



Chaos Communication System in Different Fading Channel for MIMO System

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ABSTRACT: The security of chaos communication system is superior to other digital communication system, because it has characteristics such as non-periodic, wide-band, non-predictability, easy implementation and sensitive initial condition. However, chaos communication system increases the number of transmitted symbols by spreading and transmitting information bits according to characteristic of chaos maps. This Results in in-efficient data transmission speed, so research is necessary for increasing the data transmission speed in chaos communication system. One way of achieving high data transmission speed is by including many antennas to chaos communication system. In this work, we make use of multiple-input and multiple-output (MIMO) technique for improving the data transmission speed. Along with MIMO antenna system we have used correlation delay shift keying (CDSK) for Evaluating BER performance over Rayleigh, Rician and AWGN (Additive white Gaussian noise) fading channel. Lastly we evaluate the BER performance of the 2X2 and 4X4 MIMO system by applying boss map and MIMO detection algorithm such as zero forcing (ZF) and minimum mean square error (MMSE).

KEYWORDS; chaotic systems, CDSK (Correlation delay shift keying),MIMO.

I.INTRODUCTION

Riotous frameworks give a rich component to flag outline and era for correspondence and an assortment of sign handling application, in light of the fact that Chaotic signs are commonly broadband, commotion like, and hard to anticipate they possibly can be used in different settings for covering data bearing waveforms and tweaking waveforms in spread range analysis[1].

Current correspondence frameworks require the utilization of cutting edge strategies for Information insurance against unapproved access. In this way, one of the key issues of cutting edge cryptography is the era of keys having relevant factual properties. The utilization of confused signs to convey data was initially proposed in 1993 by Hayes, et.al and from that point forward, Chaotic frameworks have been given much consideration and turn into an imperative in both nonlinear plan and engineer[2].

Confusion sign is communicated as haphazardly and non-linearity produced signal ,however it is conceivable to decide estimation without bounds by estimation of the past. Because of security and point of preference, Chaos correspondence frameworks are being considered continuous. Keeping in mind the end goal to comprehend drawback because bustle mistake ratio execution of this framework is terrible, bedlam correspondence framework is assessed the bustle mistake ratio execution as indicated by mayhem Maps and discover a confusion guide that has the best bustle mistake ratio achievement [3].

In Rayleigh blurring channel, execution of bustle mistake ratio also connection defer substitute keying framework that is affected to 4x4 MIMO with Zer0 F0rcing and MMES assess. In addition, BER execution of CDSK framework that is affected to 4x4 MIMO with MIMO identification calculation is assessed, and we analyze BER execution of Zer0 F0rcing also MMES. chaos map with a specific end goal to enhance the BER achievement is proposed[4], also named a novel disarray map "Manager map". Also, assess the execution of Zer0 F0rcing and MMSE when 4x4 MIMO is affected to connection defer substitute keying utilizing Manger guide

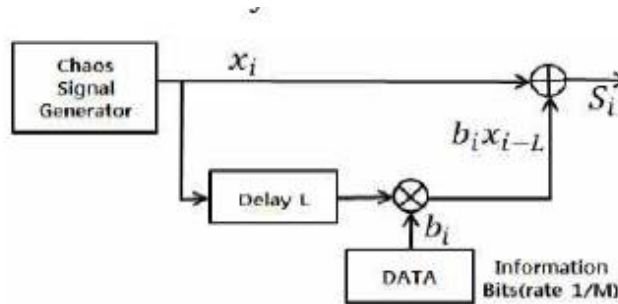
International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

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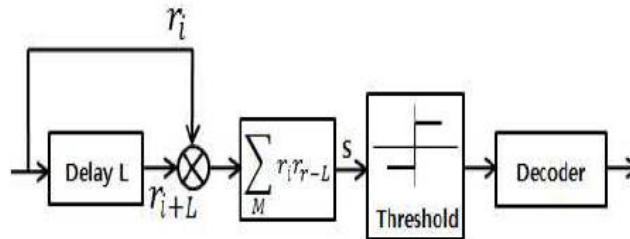
Vol. 5, Issue 6, June 2016

II. SYSTEM MODEL AND ASSUMPTIONS

2.CDSK OPERATION:



a) Transmitter of CDSK system



b) Receiver of CDSK system

Figure above demonstrates the piece outline of a CDSK transmitter (a) and receiver (b). In this figure, the transmitted sign is the aggregate of the riotous x_i and its deferred grouping x_{i-L} increased by the data image $b_i(\pm 1)$, where L is the postponement.

