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Optimum Power Utilization for MIMO Wireless Communication

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ABSTRACT— This paper, we propose Energy optimization algorithm for allocating equal power among the user to carry different bit streams in Multiple Input Multiple Output (MIMO) transmitter through utilization of Energy Efficiency. The interference between the links is cancelled and improves system performance. The simulation result shows maximum bandwidth utilization of each user and linear improvement of system performance in wireless channel..

KEYWORDS— Energy optimization algorithm, power, Multiple Input Multiple output (MIMO), Energy Efficiency, Bandwidth, Interference alignment.

I. INTRODUCTION

Multiple Input Multiple Output Technology provides ultimate solution for wireless communication problems. It improves the system performance by using multiple antennas at both transmitters and receivers. MIMO technology significantly increasing data throughput and without additional bandwidth or increasing transmit power in link range. Different types of MIMO formats are used in wireless communication. In existing era to achieve the high SNR and global channel knowledge in interference alignment over finite number of signal dimension through distributed algorithms [Gomadam.K, 2008, Ho.Z, 2010].The interference can be align over un coordinate co channel in the network to maximize the data rate and minimize interference plus noise leakage to quantized channel state information through cooperative algorithms [Peters S.W, 2011]. Cross layer design interact between different layers and significantly increasing Energy Efficiency in wireless communications. Data can be transmitted in sub channel, modulation and power allocation depends on circuit power consumption and transmission on all other sub channel [Miao.G, 2009].Random opportunistic beam forming algorithm decreasing power consumption in mobile communication networks and increasing Energy Efficiency in fixed transmission power. This algorithm reduces number of transmitter antenna M and increasing data rate [Chong.Z, 2011].Ensuring reliable operation for maximize battery life time of the sensor nodes to design micro sensor systems [Wang.A,2001].To reduce total energy consumption to send a given number of bits through error control codes [Cui.S,2005]. Bernshtein's theorem align the feasibility of in signal vector space only on beam forming for K-user MIMO interference channel. It indirectly shows corresponding polynomial system for single beam [Yetis.C.M, 2010]. An iterative algorithm minimizes the weighted sum mean square error and maximize weighted sum rate [Negro.F, 2010,Sungs.H, 2010]. To achieve higher degree of freedom per orthogonal time and frequency dimension [Cadambe.V.R,2008]. To maximize throughput and energy efficiency over fixed transmit power. [Guowang Miao,2008,2010,chen.Y,2011,],.To measure the system performance by obtaining overall network capacity through distribution and game theory technique[Gesbert.D,2007]. In Energy Efficient transmission for MIMO Interference channel fixed transmits power is allocated at transmitter. Each transmitter and receiver pair utilize full transmit for each data transmission, so waste of power in channel. In order to reduce power consumption and improve system performance, we propose Energy optimization algorithms in MIMO wireless channel to allocate equal power to number of user available in network for transmitting data's.

A. Organization and Notification

The system model of Multiple Input Multiple out wireless communication channel descriptions given in section II .Problem description given in section III.

Proposed algorithm description given in section IV. Result and conclusion given in section V and VI respectively. Notification : we use upper case letter N denotes number of user in the networks, lower case letter nt denotes node transmitter and nr denotes node receiver.

II. System Model

Multiple Input Multiple Output Technique carry N number of user in transmitter and receiver pair link in wireless communication.

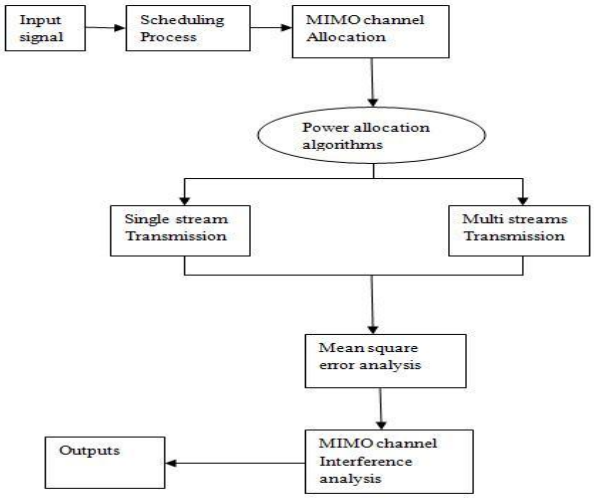

Fig 1Block diagram of Energy optimization in MIMO channel

In Figure 1shows that the input bitstreams carry equal number of user available in the wireless network. The scheduling algorithm analysis number of user in the network and allocate bandwidth in the users. MIMO channel allocation provides effective path to transmit the bitstreams.The energy optimization algorithms allocate equal power to available user in the network. The single stream transmission the interference between the links is not eliminated. In multi stream transmission provide good energy efficiency if the channel is not good. Mean square error analysis eliminates the interference in the channel. MIMO channel interference analysis model the transmitter and receiver node pair and produce the outputs.

