

PERFORMANCE OF SPACE-TIME BLOCK CODING IN MIMO SYSTEM-A LITRATURE SURVEY

Assist Prof Amit Pathak¹, Preeti Sharma²
Shri Ram Institute of Science & Technology

Abstract— The demand for mobile communication systems with high knowledge rates has dramatically raised in recent years. New ways are necessary so as to satisfy this immense communications demand, exploiting the restricted resources like information measure and power as economical as potential. MIMO systems with multiple Antenna parts at each link ends are an economical answer for future wireless communications systems as they supply high knowledge rates by exploiting the abstraction domain underneath the constraints of restricted information measure and transmit power. during this paper some survey supported completely different| .MIMO system victimization different techniques are bestowed.

Index Terms— MIMO,STBC ,BER,SM

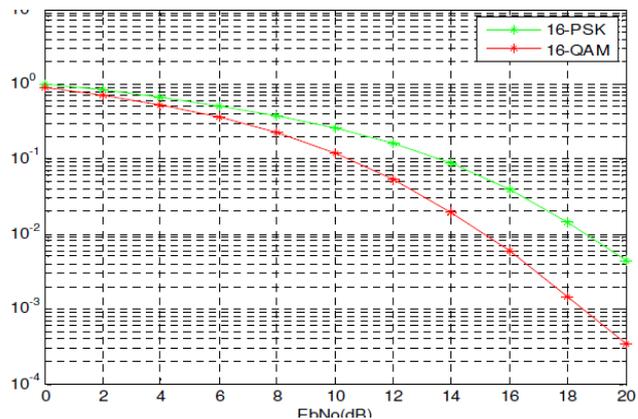
INTRODUCTION

Communication technologies became a awfully necessary part of human life. Wireless communication systems have opened new dimensions in communications. Individuals is reached at any time and at anyplace. MIMO stands for multiple-input multiple-output and suggests that multiple antennas at each link ends of a communication system, i.e., at the transmit and at the receive facet. The multiple-antennas at the transmitter and/or at the receiver in an exceedingly wireless communication link open a brand new dimension in reliable communication, which may improve the system performance considerably. the thought behind MIMO is that the transmit antennas at one finish and therefore the receive antennas at the opposite finish are "connected and combined" in such the way that the standard (the bit error rate (BER), or the info rate) for every user is improved. The core plan in MIMO transmission is frame of reference signal process within which signal process in time is complemented by signal process within the abstraction dimension by victimization multiple, spatially distributed antennas at each link ends.

A. Review Stage

In 2012[1], author worked on BER Performance of MPSK and MQAM in 2x2 Alamouti MIMO Systems ,and conclude

that the technique used do realize an area in correcting error rates of QAM system of upper modulation schemes. The model will equally be used not just for the factors of reconciling modulation except for a platform to style alternative modulation systems additionally. Results shows that

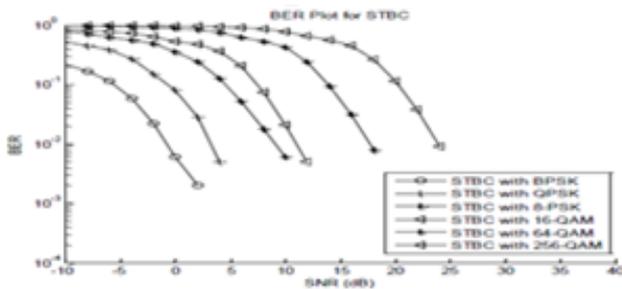


Graph 1.1 plot b/w MPSK ,MPSK (M=16)

The results show that as the modulation order increases more energy is needed to achieve a given error probability. Increase in the modulation order means an increase in the number of bits per symbol to be processed. While BPSK is better than QPSK and 16 QAM , its data rate is lower. we see that 16QAM which is more susceptible to noise and interference due to its dependence on amplitude requires relatively more power for a given BER, but it should be noted that it has a higher spectral efficiency when compared with BPSK or QPSK .

