

Spectral Efficiency of Joint Multiple Cell-Site Processors for Randomly Spread DS-CDMA Systems*

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Abstract

We consider a chip-interleaved randomly spread DS-CDMA scheme employed in three variants of Wyner's infinite linear cell-array model with flat fading. Focusing on the asymptotic setup in which both the number of users per cell and the processing gain go to infinity while their ratio (the "cell load") goes to some finite constant, the spectral efficiencies of the optimum and linear MMSE *joint multi-cell receivers* are considered. Dramatic performance enhancement as compared to *single-cell-site* processing is demonstrated. The asymptotic behavior of the two receivers in extreme SNR regimes and in a high cell-load setup are analyzed as well. The impact of chip-interleaving vs. symbol-interleaving is also investigated. Chip-level interleaving is found beneficial in several cases of interests, and is conjectured to be beneficial in general.

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