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MESI: Technique for Better Interference Cancellation and Fading Effect in MIMO-OFDM System

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Abstract: Signal Multi-divisional access is used as a 3GPP uplink transmission scheme. In this document, we propose a new Multi-Channel Multichannel Detection (CES) detector. In multi-user MIMO systems. Compared to the conventional SIC receiver, this system overcomes the problem of error propagation in the interference removal process by combining fine resolution output and channel decoding. The effect of future channel estimation error is achieved through the use of our Messy technology, the best results are obtained using our proposed technique.

Keywords: MESI, SNR, BER

I. INTRODUCTION

(SC-FDMA) has the main advantage in terms of power ratio. Average Power (PAPR). It can be used with MIMO (Multiple Input Multiple Output) technology to improve coverage and capacity. For uplink multi-user MIMO, multiple mobile stations (MSs) are allowed to transmit on the same resource block (RB) at the same time, providing spatial multiplexing access capability for two users with almost independent spatial characteristics. [1]

[3]. ZF guidelines for FD-LE completely eliminate inter symbol interference (ISI), while for deep spectra, null values cause degradation due to noise enhancement. The MMSE standard overcomes this disadvantage by adding additive noise and ISI accounts. The DFE offers better performance than the traditional LE as it eliminates ISI from the cursor by using previously detected symbols without noise enhancement. However, the DFE is subject to error propagation problems when it comes down to bad decisions. [1].

Spatial multiplexing Compared to a single-antenna system on one or both sides of the link, there is a linear increase in capacity (the minimum number of transmit and receive antennas) without additional power or bandwidth consumption [2-4]. The corresponding gain is available if the propagation channel is widely distributed and can be achieved by simultaneously transmitting independent data streams in the same frequency band. The receiver uses the spatial multiplexing difference of the spatial signatures caused by the MIMO channel to separate different signals in order to gain capacity.

Diversity: By making the channel "less erased" and increasing the robustness to co-channel interference, diversity leads to increased link reliability. The diversity gain is achieved by transmitting data signals over a plurality of independent (ideal) fading dimensions in time, frequency, and space, with the appropriate combination in the receiver. Spatial diversity (i.e. the antenna) is particularly interesting when compared to the diversity of time or frequency, as it does not cost time or bandwidth, respectively. Spatiotemporal coding [5] provides spatial diversity gain in multi-transmitter antenna systems without knowledge of the channel at the transmitter.

Array gain: The transmitter and the receiver can be implemented. It requires consistent combined channel knowledge and results in an increase in the average signal-to-noise ratio (SNR) received and thus improved coverage. Multiple antennas on one or both sides of the wireless link can be used to eliminate or reduce co-channel interference, thereby increasing the capacity of the cellular system. [9]

A. OFDM Design Issues

There are certain key factors needed to take under serious consideration when developing and designing OFDM system.

1. Useful symbol duration: The size of symbol or length of symbol in respect of time effect the number of carriers and

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spacing between them. It is helpful in measuring latency etc. Larger symbol duration is helpful in accommodation delay profile of channel and cause increment number of subcarrier, reduces subcarrier spacing and higher the FFT size. There may arise issue of subcarrier offset and instability of OFDM symbol. Subcarrier spacing and number of carriers depend upon application and requirement. In mobile environment due to Doppler shift subcarrier spacing is chosen to be large.

2. Number of carriers: Number of sub carriers chosen depend upon channel bandwidth, datarate, throughput requirements and territory (ruler, urban etc). If number of carriers are N then it would be reciprocal of duration of symbol in time T i.e. Selection of number of carriers depends on FFT size supported by FFT module. For higher number of carrier there would be higher number of complex point processing by FFT.

2. Modulation scheme: It is one of the advantages of OFDM that different modulation scheme can be applied to each sub-channel depending upon channel condition, data-rate, robustness, throughput and channel bandwidth. There could be different modulation scheme applied specified by complex number i.e. QPSK, 16 QAM, 64 QAM.

Narrow band MIMO detectors are used to reduce the complexity of fast Rayleigh fading channels. MIMO technology offers the promise of high spectral efficiency and robustness to fading. The key to its success is the MIMO detector at the receiver, whose job is to recover symbols transmitted simultaneously from multiple antennas. They are divided into linear and nonlinear receivers. The Lin-ear receiver is a pseudo-inverse ZF (negligible noise enhancement) receiver that optimizes the noise-receiving MMSE receiver and provides a common commitment between residual interference and noise enhancement between input signals. Nonlinear receivers are ML and SIC. ML is an exhaustive list of the best detection receiver complexity [2]

QAM index. This paper ranges from a simple linear detector based on zero forcing and MMSE standards to an optimal maximum likelihood detector. Describes continuous cancellation or decision feedback detector. Quantify the complexity of various inspection strategies [2]