In this manner, the transmitted signal is given by

$$S_i = b_i x_{i-L} + x_i \quad (1)$$

The CDSK beneficiary is like the DCSK collector. Along these lines, the collector can recognize the data by increasing the got sign and its deferral sign is given by

$$C_2 = \sum_{i=1}^N R_i R_{i-L} \quad (2)$$

CHOATIC MAP

Tent map:

Tent guide mathematical statement is non-straight framework utilizing the past yield as the present info. Tent guide change its direction of yield by the estimation of the parameter α , in the event that it has under 1.01 it has straight trademark. Here is Tent guide mathematical statement

$$X_{n+1} = \alpha |0.5 - |0.5 - x_n|| \quad (3)$$

At the point when the estimation of the parameter is $\alpha = 1.999$.

Trajectory boss map:

$$\begin{aligned} x_{n+1} &= \alpha |0.45 - |0.503 - x_n|| \\ y_{n+1} &= x_n - 0.3 \end{aligned} \quad (4)$$

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 6, June 2016

Comparison of Boss guide is communicated as equation(4). Mathematical statement type of Boss guide is like Tent guide since Boss guide was proposed by changing from Tent guide. Furthermore, direction of Boss guide is demonstrated as figure 4 when introductory quality is 0.1 and parameter alpha is 2.5[4].

III.EFFICIENT COMMUNICATION

In this paper, In Rayleigh fading channel ,BER performance of CDSK system say that zero forcing 2x2 MIMO ,in that diagram co inside up to 20dB.after that it will change to BER value is 0.01,and another one is 0.001, fig.4 .next one is MMSE ,if we used MMSE algorithm ,its gives better performance than the Zero forcing ,BER value got less in this MMSE algorithm ,BUT if we use the ZERO forcing in that BER value increase, so compare to Zero forcing and MMSE,MMSE is better than the Zero Forcing ,next one is . in that graph comparing Boss map and Tent map ,in fig 5 graph saying that Boss map better than the tent map ,because BER performance of zero forcing is very bad condition in, so BER performance of Boss map is better than the Tent map, because in graph say that MMSE Boss map BER value is very less than the ZF tent map, so similarly we can do it like this ,finally we got the result in this graph, coming .Enhancement Rician channel ,slightly variation between Rayleigh channel and Rician channel, in Rician channel BER performance value very less than Rayleigh channel ,but ZF and MMSE value almost equally at the end of the 30dB,0 to 20dB almost same BER performance ,after that different variation in that BER value , comparing the Rician channel and Rayleigh channel ,Rician channel is better than the Rayleigh Channel, because see the .in Rayleigh channel BER value is 0.09 and another one is 0.01,but in the Rician channel BER value is 0.98,and 0.9,so comparing the value we got easily Rician channel better than the Rayleigh channel, BER performance of CDSK system 4x4 MIMO, in that diagram number of antenna transmitter is 4,receiver 4 ,in this 4x4 MIMO system, ZF and MMSE slightly difference from BER value , in 4x4 graph,2x2 Boss map and 4x4 Boss map almost same BER value but 2x2 Tent map and 4x4 tent map slightly difference is 10%,so compare the 2x2 and 4x4 ,4x4 MIMO system is better then the 2x2 better ,number of antenna increase with receiver also same ,so 4x4 very important in the MIMO system.

