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Article / Book Information

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論文要約

THESIS OUTLINE

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学生氏名 : Student's Name	Michael Andri Wijaya		指導教員 (主) : Academic Advisor(main)	府川 和彦
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The dissertation entitled “Intercell Interference Management for MIMO Small Cell Networks” is composed of 5 chapters. Chapter 1 “Introduction” addresses the evolution of mobile communications. In order to increase the system capacity, a future generation of mobile communications is expected to implement multiple-input multiple-output (MIMO) and small cell networks as the key technologies. Considering this situation, the dissertation focuses on intercell interference coordination (ICIC), which can be the main challenge for the future generation. Chapter 2 entitled “MIMO Small Cell Networks and Conventional Transmit Power Control Algorithms” summarizes the MIMO small cell networks and its channel models. Conventional power control algorithms for ICIC are explained. The chapter also describes that the conventional algorithms cannot achieve excellent performance with low complexity. Chapter 3 entitled “Power Control for Intercell Interference Coordination by NN Algorithms on the Transmitter Side” proposes a new power control algorithm that uses a neural network (NN) for ICIC. The chapter explains NN structure, implementation of NN for the power control, NN offline training using the backpropagation algorithm, pre-training techniques of the deep learning, and validation training sets for preventing overfitting. Computer simulations show that the proposed NN algorithm can sufficiently increase the system capacity even with low complexity. Chapter 4 entitled “Joint Processing of WMF and MUD for Interference Cancellation on the Receiver Side” proposes a new interference canceller (IC) that employs multi-user detector (MUD) to cancel strong interfering signals and to increase the system capacity. MUD uses SINR based replica selection algorithm to optimize interfering signals selection, which can reduce complexity more drastically than conventional schemes. In addition, whitening matched filters (WMFs) suppress the remaining interfering signals and noise. Computer simulations show that the selection of interfering signals to be cancelled on the basis of interfering base stations can provide almost the same BER performance as the selection on the basis of interfering signals, while requiring much less complexity. Chapter 5 “Conclusions” summarizes the dissertation and provides suggestions for future works.