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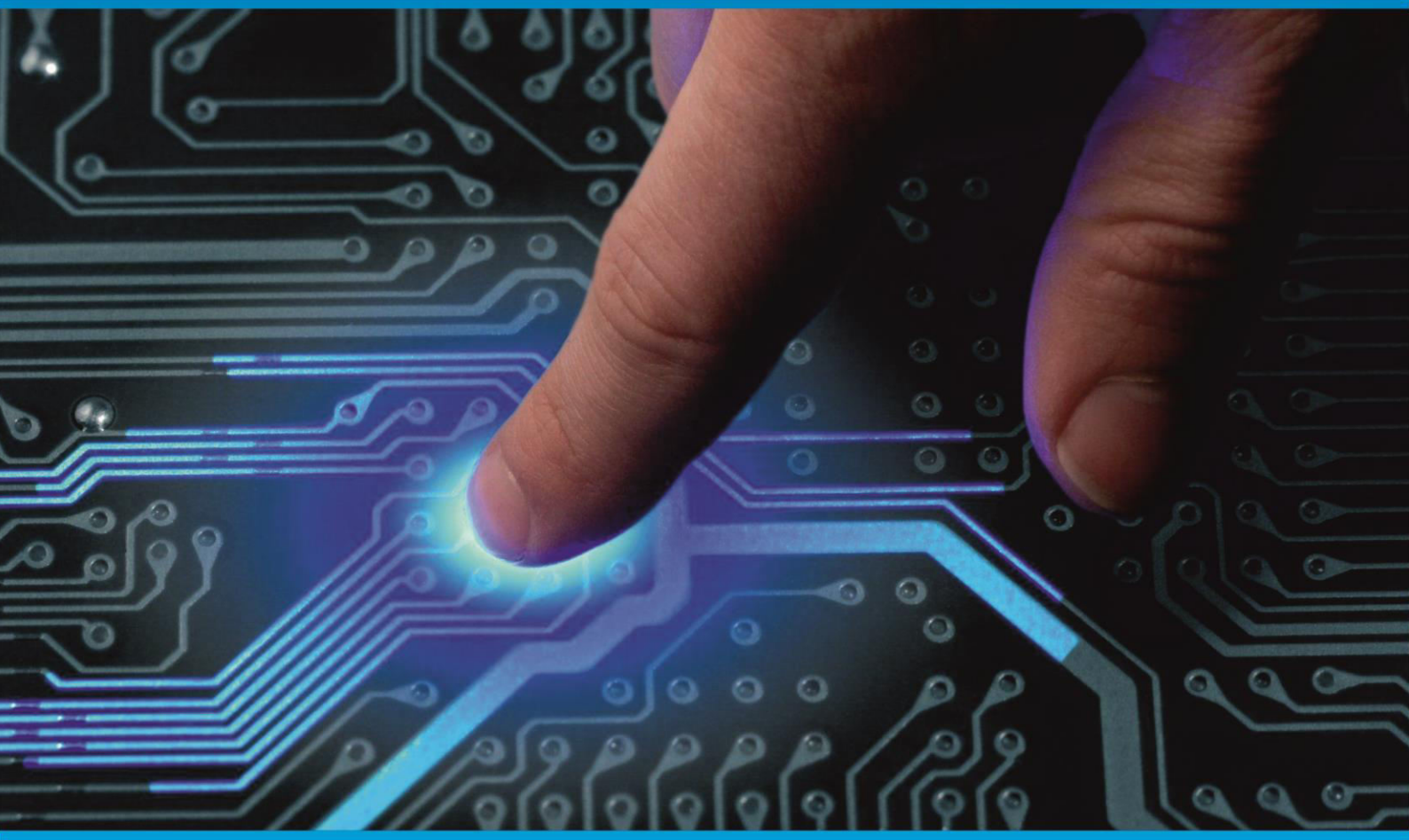

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MC-CDMA System Networks over Fading Channels with AWGN Noise

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ABSTRACT: The main purpose of this project is to improve the effect of channel fading in wireless networks effectively, to overcome fading impairment with an Multiple access technique . For this project we use the CDMA technique. CDMA schemes have been consider as attractive multiple access schemes of wireless system. MC-CDMA scheme has became a promising access technique for Future Generations. And also In this project we consider the Rayleigh fading channel, To transmit the MC-CDMA signal through the Rayleigh fading channel along with AWGN noise, to get the receive signal with less amount of noise and also from the received signal we should calculate the PAPR. The PAPR should also reduced in the received signal.