III. Problem Description

The distributed algorithm align the interference to find the global channel knowledge in network .but we achieve only local channel knowledge in the each node [Gomadam.K, 2008].To reduce the power consumption and to improve the system performance to design cross layer in network. It provides poor system performance [Miao.G, 2009].To updating transmitter precoding metrics in two user MIMO channel in fixed transmit power. The analytical condition of convergence determination is more difficult, due to complexity of updates [Ho.Z, 2010]. The random opportunistic beamforming scheduler algorithms to reduce number of antenna in the network and decrease power consumptions. It allows limited number of user in networks [Chong.Z, 2011]. The iterative algorithms maximize weighted sum rate and high SNR. The interference between the channel is not cancelled and complexity to implement this algorithms [Negro.F, 2010, Peter.S, 2011]. To Increasing energy efficiency and improve the transmission distance. It also increase total power consumption and reduce transmitter power [Cui.S, 2005].

IV. PROPOSED ALGORITHM

Energy optimization algorithm allocates equal power among the data streams that are sent from the same transmitter to maximize the system performance through the utilization of energy efficiency. The power allocation is considered in downlink broadcasting channel. The minimax scheduling algorithms analysis user in the network and allocate bandwidth in the user. In MIMO wireless communication the centralized algorithms find. The local channel state information maxima .To maximize Energy Efficiency to maximize the receiver rate. The receiver rate is obtained by minimum mean square error receiver. In centralized algorithms does not eliminate the channel overhead, because the information exchange in central controller. Decentralized algorithm reduces the channel overhead based on the local channel state information and distributes the signals in coverage areas. The channels are randomly allocate to equal number of user carried by bit streams based on the coverage areas. Distributed algorithms cancelled the interference between the links and maximize the energy efficiency, transmit data to wireless channel.

V. Simulation Results

The simulation results demonstrate the performance achieved by proposed Energy optimization algorithms. In this simulation, the bandwidth of overall network is 250-280MHZ. Three base stations A, B, C are randomly allocate in the user based on the coverage areas. The power of each base station is 3.5watts.The coverage area of each base station is 27 km, totally 81km.The frequency of each base station is 1000MHZ and totally 3000MHZ is allocating in networks.

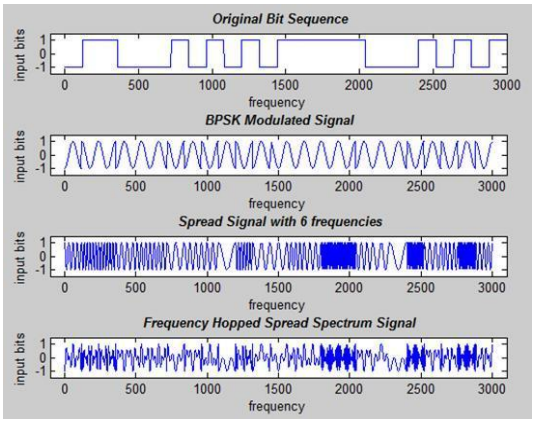

Figure 2 Inputs and Modulation of bitstreams

Figure 2 shows The 25 bits with 120 users is applied to input of wireless network. Based on the users available input bit streams are generated in the channel and carrier signal is allocated for each available user signal is modulated and phased shifted The spread signal

with 6 frequency signal is allocated in each channel is used by 6 user in each channel. The frequency of spread spectrum shows combination of data and 6 spread signal with carrier frequency.

