

Performance Comparison of DFT, Discrete Wavelet Packet and Wavelet Transforms in an OFDM Transceiver for Multipath Fading Channel

Multi-carrier modulation (MCM) schemes divide the broadband frequency-selective channel into parallel, flat-fading subchannels of equal bandwidth and interspacing. A cyclic prefix is appended to each symbol, in order to mitigate inter-symbol interference (ISI), however it leads to spectral inefficiency. Moreover, OFDM transceivers suffer from poor frequency characteristics. Perfect reconstruction wavelet packet transmultiplexer in an OFDM transceiver counters the degrading effects of ISI, and also conserves bandwidth. In this paper we give the performance comparison of conventional discrete Fourier transform (DFT) with discrete wavelet packet transform (DWPT) in an OFDM transceiver. Two of the most popular wavelets, namely Haar and Daubechies wavelets are used for DWPT in a multipath flat-fading and frequency selective-fading channel. A comparison between wavelets and wavelet packets is also given and it is shown that wavelet packets outperform wavelets