KEYWORDS: Reduced PAPR ,eliminate ISI,reduced doppler spread and delay spread.

I. INTRODUCTION

Code-division multiple access (CDMA) schemes have been considered as attractive multiple access schemes in both second-generation (2G) and third-generation (3G) wireless systemsThe evolution from 2G to3G corresponds to adapting a new air interface.change of focus from voice to multimedia CDMA is a spreadspectrum technique that uses neither frequency not time slots.CDMA is a multiplexing technique where a number of users simultaneously and asynchronously access a channel by modulating and spread their information-bearing signals MC-CDMA is sometimes also called “CDMA-OFDM”.MC-CDMA is a form of frequency diversity. Each bit is transmitted simultaneously on many different subcarriersMC-CDMA replaces this encoder by an NxN matrix operation and results reveal an improved BER.MC-CDMA applies spreading sequences in frequency domain. The original information becomes spreaded in frequency domain directly.
After this spreading, the highly successful OFDM Transmitter structure is borrowed

II. RELATED WORK

In [2] authors used "Performance Analysis of V-Blast Encoded MIMO MC-CDMA Wireless Communication System in Encrypted Color Image Transmission" In this paper, a comprehensive simulation study for the performance evaluation is undertaken of V-Blast encoded MIMO MC-CDMA wireless communication system in encrypted Color Image Transmission. The 4 ×4 multi-antenna configured simulated system under investigation incorporates a combination of Minimum Mean Square Error (MMSE) and Zero-Forcing (ZF) signal detection techniques under different digital modulation schemes (BPSK, QPSK, and 16QAM). MATLAB based simulation study shows that VBlast encoded system is very much robust and effective in retrieving encrypted color image under the utilization of ZF and MMSE signal detection and 16QAM digital modulation schemes. in [3]. Authors used an. Performance Improvement of MIMO MC- CDMA System Using Relay and ITBF In the wireless communication the Inter Symbol Interference (ISI) is a major barrier caused by multipath fading which has a strong negative impact on Bit Error Rate (BER) and affects the high

speed data transmission over the wireless channel. In [4] Iterative Invertible Clipping Method for PAPR Reduction in Wireless MC-CDMA Communication Systems. Water filling algorithm (WFA) is an efficient resource allocation algorithm to solve the power utilisation problems among the subcarriers in time-dispersive channels. The conventional WFA fails to consider the effect of CFO. for high-quality multimedia transmission in the presence of CFO and imperfect channel state information conditions.

In [5] authors The Road to Multi-Carrier CDMA We take a look at the basic techniques of Frequency division Multiple Access (FDMA) and Time Division Multiple Access (TDMA) and explain the two schemes Orthogonal Frequency Division Multiplexing (OFDM) and Direct Sequence CDMA (DS-CDMA), the merger of which has led to MC-CDMA. Finally, a comparison is presented between the three proposed MC-CDMA techniques and their

