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Performance Analysis in MIMO-OFDM System for 802.11b

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Abstract *— The proposed work is the combination of Multiple input Multiple output (MIMO) and Orthogonal Frequency Division Multiplexing (OFDM) in wireless communication network due to high data rate, multipath propagation, high spectral efficiency and high throughput. It deals with the channel estimation . In this work, the Network based Zonal Information Protocol (ZIP) coded Massive MIMO OFDM was proposed and analyzed through simulation. The performance of ZIP coded and Low Density Parity Check (LDPC) coded Massive MIMO OFDM is analyzed, through Packet Delivery Ratio (PDR), Packet Drop and Latency as performance measured.*

Keywords: Latency, MIMO, OFDM, Packet Drop, PDR, ZIP Code.

I. INTRODUCTION

In wireless technologies the MIMO-OFDM is that the muse for future Evolution (LTE) system, high speed, WLAN802.11 and also for 5G network. The design of the 5G mobile network presents many new challenges not faced by earlier generations of mobile access technology. This is because of the wide range of diverse services 5G will have to support [1]. There is the predicted exponential increase in demand for very high bandwidth connection resulting from video streaming and other high data rate applications. At the same time, the emergence of the internet of things (IOT) will produce a very large number of low speed users. Reconciling these very different types of communication is very challenging and is currently the topic of extensive research [2]–[11]. of many recent wireless communication systems. The many advantages of CP-OFDM include robustness in the presence of multipath transmission, relative insensitivity to timing offsets, compatibility with multiple-input multiple-output (MIMO) systems and the ability to support multiple access in the form of orthogonal frequency division multiple access (OFDMA). The well-known disadvantages of OFDM include high out-of-band (OOB) power, sensitivity to frequency offset, and high peak-to-average power ratio (PAPR) [12], [13].

To reduce the time and improve the accuracy of the channel estimation [14] New Adaptive Purist (NAMP) reconstruction algorithm for sparse multipath channel estimation, [15] and the Iterative decision-directed based Channel estimation algorithm has been used and shown better performance compared to traditional channel estimation. To analysis performance of the system [16] Sub-Spaced Blind channel estimation algorithm was used and Normalized mean-square error (NMSE) were estimated. This work proposes the Network ZIP code and algorithm used for the MIMO-OFDM system. Here, ZIP code is proposed thanks to the zero costing. The simulation result's is analyzed with LDPC coded MIMO-OFDM system. In section II, III MIMO-OFDM system model for proposed work is presented and shows the workflow for it. Then, Simulation parameters, Simulation results and Conclusion are given in Section IV, V and VI respectively.

II. SYSTEM MODEL

We novel network code proposed a fresh design scheme of training sequence in time domain to conduct channel estimation. Training sequences of assorted transmit antennas can be easily obtained by truncating the circular extension of 1 preparation sequence, and the pilot matrix are assembled by these training sequences in one circular matrix with good channel code reversibility. An eigenmode transmission was given to this method, and data symbols encoded by space-time codes and can be steered to those eigenmode that are identical as MIMO wireless communication systems with single-carrier transmission. At the same time, an improved water-filling scheme is described for determining the optimal transmit powers for orthogonal eigenmode. The classical water-filling strategy is adopted to find out the optimal power allocation and correspondent bit numbers for every eigenmode, and residual power reallocation to work and additional bit numbers carried by every eigenmode. Compared with conventional water-filling schemes, it should also obtain larger throughput via residual power allocation.