IV. RESULT AND DISCUSSION

Fig 1. Shows that Tent Map trajectory because all its depending on the intial condition alpha, xn value ,intial condition is 0.1 ,xn value is 1.9999,

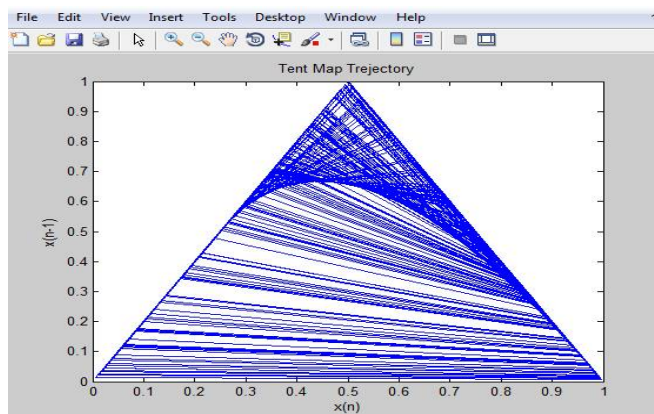


Fig.2.Tent map Trajectory

Fig 2. Shows that Boss Map trajectory because all its depending on the intial condition alpha, xn value ,intial condition is 0.1,xn value is 2.5,

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Vol. 5, Issue 6, June 2016

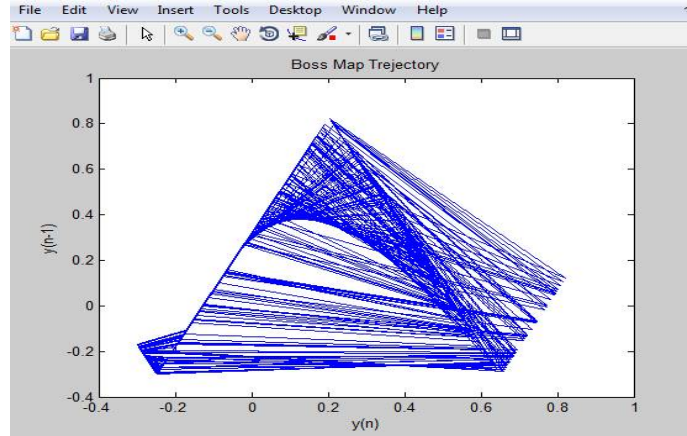


Fig.3.Boss Map Trajectory

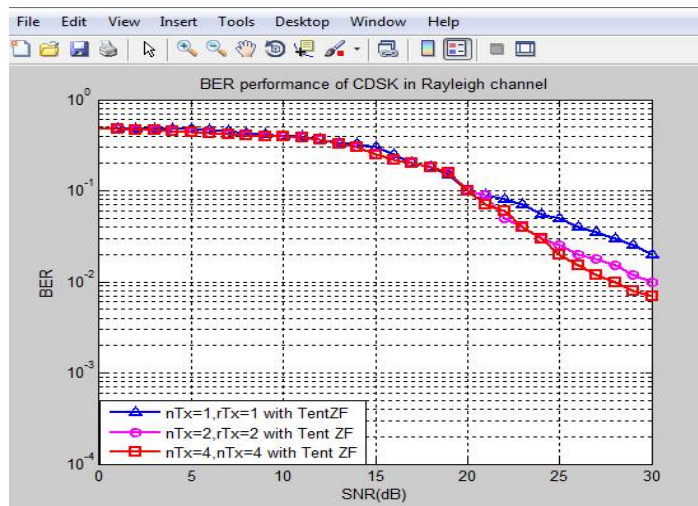


Figure4;BER PERFORMANCE OF TENT ZF(1X1,2X2,4X4) USING RAYLEIGHCHANNEL

Fig 4. Shows that BER Performance of Tent map 1x1,2x2,4x4,using Rayleigh channel ,in Rayleigh channel 4x4 increasing level is high but comparing the 2x2,1x1,4x4 is best part comparing the these 2 grid part ,because 4 input part 4 output part so obbesively it will increasing ,for that most level part in Rayleigh channel used the Tent ZF part 4x4 useful,