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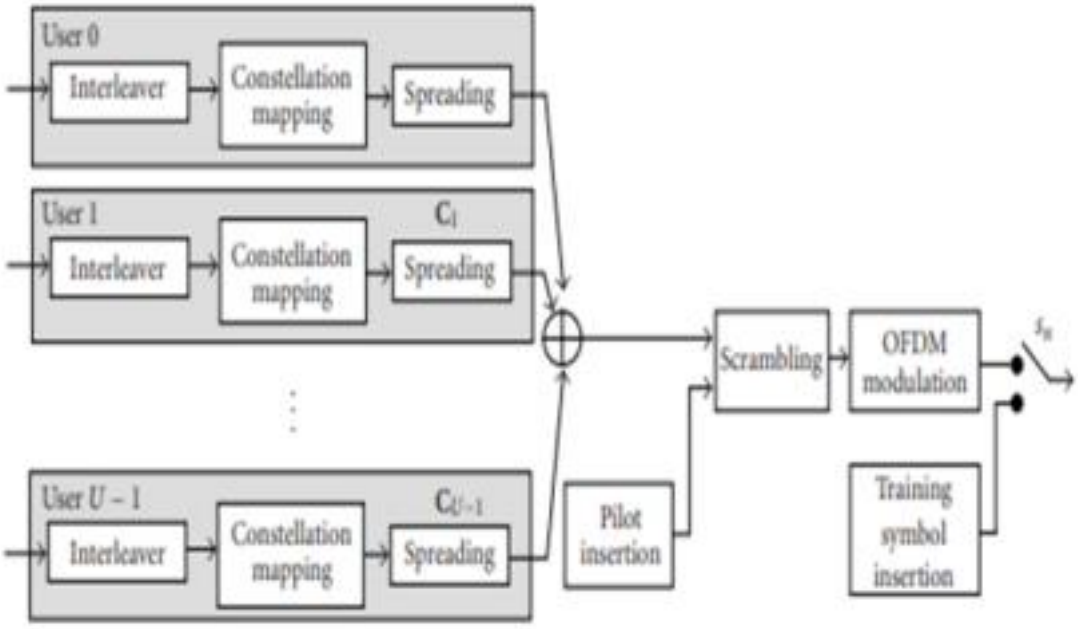
predecessor DS-CDMA and the superiority of MC-CDMA is exhibited through the simulation graphs of Bit Error Rate (BER) Vs Signal to Noise Ratio (SNR) for MC-CDMA and DS-CDMA when serving multiple users.

II. PROPOSED ALGORITHM

The acquisition of synchronization parameters such as coarse symbol boundary detection and fine frequency offset estimation in the time domain as well as coarse frequency offset acquisition and fine symbol boundary detection in the frequency domain are activated as soon as the receiver starts up. Afterwards, only the tracking mechanism using the joint WLS estimation continues to work and compensate for the residual synchronization errors. In the following, we will describe them in detail. 4.1. Time-domain synchronization Multicarrier signals are well known to be very sensitive to synchronization errors such as carrier frequency offset, timing frequency/phase offset, and symbol boundary slipping. Therefore, we implement all synchronization compensation tasks in the time domain, that is, before the signal enters the FFT.



MC-CDMA PROPOSED BLOCK DIAGRAM

Otherwise, ICI AND MAI will contaminate the signal and the receiver will have a hard time eliminating them in the frequency domain. As a result the receiver uses a time domain interpolator for timing frequency offset compensation and a phase detector for carrier frequency offset cancellation.

Frequency-domain synchronization

After the receiver has determined the symbol boundary, cyclic prefix is stripped off and the received signal is transformed to the frequency domain by the FFT module.Denote the frequency-domain signal Zk, where k is the subcarrier index. Since the fractional frequency offset has been properly compensated by the phase derotator in the first part, ICI is kept to an acceptable level. The remaining integer frequency offset I causes the frequency-domain signal to have shifted subcarrier indices. Note that the even-numbered frequency-domain subcarriers of a training symbol are differentially encoded by a PN sequence of length L [15], that is, A2kA∗ 2k+2 = Ck

Channel estimation

As in traditional multicarrier systems, every subcarrier in the MC-CDMA systems suffers flat fading that can be rectified by a simple one-tap equalizer. In the proposed MC-CDMA system, both the training symbols and the pilot subcarriers can be used to acquire estimation of frequency-domain channel gain.

Detection In an MC-CDMA system, the signal corresponding to a user's data spreads over several subcarriers and must be equalized and combined. Among single-user detection techniques, the optimal maximum likelihood detector has been shown to have a complexity that grows exponentially with the number of users [2]. This disadvantage leads to the

