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Title(English)	CO-CHANNEL INTERFERENCE SUPPRESSION SCHEMES FOR MULTI-CELL WIRELESS RELAY COMMUNICATIONS
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The dissertation entitled “Co-Channel Interference Suppression Schemes for Multi-Cell Wireless Relay Communications” is composed of four chapters.

Chapter 1 "Introduction" explains the importance of relay stations in mobile communication and reviews conventional relay techniques to alleviate co-channel interference.

Chapter 2 "Interference Suppression Schemes under Two-Cell Scenarios" assumes that there is a mobile station (MS) in the vicinity of the cell edge in a two cell environment, and proposes linear combination of two different received signals in order to suppress co-channel interference. In the proposed method, the weight coefficients of linear combination is estimated by the Recursive Least Squares (RLS) algorithm. Owing to the RLS algorithm, the preamble information of the interfering signal is unnecessary, which can reduce the load on the system. Computer simulations of Orthogonal Frequency Division Multiplexing (OFDM) transmission under frequency selective fading conditions in the two-cell environment are conducted. It is shown that the proposed decision-directed method provides lower bit error rate (BER) performance than the conventional method that requires two users’ preamble information for channel estimation.

Chapter 3 "Joint Interference Suppression and Multiuser Detection Schemes under Three-Cell Scenarios" extends the above-mentioned scheme to a 3-cell environment and assumes an MS in the vicinity of the cell intersection. Under this assumptions, the number of interfering signals increases from 1 to 2, and to linearly combine the received signals is insufficient. In the proposed method, one interfering signal component is suppressed by linear combination and the other interfering signal component is detected via multiuser detection (MUD) which can be classified into non-linear cancellation. Parameters for both the linear combination and multiuser detection are estimated by 1) RLS, 2) minimum mean square error (MMSE), and 3) algorithms based on the eigenvalue decomposition. Compared to the maximum likelihood estimation, the computational complexity is greatly reduced. Computer simulations of OFDM transmission under frequency selective fading conditions are conducted. It is demonstrated that the method based on the eigenvalue decomposition can achieve lower BER although the amount of computational complexity increases.

Chapter 4 "Conclusions" summarizes the results obtained in the thesis and mentions future tasks.