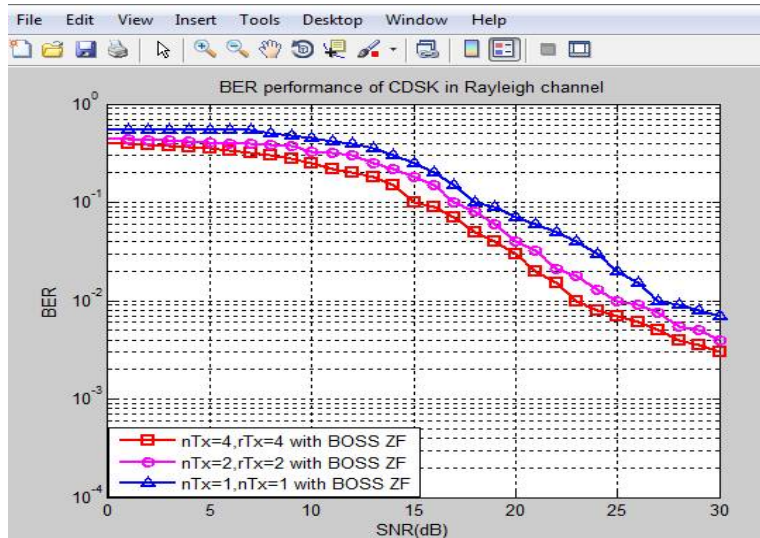


Figure 5; BER PERFORMANCE OF BOSS ZF (1X1,2X2,4X4) USING RAYLEIGH CHANNEL

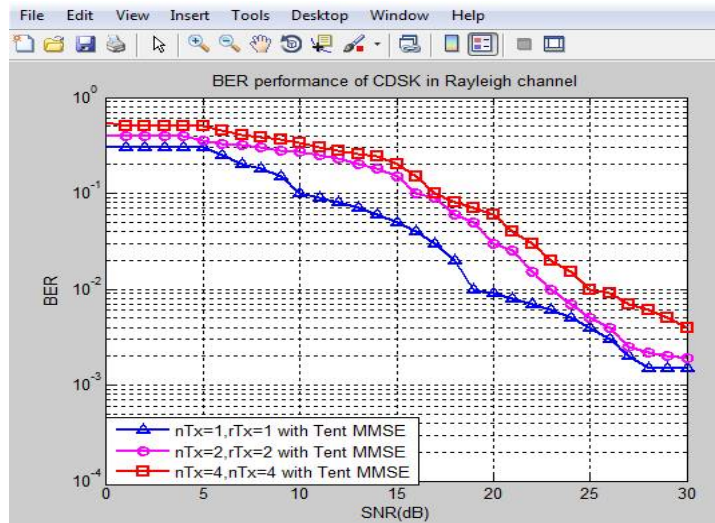


Fig6: BER PERFORMANCE OF Tent MMSE (1X1,2X2,4X4) USING RAYLEIGH CHANNEL

Fig 5. Fig 6. Shows that BER Performance of BOSS ZF and TENT MMSE (1x1,2x2,4x4), using Rayleigh channel, in zero forcing part 4x4 increasing level is high but comparing the 2x2, 1x1, 4x4 is best part comparing the these 2 grid part, because 4 input part 4 output part so obviously it will increase, for that most level part in Rayleigh channel used the Tent ZF part 4x4 useful, now come to the Tent MMSE 1x1 is best performance part comparing the 2x2, 4x4 part in tent MMSE, its mainly inverse propositional BOSS ZF, these are very important role for this,

