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A NEW SLM AND PTS SCHEMES FOR PAPER REDUCTION IN OFDM SYSTEMS

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ABSTRACT:
Orthogonal repeat division multiplexing (OFDM) is a multi carrier alteration methodology where the bombshell of 4G remote correspondence is locked in towards OFDM structures. The noteworthy burden of OFDM system is high Peak to typical power extent .The proposed work relies upon best to ordinary power extent (PAPR) decreasing by the execution of Selective Mapping Technique (SLM) and Partial Transmit Sequence (PTS) procedures. Proper the work is extended by changing the SLM and PTS of PAPR by diminishing their multifaceted nature of the OFDM system. Entertainment comes to fruition show that the versatile quality is diminished by using as of late proposed count than typical schemes.
Keywords: OFDM , SLM , PTS ,CCD

I.INTRODUCTION

Nowadays the wireless applications are engaged towards high information rates. The idea of multi bearer transmission gives high information rates in correspondence channel. The OFDM is an exceptional sort of multi bearer transmission strategy that partitions the correspondence channel into a few similarly separated recurrence groups. Here the bit streams are partitioned into many sub streams and send the data over various sub channels. A sub-bearer conveying the client data is transmitted in each band. Each sub transporter is orthogonal with other sub bearer and it is done by a regulation plan. signal are transmitted at the same time in super forced and parallel frame. The sub bearers are firmly dispersed and covered to accomplish high transmission capacity productivity [2]. The fundamental weakness of OFDM is high top to normal power proportion. The pinnacle estimations of a portion of the transmitted signs are bigger than the run of the mill esteems [1]. High PAPR

of the OFDM transmitted signs brings about piece mistake rate execution debasement, entomb tweak consequences for the sub transporters, vitality spilling into contiguous channels and furthermore causes non direct mutilation in the power enhancers. The fundamental work of this paper is to decrease the high pinnacle controls in OFDM frameworks. A few strategies are there to decrease PAPR effectively(15). In this investigation the idea of specific mapping (SLM)and fractional tansmit sequence(PTS) strategy is connected to the OFDM images to lessen high pinnacle signals[11]. Coding and reenactment were done for SLM, PTS and their impacts on diminishing the PAPR were investigated. Additionally Reduced Complexity approaches for the SLM and PTS procedures were done and their exhibitions in lessening the PAPR were performed and analysed[3].

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The power signs of all the above work are seen in correlative aggregate circulation work (CCDF) plot. The outcomes express that the proposed new SLM and PTS technique attainsa great PAPR decrease and the encoding complexity is reduced by applying the new schemes.

II.SELECTIVE MAPPING TECHNIQUE (SLM)

Many methods are there to reduce the PAPR , but both complexity and redundancy are high and only small gains in PAPR are achieved[12]. When the phases of different sub-carriers add up in phase the possibility of PAPR being high is for sure. Hence one method to reduce the in-phase addition is to change the phase before converting the frequency domain signal into time domain[13]. Hence before taking the N point IDFT each block of input is multiplied by an φ vector of length N. Now there is a possibility that the PAPR may turn low

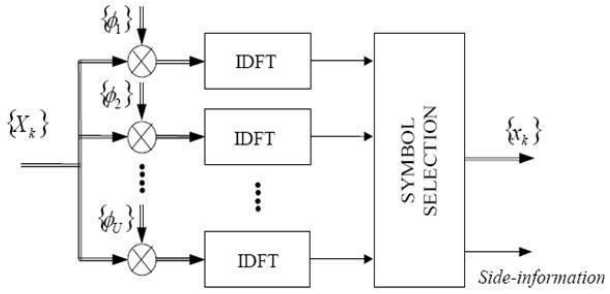

Fig 1 : Scheme of a Modulator with Selective Mapping

The figure 1 shows the scheme of a modulator with selective mapping technique. The algorithm for selective mapping technique is as follows:

Step 1: Get the input vector(X) of length D and let N=integer

Step2: for i=1: N

Step 2.1: Generate φ (i) of length D

Step 2.2: Multiply φ (i) with the input vector and get Z (Freq domain)

Step 2.3: Compute IDFT and get z (Time domain)

Step 2.4: Determine PAPR using the formula

2 max x (t) PAPR = 2 E x (t)

Step 2.5: Increment the value of i

Step 3: Go-to Step 2

Step 4: PAPR of length N is obtained.

Step 5: Select a threshold Y. One with minimum PAPR is used for transmission

Step 6: If min of PAPR>Y then increment a count

Step 7: Perform Steps 1-6 M times

Step 8: Obtain final count

Step 9: Increment the value of N and repeat Steps1-8

Step 10: Plot Graph for various N values where

X axis: Threshold values
Y axis: Pr[PAPR low>Y]

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Step 11: It could be inferred that as the value of N increases PAPR decreases
(It is required to inform the phase information controlled for the data sub-carriers to the receiver as side information) Because of the varying assignment of data to the transmit signal, we call this „Selected Mapping". The core is to choose one particular signal which exhibits some desired properties out of „N" signals representing the same N information.

SIMPLIFIED METHODS FOR PAPR REDUCTION

A. COMPLEXITY REDUCTION FOR SLM AND PTS:

This chapter presents a simplified version of partial transmit sequences (PTS) and selected mapping sequences to reduce peak-to-average power ratio (PAPR) of an OFDM signal. Simplification of PTS is achieved by having a set of partitions but optimizing phase values only for alternate partitions. This proves to be a promising solution to reduce complexity of PTS. It is also proposed to choose the selected mapping sequences using a new phase Sequence[4]. In this previous case, although with an increase of the complexity, very high PAPR reduction can be achieved[10]. In the above two methods the complexity factor of the algorithm was quite high. This approach provides a trade-off between complexity and performance in SLM and PTS techniques[8].

