

ABSTRACT

Recently, CDMA technology has been applied for general communication, where it had already been used in military communication. IS-95 and UMTS has adopt CDMA for several advantages such as low power, good coverage and large capacity. The main methodology of CDMA based multiple access is spread spectrum technique, but some disadvantages of CDMA motivate some researchers to improve it through OFDM based multicarrier transmission combining.

The combination of CDMA and OFDM is known as MC-CDMA. MC-CDMA is more robust against multipath propagation, MAI and frequency selective fading, it also good for frequency reservation. MAI occur due to large number of active user within the system, in order to manage the MAI problem one can applied MUD at receiver. MUD consist of 2 category, that is optimum and suboptimum MUD, each have unique characteristic, for example, optimum MUD provide good performance but more complex receiver is needed to accommodate large number of users which grow exponentially. One of the algorithm applied for optimum MUD was MLSE (Maximum Likelihood Sequence Estimation).

This final project discuss and analyze MC-CDMA performance using MLSE MUD as a detector in multiuser environment. The simulation result show the performance improvement by using MUD MLSE for MC-CDMA system to obtain 10^{-4} BER. This is indicated by ± 3.5 dB SNR improvement using 8 subcarriers for 3 active user each with velocity 5 km/h. The addition until 5 active user result constant BER for both MC-CDMA non MLSE condition at certain BER value, on the other hand MC-CDMA MLSE is still able to achieve ± 28.5 dB SNR.

Index terms : MC-CDMA, MLSE, MUD, MAI