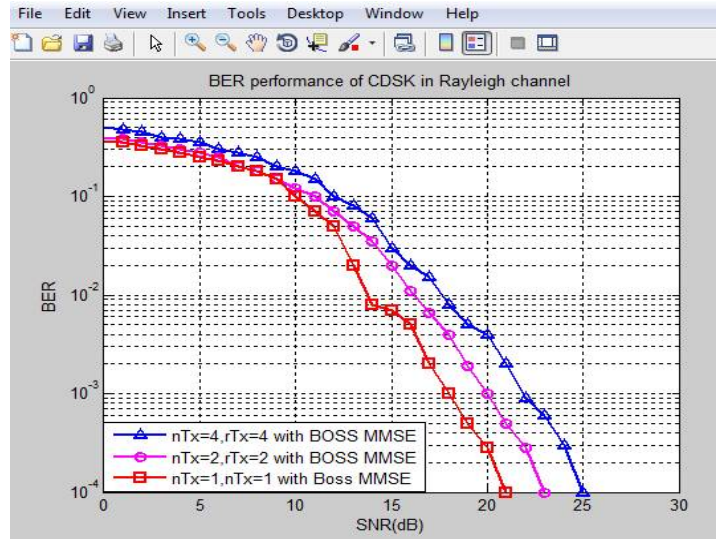


Fig 7:BER PERFORMANCE OF BOSS MMSE(1X1,2X2,4X4) USING RAYLEIGH CHANNEL

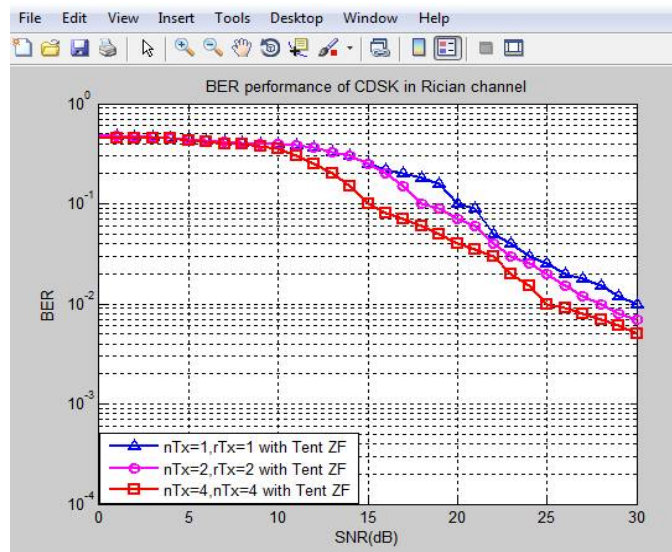


Fig 8:BER PERFORMANCE OF TENT ZF(1X1,2X2,4X4) USING RICIAN CHANNEL

Fig 7.Fig 8. Shows that BER Performance of BOSS MMSE and TENT ZF(1x1,2x2,4x4),using Rayleigh channel ,in zero forcing part 4x4 increasing level is high but comparing the 2x2,1x1,4x4 is best part comparing the these 2 grid part ,because 4 input part 4 output part so obbesively it will increasing ,BER Performance of Tent map 1x1,2x2,4x4,using Rician channel ,in Rician channel 4x4 increasing level is high but comparing the 2x2,1x1,4x4 is best part comparing the these 2 grid part ,because 4 input part 4 output part so obbesively it will increasing ,for that most level part in Rician channel used the Tent ZF part 4x4 useful,

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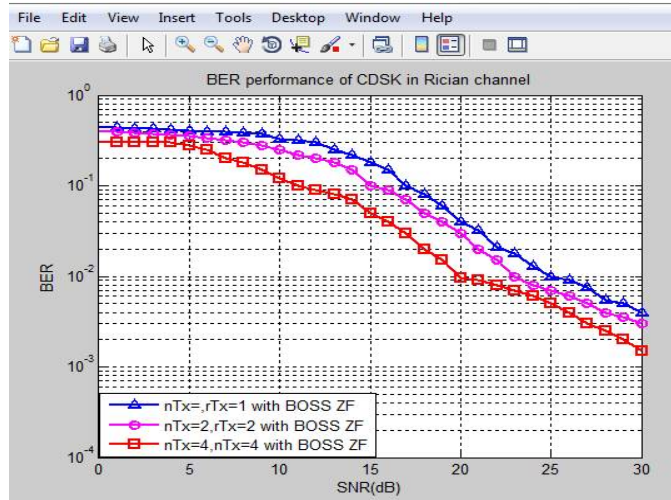