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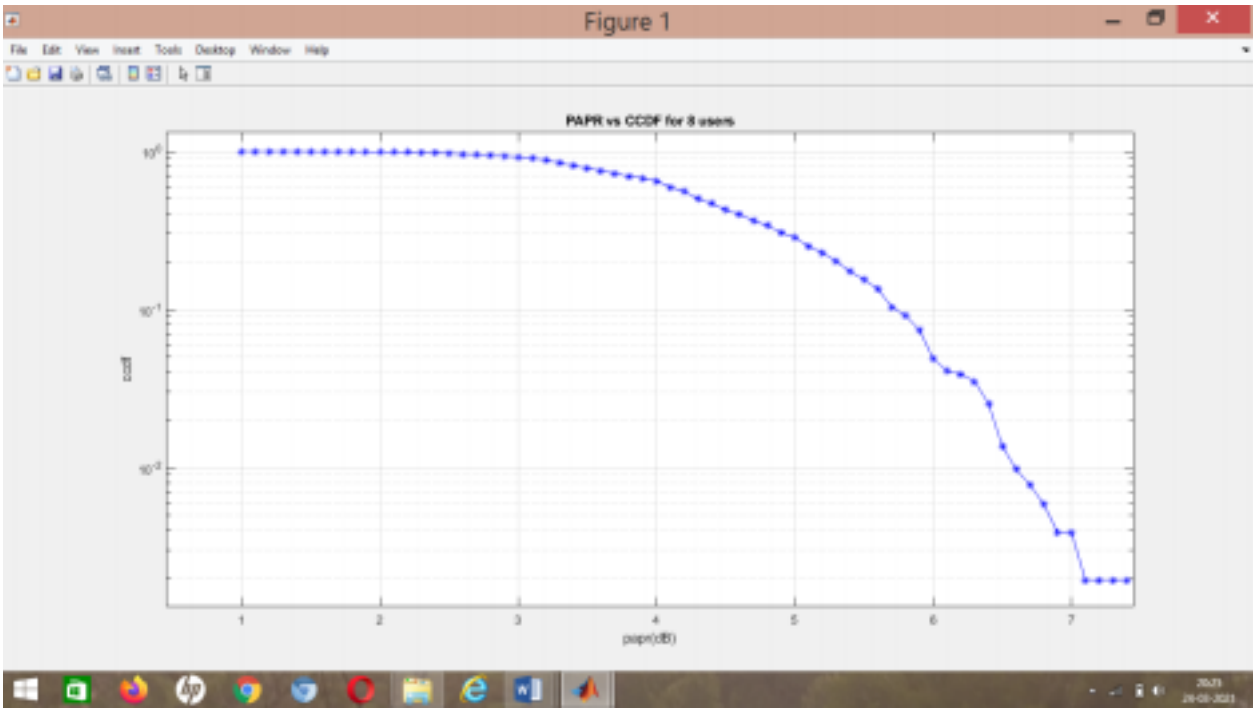
consideration of suboptimal techniques,such as orthogonality restoring combining (ORC), equal-gain combining (EGC), maximum ratio combining (MRC), threshold orthogonality restoring combining(TORC), and minimum mean squared error combining (MMSEC). eq. (3)

PSEUDO CODE

Step 1: Start the program.
step 2:Declare the parameters FFT,OFDM.
step 3:Set the number of users.
step 4:Set the number of data sub-carriers.
step 5:Generating data for users after spreading then take IFFT.
step 6:Append cyclic prefix for users.
step 7: Adding data for Transmission of all users.
step 8:Create Rayleigh Fading Channel.
step 9:Addition of AWGN Noise.
step 10:end.

III. SIMULATION RESULTS

1.In the Proposed method, PAPR of the Multicarrier Code Division Multiple Access (MC- CDMA)signals is done on Rayleigh fading channel with AWGN noise..Analysed and implemented using MATLAB. Simulation results for various numbers of users are analysed by evaluating complementary cumulative distribution function(CCDF) &PAPR which show the substantial reduction in PAPR of the MC CDMA signal. The MC CDMA signal is implemented using MATLAB g with the following specifications number of symbols are 512,IFFT size is 128 and number of subcarries are 64 spreading codes is Pseudo noise(PN codes).The Complementary Cumulative Distribution Function(CCDF) Iis one of the most regularly used parameters, which is used to measure the efficiency of PAPR techniques. Thios simulation results are shown in below.



