ABSTRACT

High data rate wireless communication has become more important and has become a necessity. Orthogonal frequency division multiplexing (OFDM) is a promising solution for increasing a communication system's data rate by utilizing the available bandwidth in the most efficient way. Furthermore, the use of multiple receive and transmit antennas greatly increases the channel capacity and the performance over frequency selective channels. In order to operate in the most effective way, OFDM-based communication systems need accurate channel estimation. This can be challenging problem when the channel itself is time variying due to the changing geometry and Doppler frequency shift.

The objective of this Final Paper was to investigate the performance of various channel estimation techniques for OFDM systems with multiple antenna. For a transmitter diversity OFDM system, cannot use the same channel estimation technique like on system with one transmitter antenna,due to the interference at the receiver caused by the multiple transmit antennas. In this Final Paper, will be analyzed about the channel estimation problem of single input multiple output (SIMO) and multiple input multiple output (MIMO) systems. For SIMO and MIMO systems, the use of maximal ratio combining (MRC) and space time block coding (STBC) would improve the performance in terms of channel capacity.). This simulation will follow IEEE 802.11a standard with only acomodate a fix rate (12 Mbps) for all simulation, where the systems will be test on multipath fading rayleigh channel added with noise gaussian.

The result get from the simulation, on SIMO-OFDM (1x2) system the use of comb tipe estimator improve the overall performance about 2.8 dB comparing with the system use of block tipe, and on the higher Dopler's frequency the degradation performance of comb tipe is lesser than the use of block tipe. On MIMO OFDM STBC (2x2) system the use of block tipe Simplified give 0.4 dB better than the use of comb tipe estimator but for higher SNR's value give the same value of BER.