The main goal of wireless technology is to provide better quality of voice, data, photos, fax and video. Digital Transfer Digital, LTV, 3GPP is the latest advance in wireless communication. The above-mentioned advances are possible with the help of UPDM and Kodma technologies. In recent years, OFDM has become the most popular technology for transmitting data/signals through wireless media. In the transmission, the signals are sent in sub-channels with different parallel frequencies. The frequency of the sub-channels is chosen so that these frequencies are perpendicular to each other and therefore do not interfere with each other. This phenomenon allows the transmission of data at overlapping frequencies, greatly reducing bandwidth requirements [1]. Since the data is transmitted in a radio space in radio communications, the channel displays the multipath fading phenomenon that causes interference between the ISI symbols in the signal received on the receiver side. The overlap between symbols (ISI) is undesirable, it increases the bit error rate. Data is generated as the band width exceeds the coherence bandwidth of the radio channel. To reduce or eliminate interference between symbols (ISI), different types of equalization techniques are used to compensate ISI by using the pulse response of the channel [2]. The principle of equalization is to keep the bit error rate as low as possible and to make the signal to noise ratio as high as possible [3]. These equalization techniques have proven invaluable in the design of wireless systems with high data transfer capabilities. Most wireless receivers are equipped with equations, which work well in expected mode. In wireless communications, receivers are usually equipped with a tie, which offers average performance. The quality of wireless communications depends on three parameters: performance, bandwidth, and transmission reliability. This parameter is threaded. Simultaneous optimization of these three parameters can be achieved by a new technology called OVEDM assisted by MIMO [3] The amplitude of the signal fluctuates rapidly with time and frequency. In addition to the Ogen network, fading is another source of signal degradation characterized by additional signals interference in wireless channels. Fading due to multipath fading can be fading due to multiple paths Spread, or drop in the shade, due to the shadow of the obstacles affecting the spread radio waves. The phenomenon of fading in the radio communication channel from 800 to 2.5 is shown a wide range of channel measurements in this area. [5]

MIMO (Multiple Input Multiple Output) systems provide greater capacity or versatility. We focus here on the high data transfer rate offered by spatial multiplexing (CM). Ordnance Division (OFDM) is a popular technology for high-speed wireless transmission because it efficiently uses available bandwidth and is easy to implement. The fading channels of selective frequency are divided into parallel channels. The combination of MIMO and OFDM is a promising wireless access scheme [1]. Quick examples of MIMO-OFDM applications include evolving third-generation (3G) systems called Long-Term Evolution Systems (LTE) and Universal WIMAX Access (WIMAX). The transmission of separate data streams from different antennas in the SM-MIMO system often results in several spatial interactions (named) or interference between antennas. This requires a complex future design to deal with interference. The best detector is the maximum backscale (MAP) detector that provides a uniform output probability value (LR) to the error decoder directly

(VEC). Since the computational complexity of MAP maps and detection of the maximum probability (ml) depends on the number of spatial channels and levels of modulation codes, it has proposed and examined several suboptimal solutions.[8]

II. RELATED WORK

Decomposition is the most important problem in wireless communication. In order to eliminate the harmful effects of fading on radio channels, the well-known scheme used is a combination of diversity techniques. The transmission signal receives several independent fade paths in the future of diversity. These signals are combined to increase the signal-to-noise ratio of the receiving signal. In this work, we propose a new hybrid diversity plan for the Riley, Merk / Egg gradient channel, where M branches merge with the maximum and L branches are dissolved with the same gain. The effectiveness of this hybrid diversity system is assessed by analyzing the system's performance in terms of the probability that the bit error rate will not be available. [4]

Diversity is a powerful technique for managing wireless fading damage. This article presents the types of diversity and techniques of combining different diversity: choice diversity, equal equivalence mix, and maximum ratio mix. Analytical expressions of the signal-to-noise ratio (Schner) and the bit error rate at output are given to combine the maximum ratio of three branches, and the combination of equal gain and selective diversity. It is assumed that these three branches are Riley's obsession with the formation of Pbesk. The signal-to-noise ratio and the bit error rate after selection are measured in the Riley fading channel, and the combination of equal gains and the total maximum ratio is compared with the results of the analysis. [6]

The thesis provides a uniform framework for studying the performance gain of eliminating continuous interference (CES) in low-interference interference networks with arbitrary fade distribution and path loss in the power law. We derive the average number of users who can decrypt continuously and potentially decrypt users. Our results show that in the absence of capacity control, marginal revenues that cause continuous user reception are decreasing rapidly with k, especially in networks with high and low loss rates. On the other hand, CIS is more advantageous when users group around the receiver, or use a very low rate code. [7]

On paper, study the basic limitations of multi-antenna systems in terms of data speed. With M transmitter antennas and receiving antennas M, independent M antennas are created and the same bandwidth is created. This article examines the problem of allocating the maximum data rate of a given bit error rate in a channel between the receiving antenna M and Technology to quit smoking. We analyze the best linear performance. Non-linear reception processor and best linear emitter / A future processor pair, and channel capacity. Results indicate that two M / 2 channels can be configured as a single channel with maximum data rate for each optimal linear processing in the future. Channels up to M can be created either in the non-linear processing of the receiver or in the optimal linear transmission and reception processing with the maximum data rate of a single channel. The results show that large bandwidth problems can occur in systems with limitedbandwidth.[10]