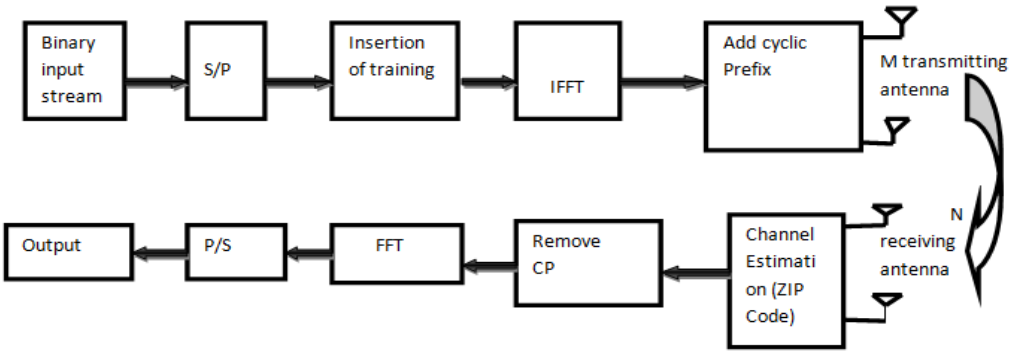

Fig- 1: BLOCK DIAGRAM OF MIMO-OFDM SYSTEM

The proposed work consists of the input in binary stream where serial to parallel converter is used and the node is created for the input data. Then, IFFT is used to convert the data from the frequency domain to time domain and the cyclic prefix is added before the information are transmitted. Then, the information is passed through the channel where Network based ZIP code is used where the frequency is compressed depending upon the amount data transmitted through the node to avoid the space loss in the channel. Now, after passing through the channel the cyclic prefix is removed and the information is converted from time domain to frequency by using FFT and converted from parallel to serial before receiving the output. Then the performance metrics will be analyzed.

III. PROPOSED WORKFLOW

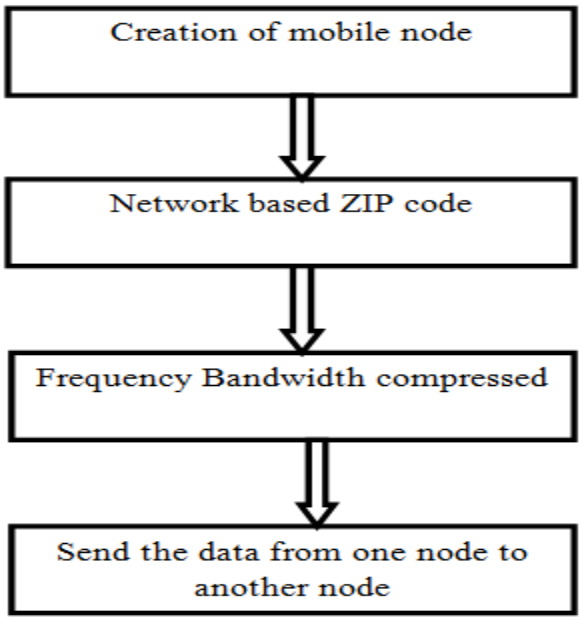

Fig- 2: PROPOSED WORKFLOW

Initially, the node is created. Due to Zero costing ZIP code is used in this system. In this Frequency and Bandwidth is compressed based upon the channel. Then the information is transmitted from one node to another node and performance metrics are analyzed.

IV. SIMULATION PARAMETERS

Table-1: Simulation Parameters

Channel Type	Channel/Wireless Channel
Radio-Propagation Model	Model Propagation/Two Ray Ground
Network Interface Type	Phy/Wireless phy
MAC Type	Mac/802_11
Link Layer	LL
Antenna Model	Antenna/Omni antenna
Max Packet In Ifq	500
Number Of Mobile Nodes	33
Routing Protocol	AODMV
X Dimension Of Topography	1300
Y Dimension Of Topography	1000
Time Of Simulation End	25ms

V. RESULTS AND DISCUSSIONS

By using Network Simulator (NS2), the performance of this proposed work was analyzed. Here, Network Animator (Nam) window is used to examine the concept and to view node creation, data transmission and graphical interference. The performance of the proposed work is analyzed by using NS2 tool. By using Nam window, the results are generated for following specification: Packet Delivery Ratio (PDR), Packet Drop and Throughput. The main objective of this work is to analyze the performance of the system. Initially, "Fig-3" the creation node for the channel was created.

