

Abstract

Ehab Farouk Badran

The performance of Multi-Carrier CDMA Based Discrete Wavelet Transform in the AWGN Channel

MC-CDMA inherits the interference rejection capability of CDMA, and the potential of mitigating multipath propagation effects of orthogonal frequency division multiplexing (OFDM). MC-CDMA with its frequency diversity is an attractive modulation scheme for multi-user high data rate wireless communication system. However on OFDM and MC-CDMA sub-channel decomposition cannot be achieved without adding guard band cyclic prefix, where a copy of the end part of the data symbol block is transmitted. Due to the relationship between circular and linear convolutions in discrete Fourier transform (DFT), the residual inter symbol interference (ISI) is eliminated by ping the guard interval part in the receiver. This method needs transmitting extra guard interval signals that introduces overhead and thus leads to spectral inefficiency and performance degradation. An efficient scheme which not only counters the degrading effects of ISI but also conserves the bandwidth is the application of discrete wavelet packet transform (DWPT) based MC-CDMA. in this paper we replace Fourier based complex exponential carriers of MC-CDMA with an orthonormal wavelets packets, such as daubechies, haar, biorthogonal, discrete meyer and coiflets to compare the performance of MC-CDMA based discrete fourier transform (DFT) and MC-CDMA based discrete wavelet packet transform(DWPT).