Retrieval of the input signal for the selective fading channel is a major theoretical and practical problem. In this article, we propose several new blind algorithms that use second system statistics directly for direct multi-channel equalization. The algorithm is based on the extraction of the sub-space of the pre-selected block of the channel's circumference matrix. For multi-user systems, user signal separation can be obtained based on partial information of the composite channel response. These equivalence algorithms do not rely on precise separation between the sub-surfaces of signal and noise, and therefore are not sensitive to channel level (or range) error estimation. The credit is reached directly, no channel is selected. In addition, we discuss the equilibrium conditions of these algorithms. [11]

III. PROPOSED WORK

As concurrent wireless systems become more susceptible to interference, as well as the traditional approach to interfering with noise interference in the background, the issue of using advanced interference control techniques to improve system performance has become increasingly attractive. Attention and important solution is the continuous elimination of interference (SIC).

The first signal is best detected instead of the co-detection signals of all the antennas, and their interference is eliminated from the individual signals contained in the SIC receiver. Then, grasp the second best signal, eliminate its interference from the signal rest, and so on. This technique is called the continuous minimal squared error (MS) based on SIC detection:

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Touch style to estimate the icon. A weighted weight matrix returns to a weak spread of error. Sequence detection has a major control over the overall performance of the interference sequence detection regulator.

1 Ratio of signal to noise and interference after command. The first cognition of signals with the highest sinner after detection. Consider the minimum detection of the average square error and the SENER detection after detection.

2 f 1 = 1, the overlap is actually eliminated in the calculation, but if 1 ≠ 1, in this case, since the zero forcing factor which is in case 1 = 1 is used for estimation, the spread of the error is kept.

3 In the previous work, the detection order gave a lot of Control of overall performance to detect the continuous cancellation of the order due to false dissemination due to incorrect decisions. Then we use the signal (signal to interference, noise ratio) detection command. Signals are detected with the highest SENER after detection first

4. After detection of the highest signal, the first relationship between the perceived signal and interference noise. Once the zero-strength matrix weight is used to estimate the value of the CINER, we choose the result layer with the higher SENER. When selecting the second cognitive code, interference from the first cognitive code is rejected by the received signal. Assumption 1 = (that is, the first symbol is rejected first).

Algorithm
MMSE (Minimum Mean Square Error)
SINR: Signal-to Interference-Noise-Ratio
1: for time=1 to simulation time
2: for i=1: N, where N the number of nodes that placed in the network
3 find the signal to noise ratio first and consider mean squared error detection
4: if F1=1 (cancel interference effectively)
5: else condition of 1=1 is used for estimation propagation error is maintained
6 Maintain MMSE Weight Matrix with Error
7: Count Error
8: Remove error by MMSE based SIC technique
9: end
10: end
11: end

IV. RESULTS ANALYSIS

The data obtained at SNR 5 dB were analyzed with MISE technique It is estimated that no convolution BER of 5.312x10 is used-5The BER obtained using the convolution code is obtained5.214x10-6. This means that the more bits are in error. Instead of using the convolution code. Voice based Communication Standard 10-3Indicates a convolution. The code works well in 1.8 dB systems. Based on the performance of these antennas, the simple MIMO-based radio antenna is better than the traditional MIMO-OFDM. Communication Standard 10-3Indicates a convolution The code works well in 1.8 dB systems. Based on the performance of these antennas, the simple MIMO-based radio antenna is better than the traditional MIMO-OFDM.

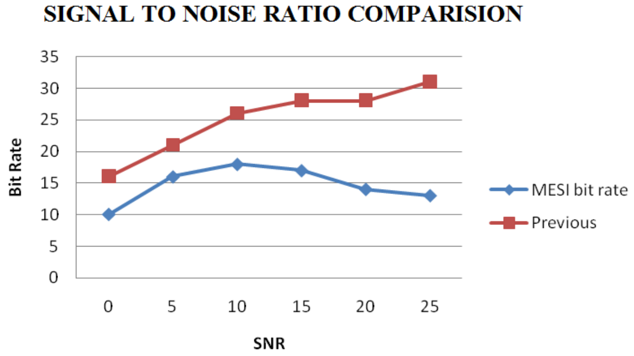

Fig 1 BER Performance in MIMO OFDM 4QM

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SNR	MESI	Previous
0	10	16
5	16	21
10	18	26
15	17	28
20	14	28
25	13	31

Table 1 BER Performance in MIMO OFDM 4QM

V. CONCLUSION

A fading effect detection technique MISE for a multi-user system MIMO SC-FDMA is proposed. Despite the increased complexity of the receiver in the base station, the complexity of the flexible SIC receiver is limited. The solution combines interference cancellation and signal-to-noise reduction. The new receiver that sends the software output has removed the error code to a certain extent. We also study the impact of channel estimation errors on the receiver and obtain the variance threshold. And the system error propagation will severely increase for traditional linearity and the proposed receivers to evaluate performance. The simulation results show that for multi-user SC-FDMA MIMO systems, the iterative technique has superior performance in the BER of traditional linear MMSE receivers.

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