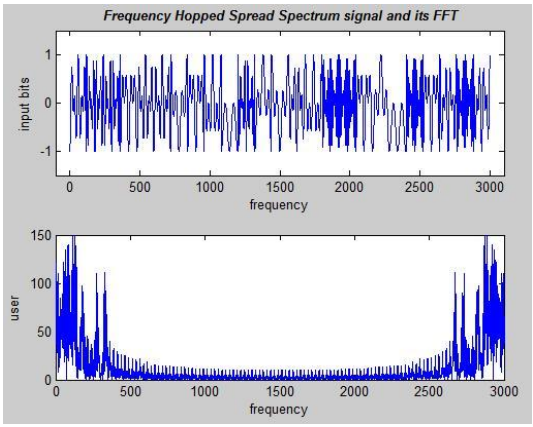

Figure 3 frequency hopping spread spectrum and its FFT

Figure 3 shows Frequency hopping spread spectrum shows combination of data and 6 spread signals with carrier frequency and FFT is calculated to obtain bandwidth allocation of each user with in 3000 MHZ spectrum in networks.

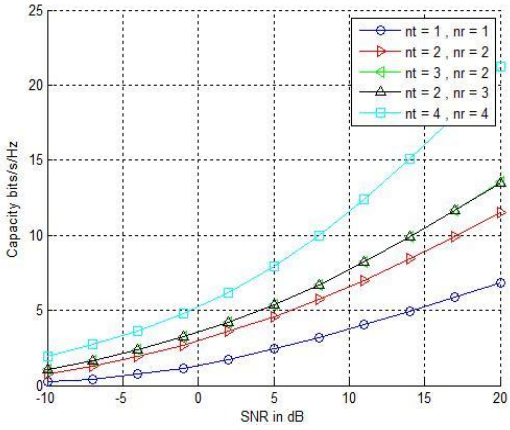

Figure 4 performance of MIMO wireless channel

Figure 4 shows Performance of MIMO wireless channel is calculated to obtain power allocation of each user and overlap of channel. Five node transmitters (nt) and node receivers (nr) carry channels. The node transmitter values of 1,2,3,2,4 shows transmitted channels and node receiver values of 1,2,2,3,4 shows received channels. In third and fourth transmitter and receiver channels are overlap in network. It shows equal power allocation of each user in received channel.

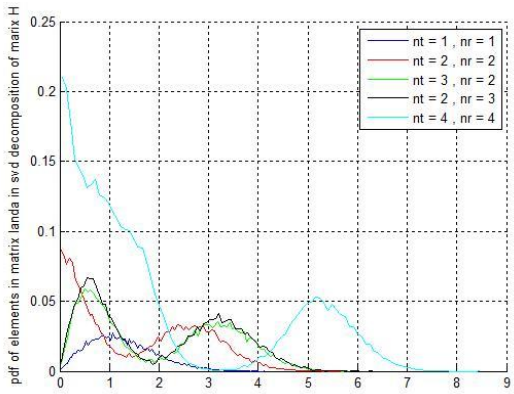

Figure 5 Performance of channel in five node transmitter and receiver

Figure 5 shows Performance of channel in five node transmitters and node receiver in network. It shows maximum level of each channel transmitted and received by network.

VI. CONCLUSION

To develop the system performance and utilize energy efficiency, energy optimization algorithms are used in Multiple Input Multiple Output (MIMO) wireless communication channel. The centralized algorithms are used to find the local channel state information maximum. Decentralized algorithms are used to reduce the overhead based on the local channel state information. The scheduling algorithms are used to analysis number user available to allocate the bandwidth among each user in transmitter and automatically allocate base station to each user based on the distance. Based on the user available, distance, signal strength the power allocation algorithm allocates equal power among the user and to reduce the waste of energy. The minimum mean square error will be calculated on each channel and cancel the interference among each channel. To calculate the signal to noise ratio is to identify how much power is allocated for each user. The Energy optimization algorithms channel overlapping and interference in the channel is not fully eliminated .In future work to eliminate channel overlapping we use iterative algorithm or fast convergence algorithm for equal power allocation and proper scheduling in the network .

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V.R Cadambe at the university of California Irvine is the first author is the valuable discussion in interference alignment in the network. To achieve high signal to noise ratio the interference can be align over finite number of signal dimension. Andrew Y. Wang National Science Foundation Graduate Fellowship discusses estimation of indoor large and small fading loss. Multiple Input Multiple output wireless

communication improve the system performance and maximize the energy efficiency .The Energy optimization algorithm allocate equal power to user available in the network. The interference between the links are cancelled and maximize the system performance through the utilization of Energy efficiency.

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