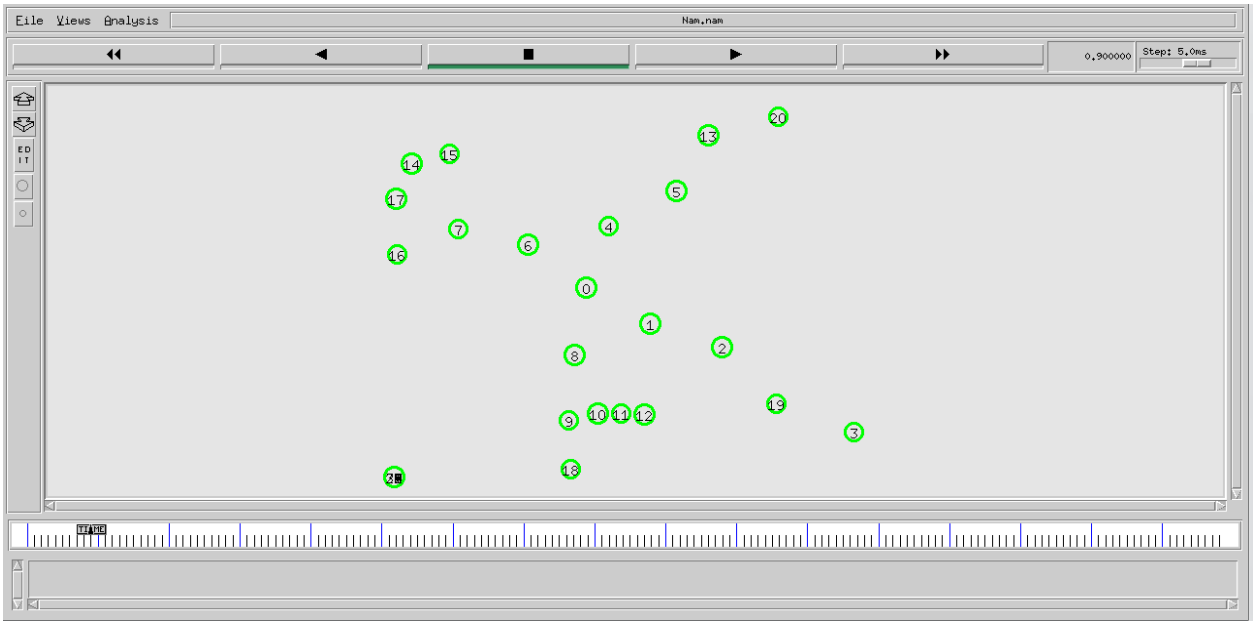

Fig-3: Creation of Nodes

In "Fig-4" in this link layer is used to transmit the data from one node to another node and possibly correct the error that occurs. Ad-hoc On-demand Multipath Distance Vector (AOMDV) was used to find the multiple path while transmitting the information from one node to another node in case of route failure occurs and also determine the shortest path for transmitting.

