Performance Analysis of PAPR Reduction in OFDM Systems based on Partial Transmit Sequence (PTS) Technique

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Abstract : Orthogonal Frequency Division Multiplexing (OFDM) is a special case of Multi-Carrier Modulation (MCM) technique which transmits a stream of data over a number of lower data rate subcarriers. OFDM splits the total transmission bandwidth into a number of orthogonal and non-overlapping subcarriers and transmit the collection of bits called symbols in parallel using these subcarriers. This paper explores the Peak to Average Power Reduction (PAPR) using the Partial Transmit Sequence technique. We provide the distribution analysis and the basics of OFDM signals and then show how the PAPR increases as the number of subcarriers increases. We provide the performance analysis of CCDF and PAPR expressed in decibels through MATLAB simulations. The simulation results show that, in PTS technique, the performance of PAPR reduction in OFDM systems improves significantly as the number of sub-blocks increases. However, by keeping the same number of sub-blocks variation, oversampling factor and the number of OFDM blocks' iteration for generating the CCDF, the OFDM systems with 128 subcarriers have an improved performance in PAPR reduction compared to OFDM systems with 256, 512 or >512 subcarriers.

Keywords : OFDM, peak to average power reduction (PAPR), bit error rate (BER), subcarriers, wireless communications

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