SUMMARY OF Ph.D. DISSERTATION

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Title

A Study on Resource Allocation for Wireless Relaying Networks

（無線中継ネットワークにおける資源割り当て方式に関する研究）

Abstract

Providing high data rate, large capacity and low cost service is one of the crucial requirements in wireless networks. Current mobile communication networks are based on single hop network architecture, while cell coverage and system throughput are limited. To achieve the flexibility and efficiency of coverage, frequency usage and transmission power, relay using in the cellular network is considered as a promising technique for the next generation wireless networks.

This dissertation proposes a number of resource allocation schemes and analyzes the performance enhancement for the cellular relay networks. Analysis and simulation results show the improvement of throughput, packet loss rate by using the scheduling schemes.

Chapter 1 gives an overview of the wireless networks and some main technologies for the next generation wireless communication systems.

Chapter 2 introduces key concepts of wireless architectures and resource allocation technologies as a liquid background for the research.

Chapter 3 describes the previous works and problems of resource allocation in cellular relay networks. Since the time slot allocations and packet scheduling schemes have been studied in only a single hop fashion. In order to improve and evaluate the performance for cellular relay networks, we discuss the problem by exploiting time slot allocation and scheduling schemes into cellular relay networks.

Chapter 4 proposes a joint hopping station selection and time slot allocation scheme to improve downlink performance for TDD CDMA cellular relay networks. In the network, a number of fixed subscriber stations act as hopping stations between base stations and far-away subscriber stations, by combining of cellular and ad hoc mobile network architectures. The proposed system is able to provide lower outage probability. The computer simulation results show that the proposed networks can provide better outage probability compared to the conventional single hop networks.

Chapter 5 proposes a packet scheduling algorithm for cellular relay networks by considering relay selection, variation of channel quality and packet delay. Our proposed algorithm selects a user with good cellular channel condition as a relay station for other users with bad cellular channel condition but can get access to relay link with good quality. The performance results obtained by using computer simulation show that the proposed scheduling algorithm is able to achieve high network capacity, low packet loss and good fairness in terms of throughput balance for mobile users.

Chapter 6 concludes the dissertation.