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Combined transmit diversity and beamforming for WCDMA

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The current work develops an efficient scheme to be used for the downlink of a WCDMA network, using transmitter diversity and beamforming. The performances of space-time transmit diversity (STTD) in combination with selective transmit diversity (STD), beamforming (BF) and beam selective transmit diversity (BSTD) which is a composite scheme of STD and BF, have been studied at the system level using the capacity and BER as the performances indexes. Both fading and interference are jointly considered in the multipath propagation environment. The main constraint was the implementation problem. It considers the use of an array with eight antenna elements spaced half wavelength per 120° sector to implement dynamically the several proposed techniques based on the environment. It was found that the comparison is strongly related to the availability of path diversity. The system capacity is maximized by the BF in the presence of multipath diversity and high multiple access interference. Otherwise it is the BSTD that achieves the best overall capacity performance. For higher data rates and small number of users the system that gives the best capacity performance is STTD+STD.

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