ABSTRACT

One that mostly influences DS-CDMA system performance is MAI effect. MAI occurs because the correlation between users PN sequence has a non-zero value. With the increasing of the number of active user, the MAI becomes worse and degrades the DS-CDMA performance. One solution to fix the DS-CDMA performance in the present of MAI is the exertion to eliminate the interference signal from the received signal. So, in this thesis it has been analyzed the possibility of applying the cycle-and-add property of PN sequence to support MAI cancellation in DS-CDMA system. The Cycle-and-Add property of PN sequence is a simple multiplicative action of received signal with its delayed one. By matched filter, the result of multiplication will be matched to the receiver's PN code in order to get the synchronization pulse. When a synchronization pulse is detected, system will generate the predicted interference signals. After processed by channel estimator, the interference signals will be directly subtracted from the received signal to cancel out the MAI. All users in the system are assumed to be simultaneously active with bit rate equals to 9.6Kbps. The analyze will be about configuration of a positive feedback circuit and the size of parallel Cycle-and-Add synchronization circuit, which are designed to improve the quality of synchronization. It is shown that in AWGN channel, for 15 active users the MAI cancellation gives 73.13% BER improvement at 6dB Eb/No, and 3-4dB improvement in achieving 10^{-3} BER. In multipath channel, for 15 active *users* 26.94% BER improvement is achieved at 18dB Eb/No.

Key words : DS-CDMA, PN sequence, MAI, Cycle-and-Add property