

## ABSTRACT

Multiple antenna using into transmitter and receiver, known as MIMO technique, it believed could improve the wireless communication system by improving the capacity and getting the gain diversity. There is so many MIMO technique which has been developed, such as using known channel information principle and unknown channel information by the receiver. By knowing channel information from transmitter and receiver it must be having better quality than unknown channel information. While receiver knowing channel condition, then that information can be used for improving MIMO system performance is by using adaptive channel estimator. In this Final Assignment is used channel estimator with MMSE method.

In other side, OFDM is very popular method in wireless communication system with high data rate, because of this OFDM method it will change channel condition from frequency selective fading into flat fading channel. Unity between MIMO and OFDM system known as MIMO-OFDM system, predicted become research focus for wireless communication in the future cause beside getting gain diversity, MIMO OFDM also work well in broadband application with high data rate.

In this final assignment, research and analysis is done about influence step size factor, length of pilot, weight fluctuation period, noise, and user speed in channel estimator performance in MIMO system which is joined with OFDM system (MIMO-OFDM). Simulation is done according to IEEE 802.11a, which system will be tested into *multipath rayleigh fading* channel and *Gaussian* noise.

Simulation result show that MMSE method as adaptive estimator with one tap size (zero) is unable to follow channel fluctuation which is so fast, but only able in constant condition ( $v = 0$  km/hours) or slow speed. By using minimum length of pilot 8 and 16 pilots, also *step size* ( $\mu$ ) 0,07 for each MIMO OFDM 2x2 and 2x3 system is able used for estimate channel with small error.