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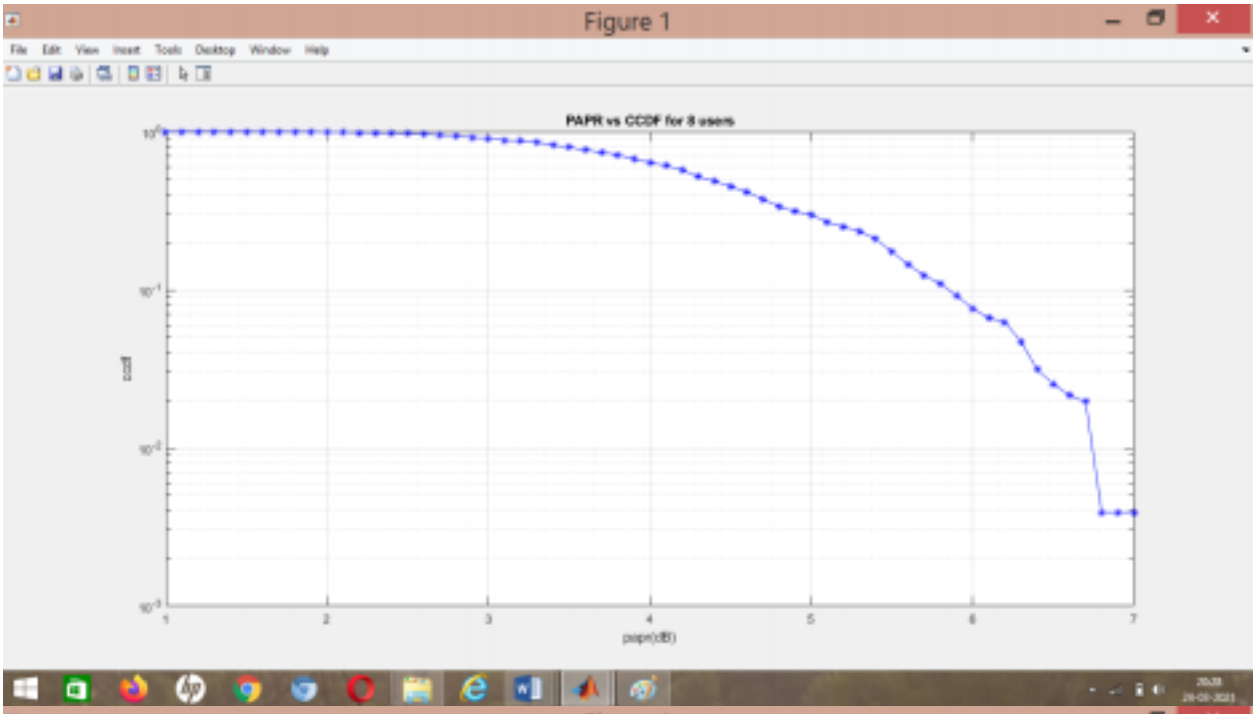
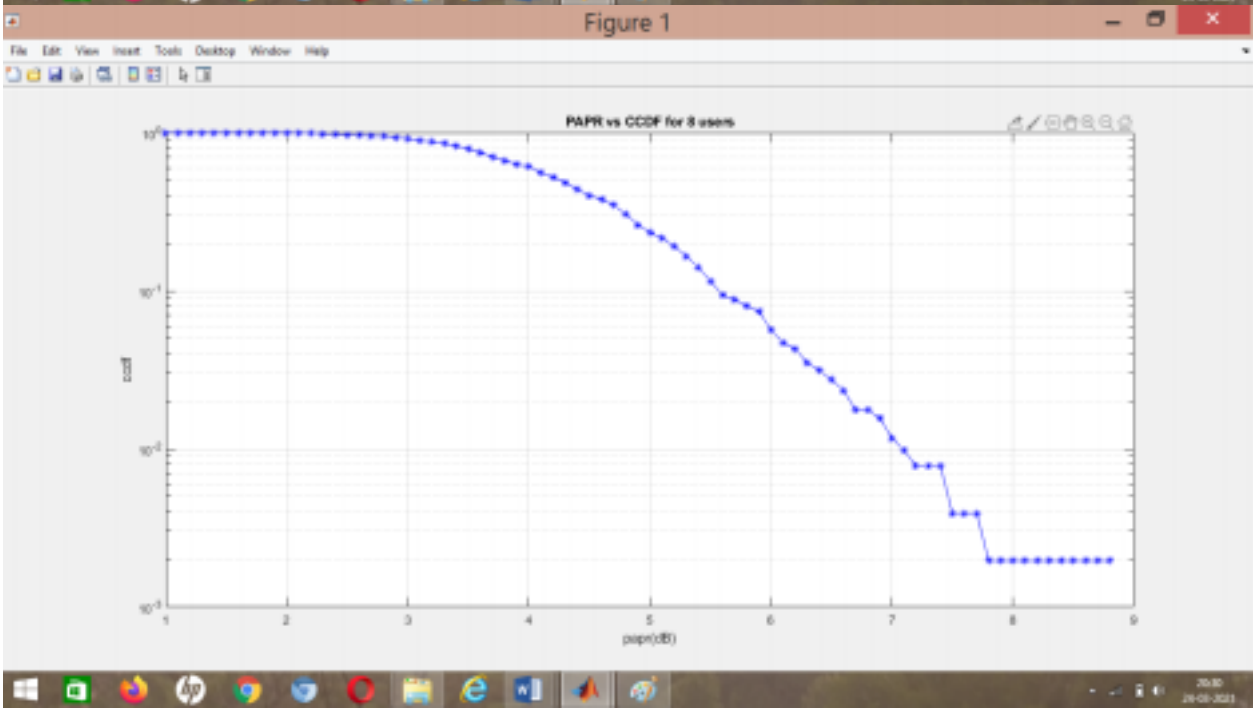
1.PAPR VS CCDF FOR 8 USERS





