# ABSTRACT

Communication system for third generation has the oriented to combine widely variety of communication services, that is with high data rate, video and traffic multimedia along with voice service. WCDMA as a technology for Radio Access in communication system third generation has an advantage in effectiveness utility and variable user data rate.

In WCDMA system, all users shared same frequency when the signal travel through Mobile Radio Channel. For that all *user* become an interferer to other user, which cause Multiple Access Interference. MAI is increasing along for a sum of user active in the system, this interference happen because the spreading code for each user is not orthogonal in the receiver.

Multiuser Detection techniques are used to reduce the interferences, that is to reduce the non orthogonality of spreading code in the receiver. Typical Linier Multiuser Detection technique to counteract the MAI problem caused by the non-orthogonality is Decorrelator Detector and RLS MUD. For comparison in orthogonality of spreading code, the PN sequence and OVSF (Orthogonal Variable Spreading Code) is used for synchronous CDMA model in transmitter, as for OVSF code is tested for asynchronous CDMA model.

The simulation for target BER $10^{-3}$, indicate that MUD RLS give improvement over conventional detection and Decorrelator Detector in AWGN channel and Multipath Fading Channel. The more users active in the system worsened the performance of WCMA receiver. And OVSF spreading code performing better than PN sequence in case synchronous CDMA, but his performance drop for case Asynchronous CDMA if compared to Synchronous CDMA.

Keyword :  WCDMA, DS-CDMA, Multi*user* Detection, Decorelator Detector, RLS, MAI, PN, OVSF, Synchronous CDMA and Asynchronous CDMA