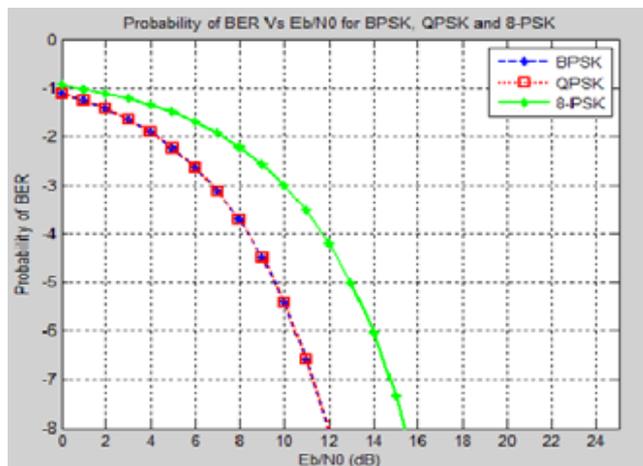
Another author [2], worked on totally different modulation techniques in 2012 resulted graph shows that The result shows that Bit Error Rate (BER) of STBC with 256-QAM is a smaller amount for prime SNR and BER with BPSK is a smaller amount for low SNR. whereas the turnout of STBC with 256-QAM is additional as compare to STBC with BPSK at higher SNR price. Therefore STBC with BPSK is additional power economical and wish less information measure, except for close to Base station

STBC with higher modulation has higher information measure and additional power. Therefore area Time Block Code with digital modulation will be utilized in multi antenna system to extend the dependability and turnout. This is often the essential model for MIMO analysis



Graph 1.3: BER performance of MPSK & MQAM method

Another author [3], in 2011 worked on comparative analysis of all modulation scheme .resulted graph shows



Graph 1.2 :B/w Probality & noise values

Comparative performance analysis of bit error rate likelihood for MPSK for M= a pair of, 4, eight over AWGN channel. The comparative performance analysis of simulated and theoretical curves for BER vs Eb/ No (signal to noise ratio) for BPSK, QPSK and 8-PSK over AWGN channel area unit given.

It is ascertained from the simulation curves and also the mathematical analysis of the signals that because the variety of signals or variety of M will increase, the error likelihood additionally will increase over AWGN channel. it's seen that higher-order modulations exhibit higher error-rates; in exchange but they deliver the next raw data-rate. Increasing the info rate can increase the SNR, however, increasing metal (Bit rate in bits /second) will additionally cause additional noise and noise term also will increase, since additional bits area unit packed nearer and sent through the channel. So, we tend to cannot increase SNR by merely increasing metal. we tend to should strike a compromise between the info rate and also the quantity of noise our receiver will handle.

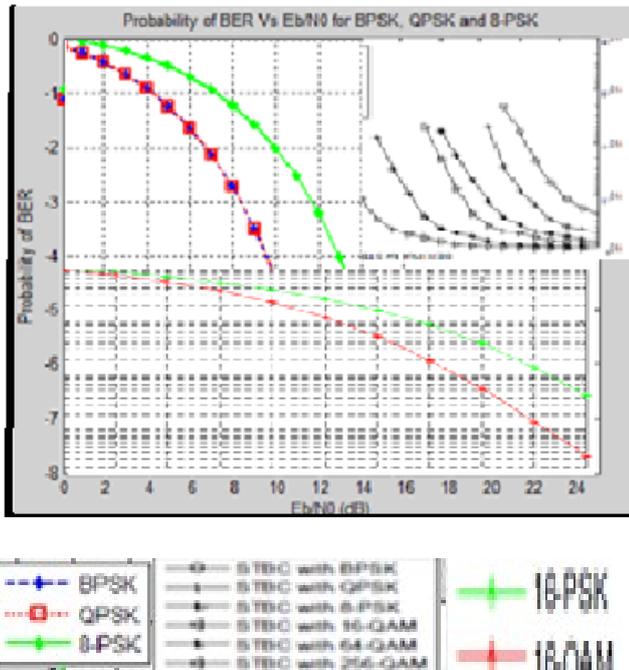
Don Torrieri, Matthew C. Valenti[4], “Efficiently Decoded Full-Rate reference system Block Codes”. IEEE trans. On comm. . system, vol.58, no.2 Feb2010. Reference system block codes with orthogonal structures generally offer full-diversity reception and straightforward receiver process. However, rate-1 orthogonal codes for complicated constellations haven't been found for quite 2 transmit antennas. By employing a genetic rule, rate-1 reference system block codes

that accommodate terribly straightforward receiver process at the value of reduced diversity square measure designed during this paper for quite 2 transmit antennas.[5]