Fig 9: BER PERFORMANCE OF BOSS ZF(1X1,2X2,4X4) USING RICIAN CHANNEL

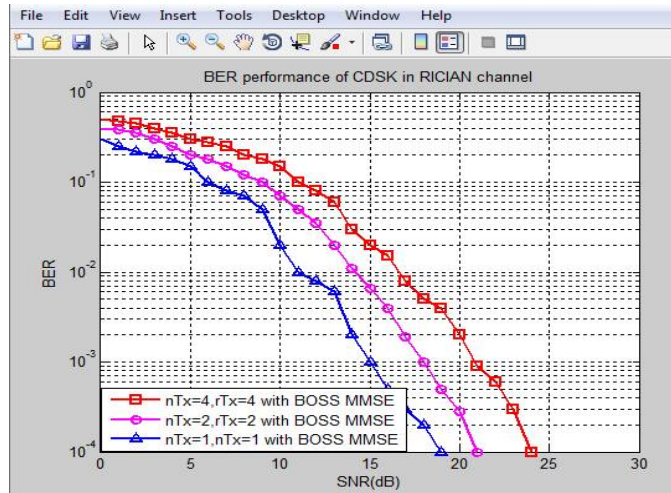


Fig 10: BER PERFORMANCE OF BOSS MMSE(1X1,2X2,4X4) USING RICIAN CHANNEL

Fig 9, Fig 10. Shows that BER Performance of BOSS ZF and BOSS MMSE (1x1, 2x2, 4x4), using Rician channel, in zero forcing part 4x4 increasing level is high but comparing the 2x2, 1x1, 4x4 is best part comparing these 2 grid parts, because 4 input part 4 output part so obviously it will increase, for that most level part in Rician channel used the BOSS ZF part 4x4 useful, now come to the BOSS MMSE 1x1 is best performance part comparing the 2x2, 4x4 part in MMSE, its mainly inverse proportional BOSS ZF, these are very important roles for this.

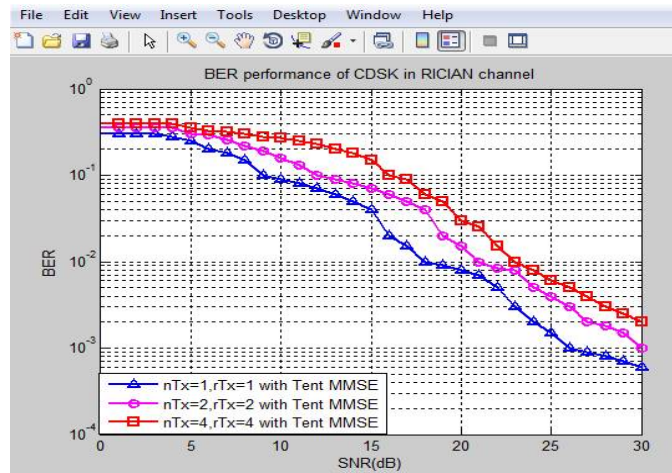


Fig 11: BER PERFORMANCE OF TENT MMSE(1X1,2X2,4X4) USING RICIAN CHANNEL.

BER Performance of Tent MMSE 1x1,2x2,4x4,using Rician channel ,in Rician channel 4x4 lower level is low but comparing the 2x2,1x1,4x4 is worst part comparing the these 2 grid part ,because 1 input part 1 output part so obbvesily it will increasing in TENT MMSE level ,for that most level part in Rayleigh channel used the Tent ZF part 1x1 useful,

VI.CONCLUSION

The BER performances of 1x1, 2x2, 4x4, MIMO CDSK system applying MIMO detection algorithm like Zero forcing and MMSE is evaluated using different fading channels like Rayleigh channel, Rician channel, AWGN (additive white noise Gaussian) channel. The performance of MMSE is better than the Zero forcing in chaos communication system because pseudo inverse of MMSE is considering not only estimation matrix equation but also noise. And also calculated, the BER performance of Boss map is better than Tent map,

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