ABSTRACT

Kalman filter is a method in finding estimated state value in dynamic linear system. With its recursive algorithm, it gives an accurate estimation. The ability of working in vector environment offers a lot of application such as Multiple Input Multiple Output (MIMO) channel estimation that is also in vector. By using Space Time Block Code (STBC) Alamouti 2x2 scheme, diversity gain and improvement in capacity could be achieved with low complexity moreover with an accurate channel response input will increase the communication system which adopt it.

In other side, using Orthogonal Frequency Division Multiplexing (OFDM) technique that is very popular in wireless communication with high data-rate that could change frequency selective fading channel into flat fading channel. Because of the orthogonality of each subcarriers, overlapping give an efficient consumption of bandwidth.

In this final assignment, research and analysis is done to express the influence of channel estimation using Kalman filter in MIMO-OFDM system. This simulation follows IEEE Wimax 802.16d standard and tested in multipath Rayleigh fading channel and Additive White Gaussian Noise (AWGN).

Simulation results show that for all channel conditions, channel estimation process using Kalman filter with 1 iteration give the best performance instead of higher iteration even of Valenti estimation method. Using Kalman filter best parameters that are process noise covariance 0,01***I** (2,2), measurement noise covariance 2***I** (2,2), Initial estimated Error Covariance 1***I** (2,2), Initial Estimated State 1***I** (2,2) and state transition matrix 1***I** (2,2) with 1 iteration in condition of noisy and flat fading channel, could achieve gain approximately 3 dB compare to Valenti estimation method for BER target 10^{-4}.