A Review On Precoding-Based Papr Reduction Technique For Uf-Ofdm And Filtered-Ofdm Modulations In 5g Systems

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Abstract - 5G networks employ multicarrier modulations (MCM)s such as filtered-orthogonal frequency division multiplexing (F-OFDM) and universal filtered orthogonal frequency division multiplexing (UF-OFDM) as a solution to overcome the challenges of high data rates and spectral efficiency. However, MCMs have high peak to average power ratio (PAPR) which drives the power amplifier (PA) in the saturation region resulting in the reduced efficiency. To overcome this problem PAPR should be reduced.

Keywords - 5G, UF-OFDM, F-OFDM, peak to average power ratio (PAPR), IAPR, precoding, Zadoff-Chu Transform (ZCT), Power Spectral Density (PSD), BER.

1. INTRODUCTION

Orthogonal frequency division multiplexing (OFDM) is a multicarrier modulation (MCM) technique which seems to be an attractive candidate for fourth generation wireless communication systems. OFDM offer high spectral efficiency, immune to the multipath delay, low inter-symbol interference (ISI), immunity to frequency selective fading and high power efficiency. Due to these merits OFDM is chosen as high data rate communication systems such as Digital Video Broadcasting (DVB) and based mobile worldwide interoperability for microwave access (mobile Wi-MAX). However OFDM system suffers from serious problem of high PAPR. PAPR can be described by its complementary cumulative distribution function (CCDF). In this probabilistic approach certain schemes have been proposed by researchers. These include clipping, coding and signal scrambling techniques. Under the heading of signal scrambling techniques there are two schemes included. Which are Partial transmit sequence (PTS) and Selected Mapping (SLM). Although some techniques of PAPR reduction have been summarized in, it is still indeed needed to give a comprehensive review including some motivations of PAPR reductions, such as power saving, and to compare some typical methods of PAPR reduction through theoretical analysis and simulation results directly.

2. LITERATURE SURVEY

Imran Baig and Varun Jeoti (2011) This technique is based on precoding the constellation symbols with ZCTprecoder after the multiplication of phase rotation factor and before the Inverse Fast Fourier Transform (IFFT) in SLM-OFDM System.

Imran Baig and Varun Jeoti (2010) In this paper, we propose two novel PAPR reduction techniques for OFDM systems, Zadoff-Chu matrix Transform (ZCT) precoding based PAPR reduction technique and ZCT post coding based PAPR reduction technique.

Kokil Dhiman and Tarun Gulati (2012) This paper presented the results obtained on applying a ZCT pre-coding and post-coding for the purpose to reduce PAPR in OFDM systems with M-QAM modulation, where as M=4, 16, 64, 256.

Saikrupa, and M.N.Giriprasad (2012) In this paper we propose a study of PAPR and PAPR reduction technique using ZCT. The Zadoff-Chu Matrix transform (ZCT) is one type of technique used to reduce the PAPR analyzed.

Tincy Mary Mathew, Anirudh Mudaliar (2014) in this paper propose Zadoff-Chu matrix Transform (ZCT) precoding based Selected Mapping (SLM) technique to reduce the peak-to-average power ratio (PAPR) in Alamouti STBC MIMO-OFDM systems. The key idea of this paper is that different phase rotation sequences are multiplied by their corresponding input sequence generated by the STBC encoder.

3. EXSTING SYTEM

In the existing system, the goal of precoding techniques is to obtain a signal with lower PAPR than in the case of OFDM without precoding techniques and to reduce the interference produced by multiple users. In this system, a precoding-based PAPR reduction technique is proposed for both the UF-OFDM and the F-OFDM systems. The principle of this method is to transform the UF-OFDM signal to a lower order summation of single carrier signals and the F-OFDM signal to single carrier signal. The performance of the proposed PAPR reduction technique is evaluated by the simulation results obtained. Moreover, the proposed technique does not impact the bit error rate performance.

DISADVANTAGES:
- The BER and SNR performance is considerably low and does not show much difference.
- The simulation of the precoding evaluation results is low efficient.

ADVANTAGES:

- Computational complexity is low as compared to the existing system.
- The precoding technique which shows the better results.
- Precoding reduces the PAPR without increase the complexity of the system.
- The system also produces the better results for the IAPR and the normalized (PSD) results.
- ZCT precoding is distortion less.
- ZCT does not require any optimization algorithm.

4. CONCLUSION

In this paper, a PAPR reduction technique using the Zadoff Chu transform precoding for the UF-OFDM and the F-OFDM modulation scheme was surveyed. In this paper, precoding based PAPR reduction techniques Zadoff-Chu Transform (ZCT) is implemented reviewed using MATLAB for F-OFDM and UF-OFDM systems. Comparison analysis shows that Zadoff-chu Transform precoding technique for PAPR reduction gives better results.

5. REFERENCE

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