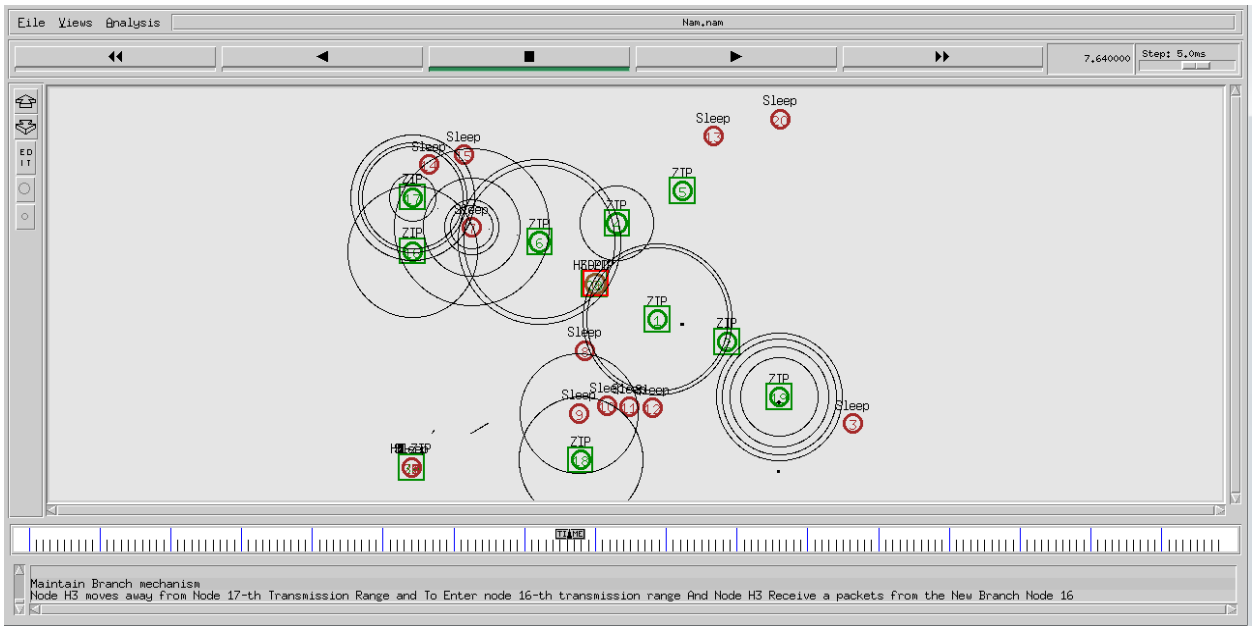

Fig-4: Data Transmission

Packet Delivery Ratio (PDR) is the total amount of packet reached to its destination. The PDR should be high for good communication channel. In "Fig-5"the proposed system (ZIP Code) it attains sustainability at 75.00 packets in 5.000ms while LDPC coded system attains sustainability at 95.00 in 5.000 ms.

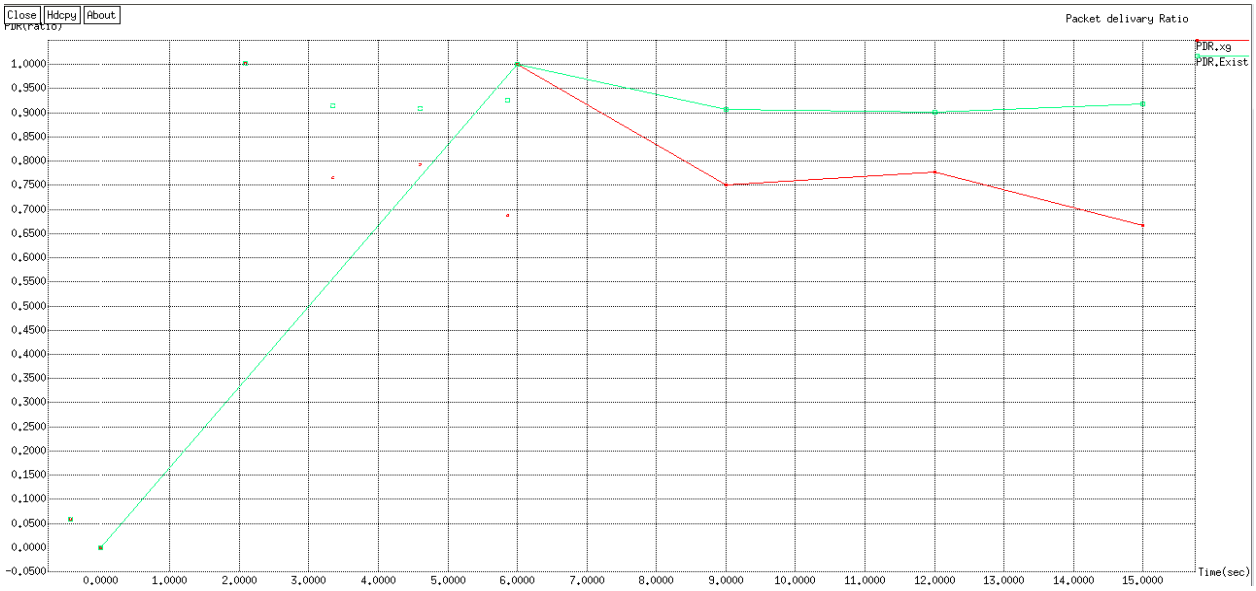

Fig-5: Packet Delivery Ratio (PDR)

