

Title	マルチメディアトラヒックに対応したCDMA通信方式における送信電力制御法の研究
Author(s)	小出, 泰雄
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Power Control for Multimedia Traffic in CDMA System

Yasuo Koide

School of Information Science,
Japan Advanced Institute of Science and Technology

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Abstract

A shortage of channel resources in mobile communication, especially in cellular phone system, is a serious problem, which is caused by rapid increase of mobile phone users. And multimedia communication service of high rate and high quality data transfer for connecting Internet and realtime video telephony will be provided in the third generation mobile communication system. However transmitting bandwidth can not be expanded freely as it is limited in radio environments. Therefore it is necessary to improve spectral efficiency.

This paper proposes a new power control method for multimedia traffic in CDMA cellular phone system. Multimedia Traffic has variety of requirements on communication rate and quality for each traffic. The proposed system set an optimal target receiving power to it according to the required transfer rate and quality. The results of proposed system shows that number of users can increase, keeping required quality.

1 Introduction

DS-CDMA system has characteristics that spectral efficiency is highest in cellular phone systems and it suits for multimedia communication, because transmission rate can be changed easily by varying spread rate (spread-spectrum processing gain). In the third generation mobile communication, high speed data communication, outdoor 384kbps and indoor 2Mbps, is planned and its application is high rate and high quality data transfer such as music, a picture, movie and realtime video telephony. However a shortage of

channel resources is serious problem because transmitting bandwidth in radio environment is limited.

A new power control method for multimedia traffic in CDMA cellular phone system is proposed. The objective is improvement of spectral efficiency. The author directs his attention to variety of traffic characteristic in required communication rate and quality. As a result, it is possible to increase the number of users in the system.

2 Cellular Phone System

In cellular phone system, many BTSs having small area are allocated in service area. A Channel can be reuse efficiency in same system and it increase channel resource.

CDMA system was adopted air interface between BTS and MS of next generation mobile communication, because it is high spectral efficiency and suit multimedia communication.

3 DS-CDMA System

In CDMA system, information bit is spreaded directly using spreading code with short period in transmitter and respreaded it using same code in a receiver. The original signal is restored in the result. Channel separation is possible in same frequency band when spreading code with each channel have high auto-correlation and low cross-correlation.

4 Conventional Power Control

Distance between BTS and each MS is very different. If all MSs transmit a signal with same power, received power at BTS with the radius of 10km is different a million times when a signal is attenuated square of distance. This difference of received power very affects correlation of code and it can't decode correct information bit. Therefore we have to control transmit power in order to receive at same power at BTS.

5 New Power Control for Multimedia Traffic

Required communication rate and quality is different with each traffic in multimedia. We propose new power control for multimedia traffic. In new system, target received power at receiver is changed by spreading rate and quality, it adjusts correlation of code to the optimum condition. Keeping required quality, it is possible to increase users in the system. Simultaneously, target receiving power is performed the minimum requirements power for reduce interference to neighbor cell and consumption power at a mobile unit.

6 Effect of Gussian Noise and Multiple Access

Noise is added an information signal by air propagation and thermal noise of a transmitter and a receiver. Interference of channel multiplex affect channel quality in CDMA system. Accordingly we examine about influence of these in multimedia traffic.

7 Verification of New Power Control Performance

We verify Performance of proposed new power control for multimedia traffic by computer simulation. We verified users is increase compared with using conventional power contorol. we show a rate of users increase with each mixing rate of media type and verify function of addmission contorol and algorithm of decrease in target reciving power.

8 Consideration

We cosidered about a result of computer simulation. And we compared a number of user using proposed algorithm with real maximum users. As a result, it is much the same.

9 Result

We proposed new power control for multimedia traffic in CDMA system, for improving spectrum efficiency, and showed its algorithm. Its performance is verified by computer simulation. Users are increased compared with conventional power contorol.