B.REDUCED COMPLEXITY SLM

In the case of reduced complexity SLM the φ vector is changed only of its odd components and the even components are assumed to be 1 for 1000 iterations. The other process remain the same.

C. ALGORITHM FOR REDUCED COMPLEXITY SLM

Step 1: Get the input vector(X) of length D and let N=integer

Step2: for i=1: N

Step 2.1: Generate φ (i) of length D keeping the even values as 1.

Step 2.2: Multiply φ (i) with the input vector and get Z (Freq domain)

Step 2.3: Compute IDFT and get z (Time domain)

Step 2.4: Determine PAPR using the formula

2 max x (t) PAPR = 2 E x (t)

Step 2.5: Increment the value of i

Step 3: Go-to Step 2

Step 4: PAPR of length N is obtained.

Step5:Select a threshold Y. One with minimum PAPR is used for transmission

Step 6: If min of PAPR>Y then increment a count

Step 7: Perform Steps 1-6 M times

Step 8: Obtain final count.

Step 9:To compare plot graphs for normal SLM and Reduced Complexity SLM

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X axis: Threshold values

Y axis: Pr[PAPR low>Y]

Step 10: It could be inferred that reducing the complexity increases the PAPR.

D.PERFORMANCE ANALYSIS:

To evaluate and compare the performance of Ordinary SLM and Reduced Complexity SLM, computer simulation has been performed on an input sequence of length 8. Constellation of Binary phase shift keying (QPSK) is used as a signal mapper for OFDM system and φ € {±l, ±j}. For the conventional SLM and reduced complexity SLM, probability that, PAPR exceeds an arbitrary threshold Y is depicted below. The thresholds fixed are 1.5, 2, 2.3, 2.6 and 3.5. The experiment was repeated for over 1000 times.

E.REDUCED COMPLEXITY PTS

In the case of reduced complexity PTS the „W" vector is changed only of its odd components and the even components are assumed to be 1 for 1000 iterations. The other process remains the same.

F.ALGORITHM FOR REDUCED COMPLEXITY PTS

Step 1: Get the input vector(X) of length D.

Step2: Divide the input vector into M blocks of length N where N=(D/M).

Step3: Assume a weight vector W of length M with initially given values as 1.
Step 4: Perform the N point IFFT on the M blocks and multiply with the weight vector.

Step5: Pass the output to a summer and obtain z (Time domain).

Step6: Determine the PAPR of z using the formula.

2 max x (t) PAPR = 2 E x (t) Let it be PAPR1.

Step7: Now change the first odd value of the M length weight vector to -1 while the others
remaining as 1.

Step8: Repeat Steps 4-5 and determine PAPR of z. Let it be PAPR2.

Step9: If PAPR2<PAPR1, then retain the weightvector, else change the next odd value to -1.

Step10: Repeat the Steps until the weight vector with minimum PAPR is obtained. Note that the
even values in the weight vector should always be 1.

Step 11: PAPR vector of length M is obtained.

Step 12: Select a threshold Y

Step 13: If min of PAPR>Y then increment a count

Step 14: Perform Steps 1-13 K times by changing the input vector and keeping N the same.

Step 15: Obtain final count

Step 16: To compare plot graphs for normal PTS and Reduced Complexity PTS

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X axis: Threshold values
Y axis: Pr[PAPR low>Y]

Step 17: It could be inferred that reducing the complexity increases the PAPR.

G.PERFORMANCE ANALYSIS

To evaluate and compare the performance of Ordinary PTS and Reduced Complexity PTS, computer simulation has been performed on an input sequence of length 32 divided into 4 sub-blocks each of length 8. Constellation of Binaryphase shift keying (QPSK) is used as a signal mapper for OFDM system and W € {±l}[9]. For the conventional PTS and reduced complexity PTS, probability that, PAPR exceeds an arbitrary threshold Y is depicted in figure 6. The thresholds fixed are 1.5, 2, 2.3, 2.6 and 3.5. The experiment was repeated for over 1000 times.

H.SIMULATED RESULTS

Fig 5.CCDFs of SLM for OFDM PAPR reduction

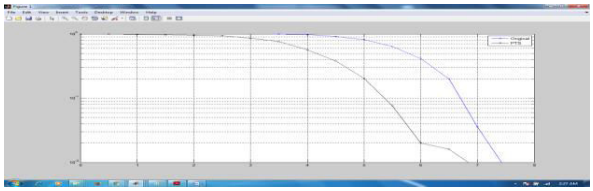

Fig 6.CCDFs of PTS for OFDM PAPR reduction

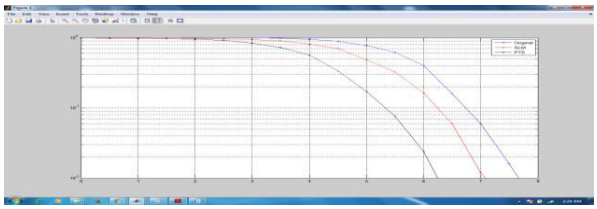

Fig 7.CCDFs of OFDM,SLM ,PTS for OFDM PAPR reduction

CONCLUSION

The simulation result shows that the ordinary SLM and PTS have better PAPR reduction but the complexity is more. The proposed new scheme reduces the complexity of the OFDM systems as the PAPR increases. The work can be extended by applying the same procedures for other PAPR reduction schemes.

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