The total amount packet fail to reach its destination is called packet drop. In "Fig-6" the existing system, the LDPC code the total number of packet loss is 27.00packet while in proposed system, ZIP code the total packet loss is 9.000packets in 15.000ms.

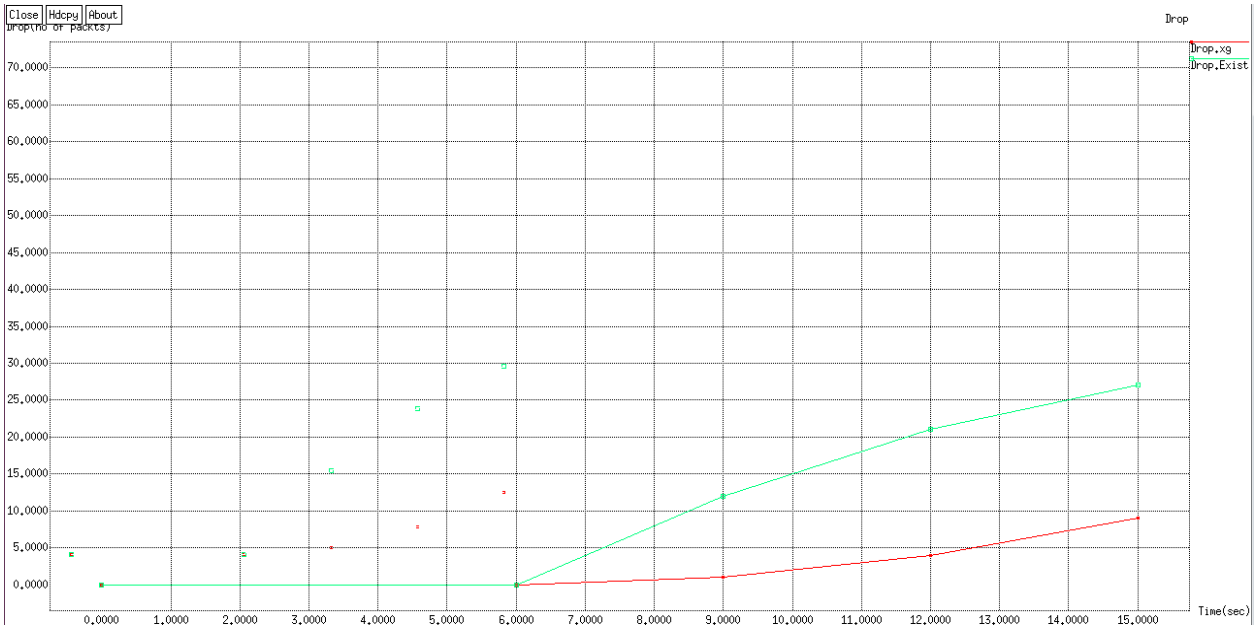

Fig-6: Packet Drop

For good communication channel the throughput should be maximum. A comparison is made with LDPC coded and ZIP coded system. In LDPC coded system the throughput is 25.000kb/s while in ZIP coded system the throughput is 28.000kb/s. So the "Fig-7" shows that the proposed method has maximum throughput.