Lei Liu, Kuanquan Wang and Wangmeng Zuo[5], ” Quasi-orthogonal reference system Block Codes for Four Antenna”, 2009 IEEE.This paper analyzes the structure and characteristics of many kinds of Quasi-orthogonal Space-Time Block Codes (QSTBC), and proposes 2 novel ways of QSTBC for four antennas to complement the family of QSTBC. Experiment results indicate that, whereas the decipherment complexness is that the same as alternative quasi-orthogonal codes, the 2 new QSTBC approaches attains} good performance as TBH and Jafarkhani cases.[4]

Table 1: Different parametric values based comparison-

Comparison of different method based on parameters				
parameter / method	almouti code	jalfrazi method	FRSTC	SM
Bit Rate	decreased	higher	average	more
SNR	less	less	more	more
Complexity	more	average	more	less
Reliability	better	more	less	more
Fading	more	less	increase d	decreased



Graph 1.4 Plots of Different Methods

II. CONCLUSION

From different results we can conclude that In this paper, study the Space Time Block Code for various combinations of transmitting and receiving antenna for different modulation schemes like PSK and QASK. A STC methods has low complexity and promises high diversity, but the bit rate is moderate. SM method provides high bit rate, but is less reliable. so we proposed a new method using STBC which is less complex & more reliable, The goal is to design a robust and low complex wireless system that provides the highest possible bit rate per unit bandwidth.

REFERENCES

- [1] Sajjad Ahmed Ghauri, Muhammad Sajid Javaid, Mohammad Raza Perwez, Bilal Ahmad, "Performance of Space Time Codes in Rayleigh Fading Channel", International Conference on Information Society, 2012
- [2] Subuh Pramono, Sugiharton, "Three, Four Transmit Antennas Space Time Block Coded MIMO in Rayleigh Fading Channel „Performance Results”, International Conference on System Engineering and Technology, September 11-12, 2012
- [3] ZHANG jie, LIU liang, LI jin, Performance Analysis of Space Time Block Code in MIMO-OFDM Systems, 978-1-61284-486-2/111\$26.00 ©2011 IEEE.
- [4] Don Torrieri, Matthew C. Valenti, "Efficiently Decoded Full-Rate Space-Time Block Codes". IEEE trans. On comm. system, vol.58, no.2 Feb2010.
- [5] Luis Miguel Cortes- Pena, "MIMO Space-Time Block Coding (STBC): Simulation and Result, "personal & mobile communications", April 2009
- [6] Lei Liu, Hongzhi Zhang, Kuanquan Wang and Wangmeng Zuo" Quasi-orthogonal Space-Time Block Codes for Four Antenna", 2009 IEEE.

[7] Lei Guo-Wei, Zhuang Ming-jie "Performance Analysis of Quasi Orthogonal STBC via Antenna Selection" IEEE Trans. Inform. Theory, vol. 45,2008.

[8] Claude Oestges and Bruno Clerckx, "MIMO Wireless Communication from real world propagation to space-time code design.2007.

[9] Mr. Ankit Pandit1 , Mr. S.J.Basha2 , Mr. K.K.Sharma, BER Analysis of Various STBC Coding for MIMO Systems at Different Modulation Schemes, International Journal of Innovative Research in Computer and Communication Engineering Vol. 1, Issue 2, April 2013.

[10] B.Revathi1, P.Poonguzhali2, A.Angelin3, C.Arunachalaperumal4, On the Performance of Spatial Modulation for MIMO Communication, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 3, Issue 3, March 2014.

[11] Soumya K, Nisha S Nair and Dr. T Sudha Performance Evaluation of Different Space Time Block Codes in MIMO Systems Over Rayleigh Channel, International Conference on Control Communication and Computing (ICCC),2013