a simple pilot scheme with space time rake receiver taking into account the speed of User Equipment (UE) in HARQ context. In the simulation results, we observe significant performance gain of the proposed receiver for weak speed in a frequency selective fading environment and multi-input multi-output (MIMO) channels. In summary, with the proposed channel estimator, combining (MIMO) with transmitter diversity using Quasi-Orthogonal Space Time Block Code (QSTBC) is a promising technique for highly efficient data transmission over mobile wireless channels.

Keywords: HSDPA, HARQ, channel estimation, QSTBC, multi-input multi-output (MIMO), partial feedback.

1 Introduction

A simple and effective HSDPA transmit diversity scheme was proposed in [1]. This scheme has a very simple implementation. It uses 4 transmit antennas and $N_g$ receive antennas and provides high diversity order. One requirement for this simple transmit diversity scheme is that channel state information is needed for decoding at the receiver. So the parameters of the channel (gain, phases,