PAPR Reduction in OFDM Signal by Incorporating Mu-Law Companding Approach into Enhanced PTS Scheme

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Abstract:

Orthogonal Frequency Division Multiplexing (OFDM) is a potential transmission approach for high capacity communication systems. Despite the many advantages of OFDM, the major downside is the high peak-to-average power ratio (PAPR) which increases the system complexity, reduces the efficiency of the system, causes degradation in BER performance, and makes OFDM sensitive to nonlinear distortion in the transmission. Various methods have been proposed to deal with the PAPR problem, including the partial transmit sequence (PTS) that has attracted consider able attention. Hence, this paper presents a hybrid approach combining an enhanced PTS technique with Mu-Law companding. The PTS technique was enhanced through improving its sub-block partitioning scheme, where the enhanced partitioning scheme con solidated a conventional interleaved partitioning into an adjacent partitioning scheme. This incorporation of Mu-Law characteristic in time domain for PAPR reduc tion in OFDM essentially enhances the PAPR reduction performance, based on using numerical simulation results. Consequently, though the pseudorandom sub block partition method obtains better PAPR reduction more than the other sub-block partition schemes (interleaved and adjacent) of ordinary PTS, it is quite difficult to be designed. The findings show that the enhanced PTS technique with Mu-Law companding, while maintaining low computational complexity, per forms significantly better than the pseudorandom partitioning PTS on various types of modulation formats and subcarriers.