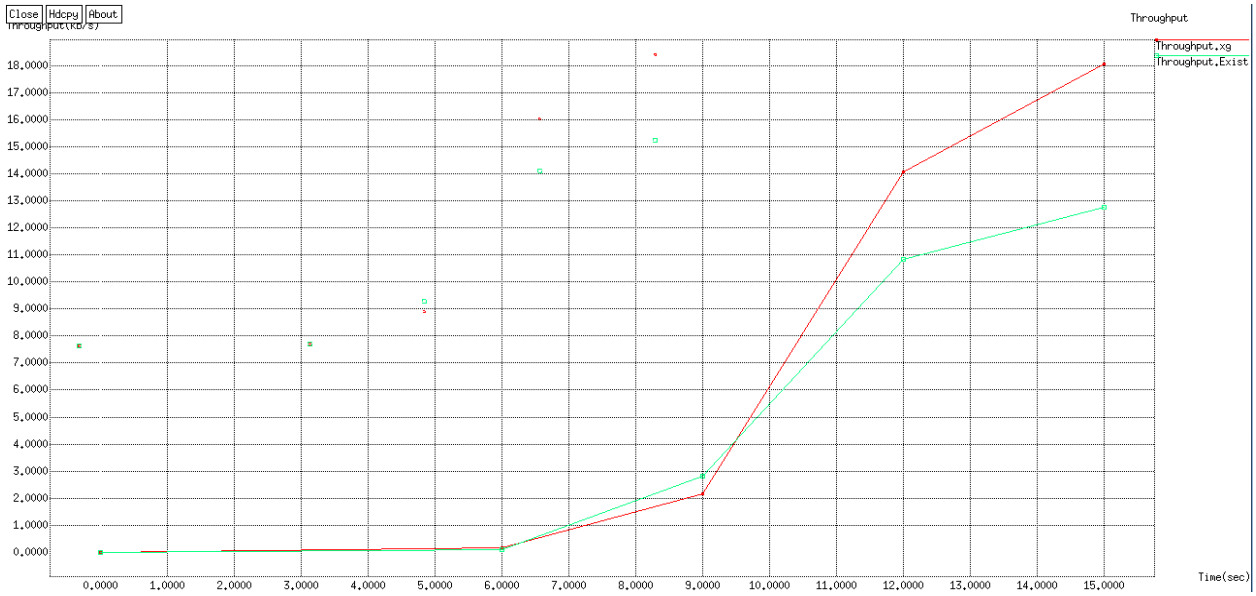

Fig-7: Throughput

VI. CONCLUSION

By smartly using the spectrum, the scarcity of a spectrum problem and the congestion through the information of data traffic in network can be minimized in very sophisticated manner. An Orthogonal Frequency Division Multiplexing (OFDM) is an reliable and authentic transmission system for the CR system which provides us with a great amount of flexibility to completely utilize the spectrum in the active mode. Dynamically using the available spectrum resources is the highlight of the paper when we think of an about efficient communication module there are various parameters which must accounting. This paper presents a MIMO-OFDM structure in the cognitive radio scenario, the performance of proposed the system is evaluated on the premise of the Packet Delivery Ratio (PDR), Packet Drop and the throughput.

REFERENCE

[1] M. Shafi, A. F. Molisch, P. J. Smith, T. Haustein, P. Zhu, P. Silva, F. Tufvesson, A. Benjebbour, and G. Wunder, ‘‘5G: A tutorial overview of standards, trials, challenges, deployment, and practice,’’ IEEE J. Sel. Areas Commun., vol. 35, no. 6, pp. 1201–1221, Jun.(2017).

[2] P. Banelli, S. Buzzi, G. Colavolpe, A. Modenini, F. Rusek, and A. Ugolini, ‘‘Modulation formats and waveforms for 5G networks: Who will be the heir of OFDM?: An overview of alternative modulation schemes for improved spectral efficiency,’’ IEEE Signal Process. Mag., vol. 31, no. 6, pp. 80–93, Nov. (2014).

[3] Z. E. Ankarali, B. Peköz, and H. Arslan, ‘‘Flexible radio access beyond 5G: A future projection on waveform, numerology, and frame design principles,’’ IEEE Access, vol. 5, pp. 18295–18309, (2017).

