Performance analysis of OFDM channel estimation under IQ imbalance

ABSTRACT

This study was done in attempt to investigate the effect of In-Phase-and-Quadrature Imbalance (IQI) presence in Orthogonal Frequency Division Multiplexing system (OFDM). Although OFDM system is widely used in the communication system, it is prone and sensitive to non-idealities such as IQI. This issue causes serious performance degradation in the system. Channel estimation plays an important part in an OFDM system. Thus, this study will investigate the effect of IQI in OFDM system channel estimation. There are two types of channel estimation scheme used in this paper. They are the Least Square (LS) and Linear Minimum Mean Square Error (LMMSE). The outcome for this channel estimation scheme will be compared with their theoretical values based on the channel's Mean Square Error (MSE). To obtain the result, LS and LMMSE channel estimation was developed and simulated using MATLAB Simulink software. Then, the corresponding output was analyzed. From the analysis, the performance of these two-channel estimation schemes was affected after the addition of IQI. However, comparing both schemes, LMMSE has better performance compared to LS in terms of MSE.