Error Probability Of Coded STBC Systems In Block Fading Environments

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Summary

In this letter, a union bound on the error probability of coded multi-antenna systems over block fading channels is derived. The bound is based on uniform interleaving of the coded sequence prior to transmission over the channel. Using this argument the distribution of error bits over the fading blocks is computed and the corresponding pair wise error probability (PEP) is derived. We consider coded systems that concatenate a binary code with a space-time block code (STBC). Coherent detection is assumed with perfect and imperfect channel state information (CSI) at the receiver, where imperfect CSI is obtained using pilot-aided estimation. Under channel estimation environments, the tradeoff between channel diversity and channel estimation is investigated and the optimal channel memory is approximated analytically. Results show that the performance degradation due to channel memory decreases as the number of transmit antennas is increased. Moreover, the optimal channel memory increases with increasing the number of transmit antennas.

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