2.PAPR VS CCDF FOR 16 USERS 3.PAPR VS CCDF FOR 32 USERS

IV. CONCLUSION AND FUTURE WORK

The simulation results showed that the proposed MC CDEMA is used to combat channel distortion,and improves the spectral efficiency,high data rate,robust against multipath fading.MC-CDMA is an important multiple access technique for wireless communication systems.In this project we reduced the PAPR for various number of users performs better PAPRthan the maximum number of users and thus performance get improved and also we reduce the noises by using

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AWGN Noise.IN Future scope we use some other channel with other internal noises for reduce some amount of noises.Some recommendations on possible future work shall now be highlighted as follows. Throughout this thesis, perfect synchronization was assumed, which generally does not apply in practice,
particularly in the uplink. Investigating effects of lack of synchronization might be a worthwhile future work. In this thesis, knowledge of channel impulse response (CIR) at the receiver was assumed. As an extension of this work, effect of imperfect knowledge of CIR may be considered.
For the multi-carrier transmission, this thesis assumed fixed number of sub-carriers. A consideration of the effect of number of sub-carriers on the system performance might be a useful future work.

REFERENCES

[1]R. Cochetti, ‘‘Low Earth Orbit (Leo) Mobile Satellite Communications Systems,’’ In Linear Networks And Systems, 1st Ed. Boston, Ma, Usa: World Scientific, 2014, Pp. 119–156.
[2] J. Foust, ‘‘Spacex’s Space-Internet Woes: Despite Technical Glitches, The Company Plans To Launch The First Of Nearly 12,000 Satellites In 2019,’’Ieee Spectr., Vol. 56, No. 1, Pp. 50–51, Jan. 2019.
[3] B. Chapman, S. Hensley, Y. Lou, B. Hawkins, R. Muellerschoen, And T. Michel, ‘‘Analysis Of Multi-Aspect And Fully Polarimetric L-Band Sar Data From Uavsar Over Spacex Rocket Debris Site,’’ In Proc. Igarss. Conf., Jul. 2017, Pp. 3294–3296.
[4] J. Radtke, C. Kebschull, And E. Stoll, ‘‘Interactions Of The Space Debris Environment With Mega Constellations—Using The Example Of The Oneweb Constellation,’’ Acta Astronaut., Vol. 131, No. 2, Pp. 55–68, Feb. 2017.
[5] B. Vucetic And J. Du, ‘‘Channel Modeling And Simulation In Satellite Mobile Communication Systems,’’ Ieee J. Sel. Areas Commun., Vol. 10, No. 8, Pp. 1209–1218, Oct. 1992. Hocine Merah, Mokhtaria Mesri, Yacine Merrad, Larbi Talbi. (2019) Iterative Invertible Clipping
[6]Method For Papr Reduction In Wireless Mc-Cdma Communication Systems. International Journal Of Sensors, Wireless Communications And Control 9:3, Pages 372-387.

BIOGRAPHY

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