[4] Q. Bodinier, F. Bader, and J. Palicot, ‘‘On spectral coexistence of CPOFDM and FB-MC waveforms in 5G networks,’’ IEEE Access, vol. 5, pp. 13883–13900, (2017).

[5] A. Ijaz, L. Zhang, M. Grau, A. Mohamed, S. Vural, A. U. Quddus, M. A. Imran, C. H. Foh, and R. Tafazolli, ‘‘Enabling massive IoT in 5G and beyond systems: PHY radio frame design considerations,’’ IEEE Access, vol. 4, pp. 3322–3339, (2016).

[6] Y. Medjahdi, S. Traverso, R. Gerzaguet, H. Shaiek, R. Zayani, D. Demmer, R. Zakaria, J.-B. Doré, M. B. Mabrouk, and D. Le Ruyet, ‘‘On the road to 5G: Comparative study of physical layer in MTC context,’’ IEEE Access, vol. 5, pp. 26556–26581, (2017).

[7] N. Michailow, M. Matthé, I. S. Gaspar, A. N. Caldevilla, L. L. Mendes, A. Festag, and G. Fettweis, ‘‘Generalized frequency division multiplexing for 5th generation cellular networks,’’ IEEE Trans. Commun., vol. 62, no. 9, pp. 3045–3061, Sep. (2014).

[8] G. Fettweis, M. Krondorf, and S. Bittner, ‘‘GFDM—Generalized frequency division multiplexing,’’ in Proc. IEEE 69th Veh. Technol. Conf., Apr. (2009), pp. 1–4.

[9] S. Premnath, D. Wasden, S. K. Kasera, N. Patwari, and B. FarhangBoroujeny, ‘‘Beyond OFDM: Best-effort dynamic spectrum access using filterbank multicarrier,’’ IEEE/ACM Trans. Netw., vol. 21, no. 3, pp. 869–882, Jun. (2013).

[10] F. Schaich and T. Wild, ‘‘Waveform contenders for 5G—OFDM vs. FBMC vs. UFMC,’’ in Proc. 6th Int. Symp. Commun., Control Signal Process. (ISCCSP), (2014), pp. 457–460.

[11] B. Farhang-Boroujeny and H. Moradi, ‘‘OFDM inspired waveforms for 5G,’’ IEEE Commun. Surveys Tuts., vol. 18, no. 4, pp. 2474–2492, 4th Quart., (2016).
[12] J. Armstrong, ‘‘OFDM for optical communications,’’ J. Lightw. Technol., vol. 27, no. 3, pp. 189–204, Feb. 1, (2009).
[13] T. Jiang and Y. Wu, ‘‘An overview: Peak-to-average power ratio reduction techniques for OFDM signals,’’ IEEE Trans. Broadcast., vol. 54, no. 2, pp. 257–268, Jun.(2000).
[14] Yuvan Huang, Yigang He, QiwuLuo, Luqiang Shi, Yuting Wu. “Channel Estimation in MIMO-OFDM Systems based on a new adaptive greedy algorithm” (2018).

[15] Wenjie Zhang, Hui Li, Bin Li “Iterative Decision-Directed Channel Estimation for MIMO-OFDM System”, 2nd IEEE International Conference On Computer and Communications (2016).
[16] Shih-Hao Fang, Ju-Ya Chen, Jing-Shium Lin, Ming-Der Shieh and Jen –Yuan Hsu “Subspaced-based Blind Channel Estimation for MIMO-OFDM Systems with New Signal Permutation Method”, 978-1-4799-4482-8/14/$31.00@2014 IEEE (2014)..
[17] M.A.Ahmed, S.A.Jimaa and I.Y.Abualhaol. “Enhanced Channel Estimation Technique in MIMO-OFDM System”, Third International Workshop on the Performance Enhancement in MIMO OFDM Systems (2012).
[18] Enqing Chen, Xiaoqiang Xiaomin Mu “Channel Estimationfor MIMO-OFDM Systems Based on Subspace Pursuit Algorithm”978-1-4673-5762-3/13/$31.00@2013 IEEE (2013).