Performance Analysis of a Combined PTS Partitioning Scheme for PAPR Reduction in OFDM Signals under Different Modulation Techniques

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Abstract:

Orthogonal frequency division multiplexing (OFDM) is known as one of the promising broadband techniques in wireless communications. One of the major drawbacks of OFDM is its high peak-to-average power ratio (PAPR) due to the overlay process of all subcarrier signals. This leads to distortion problems at the receiver. Partial Transmit Sequence (PTS) technique is one of the most popular to reduce the PAPR in OFDM systems without any distortion. The crucial step in any PTS system is partitioning of the OFDM frame into disjoint sub-blocks. Adjacent partitioning PTS (AP-PTS) is an easy partitioning scheme achieving attractive PAPR reduction performance in a trade-off between cost and performance. This paper offers performance analysis of an enhanced PTS technique based on the combination of two kinds of sub-block partitioning methods (adjacent with interleaved) for PAPR reduction in OFDM signals. It also investigates into implementation of Finite Radon Transform (FRAT) as a modulation technique for data mapping and provides comparative analysis of the performance of FRAT with the traditional data mapping techniques such as phase shift keying (PSK) and quadrature amplitude modulation (QAM). The effects of PTS partition length variability of disjoint sub-blocks on AP based PTS systems were also determined in order to perform the comparative analysis. (AP-PTS) scheme was applied for both fixed length and variable length partitioning for modulation techniques mentioned above. Simulation results show that the enhanced PTS technique outperforms reduction in PAPR against the adjacent with fixed and variable length, which (AP-PTS) is known to perform better than the interleaved partitioning for all the scenarios of mapping, and show that the traditional mapping for any types of techniques (PSK or QAM) with various partitioning scenarios had a better PAPR reduction performance compared to FRAT data mapping.