UNIVERSITI TEKNOLOGI MARA

A COMPARATIVE STUDY OF PERFORMANCE CARRIER FREQUENCY OFFSET ESTIMATION METHOD TOWARDS QAM-MIMO-OFDM SYSTEMS

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ABSTRACT

As we know the communication system evolving and enhancing, the need for high speed and reliable communication system is crucial. With the communication of multiple-input multiple-output (MIMO) communication system along orthogonal frequency division multiplexing (OFDM), a reliable high rate communication system can be achieved. Carrier Frequency Offset (CFO) is the problem of multiple-input multiple-output along orthogonal frequency division multiplexing (MIMO-OFDM). The MIMO-OFDM system with 2x2, 3x3, and 4x4 antenna configurations will use 256, 512, and 1024 QAM modulation level in the presence of multipath Rayleigh and Additive White Gaussian Noise (AWGN) channel. The performance evaluation of the system is determined in Bit Error Rate (BER) versus Energy per Bit to Noise Power Spectral Density Ratio (Eb/No). The CFO can estimate by using two methods which are the techniques in the Frequency Domain and Time Domain. Both of techniques divide by two, each of the Frequency domain is a Training Symbol (Moose) method and Pilot Tones (Classen) method. And for the time domain is a Cyclix Prefix (CP) method. The MIMO-OFDM system with Carrier Frequency Offset Estimation method will be designed and simulated using MATLAB where the results will then be analyzed. From the results obtained, it can be said that as the QAM level increased the BER will increase too. Besides that, the performance of the system will improve as the amount of transmit and receive antennas increase. In addition, the great performance showed by the MIMO-OFDM system is greatly enhanced by the estimation technique used which is the carrier frequency offset estimation. Carrier Frequency Offset accurately recovered the distorted error signal through the multipath fading channel, thus improve the performance of the MIMO-OFDM system.

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