

List of Abbreviations

AMC	Adaptive Modulation and Coding
AWGN	Additive White Gaussian Noise
BPSK	Bipolar Phase Shift Keying
BER	Bit Error Rate
BS	Base Station
CDMA	Code Division Multiple Access
CFO	Carrier Frequency Offset
CIR	Channel Impulse Response
CP	Cyclic Prefix
DAB	Digital Audio Broadcasting
DFT	Discrete Fourier Transform
DL	Downlink
DPSK	Differential Phase Shift Keying
DVB	Digital Video Broadcasting
EDGE	Enhanced Data Rate for Global Evolution
FDD	Frequency Division Duplexing
FDM	Frequency Division Multiplexing
FEC	Forward Error Correction
FFT	Fast Fourier Transform
GPRS	General Packet Radio Services
GSM	Global System for Mobile Communications
ICI	Inter-Carrier Interference
IDFT	Inverse Discrete Fourier Transform
IEEE	Institute of Electrical and Electronics Engineers
IFFT	Inverse Fast Fourier Transform
ISI	Inter Symbol Interference
ITU	International Telecommunication Union
LTE	Long Term Evolution

MAI	Multiple Access Interferences
MBSFN	Multicast/Broadcast over a Single Frequency Network
MIMO	Multi-Input Multi-output
ML	Maximum Likelihood
MSE	Mean Square Error
MSE-OFDM	Multiple Symbol Encapsulated Orthogonal Frequency Division Multiplexing
OFDM	Orthogonal Frequency Division Multiplexing
OFDMA	Orthogonal Frequency Division Multiple Access
PSK	Phase Shift Keying
PAPR	Peak to Average Power Ratio
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase-Shift Keying
SDR	Software Defined Radio
SFC	Space-Frequency Coding
SNR	Signal to Noise Ratio
SS	Subscriber Station
STC	Space-Time Coding
SUI	Stanford University Interim
S-OFDMA	Scalable Orthogonal Frequency Division Multiple Access
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
UL	Uplink
UMTS	Universal Mobile Telecommunications Services
Wi-MAX	Worldwide Interoperability Microwave access
WLAN	Wireless Local Area Network
WMAN	Wireless Metropolitan Area Networks
2G	Second Generation
3G	Third Generation
4G	Fourth Generation

List of Symbols

B	number of groups in one time frame of MSE-OFDMA
$b_{k,g}(n)$	input data symbols of k-th user of g-th group
$c_k(l)$	spreading code
Δf	subcarrier spacing of OFDM signal
Δk	relative carrier frequency offset
Δn	relative symbol timing offset
ε	carrier frequency offset
E_b	bit energy
E_s	symbol energy
$E[:]$	expectation operator
F	IDFT matrix
H	channel matrix
K	number of users
M	number of OFDM symbols in one MSE-OFDM frame
N	order of FFT/IFFT
N_{cp}	length of CP
N_d	number of data rates
N_k	number of subcarriers for k-th user
N_o	noise variance
N_t	number of transmit antennas
N_r	number of receive antennas
N_{os}	number of OFDM symbols in one time slot
N_s	number of time slots of duration
η_f	frame efficiency
P_e	probability of error
P_s	signal power
\tilde{r}_1^{FEQ}	equalized received signal

R_c	chip rate
R_k	data rate of user k
σ_{ICI}^2	variance of ICI
σ_{ISI}^2	variance of ISI
S_f	spreading factor
T	OFDM symbol duration
T_g	time slot duration
T_{pre}	preamble duration
T_{N_s}	time slots
T_F	frame duration
T_{sym}	OFDM symbol period including CP
T_c	chip duration
T_p	guard period duration
T_{sym}	OFDM symbol period including CP
T_{cp}	cyclic prefix duration
θ_k	random carrier phase
w_m	m -th subcarrier frequency
w_c	radio frequency
$w(n)$	additive white Gaussian noise (AWGN)

List of Figures

- Fig 2.1.1: Block Diagram of transmitter and receiver of an OFDM System
- Fig.2.1.2: Concept of spreading and modulation for an MC-CDMA Transmitter
- Fig.2.1.3: Demodulation and despreading in an MC-CDMA Receiver
- Fig.2.1.4: Schematic of an MC-DS-CDMA Transmitter
- Fig.2.1.5: An MC-DS-CDMA Receiver
- Fig.2.5.1 CP-reduced MSE-OFDM
- Fig.2.5.2 FFT-reduced MSE-OFDM
- Fig.2.5.3 Transmitter of MSE-OFDM
- Fig.2.5.4 Receiver of MSE-OFDM
- Fig 3.2.1 Transmitter of TD-MC-CDMA for users of group 'g' in the downlink
- Fig.3.2.2 Receiver of TD-MC-CDMA for downlink
- Fig 3.2.3 The frame structure for downlink of a TD-MC-CDMA system
- Fig.3.2.3 BER performance for the proposed scheme for different modulation schemes in AWGN channel
- Fig.3.2.4 BER performance of the TD-MC-CDMA multiple access system in downlink for a data rate of 8 kbps for 16 users in AWGN channel
- Fig.3.2.5 BER performance of the TD-MC-CDMA multiple access system in downlink for a data rate of 8 kbps
- Fig.3.2.6 BER performance of the TD-MC-CDMA multiple access system in downlink for a data rate of 10 Mbps
- Fig.3.2.7 Average BER performance of the TD-MC-CDMA multiple access system in downlink
- Fig.3.3.1 Transmitter of TD-MC-CDMA in the uplink for users of group 'g'
- Fig.3.3.2 Reception and Despreading arrangement at the uplink receiver (BS)
- Fig.3.3.3 Frame Structure in uplink of TD-MC-CDMA
- Fig.3.3.4 BER performance of the TD-MC-CDMA multiple access system for uplink at a data rate of 8 kbps

- Fig.3.3.5 BER performance of the TD-MC-CDMA multiple access system in uplink for a data rate of 10 Mbps
- Fig.3.3.6 Average BER performance of the TD-MC-CDMA multiple access system in uplink
- Fig.3.4.1 The proposed frame structure for 4G applications
- Fig.3.4.2 BER performance of OFDMA and TD-MC-CDMA multiple access system in downlink for a data rate of 8 kbps for 16 users
- Fig.4.2.1 Transmitter of FFT-reduced MSE-OFDM
- Fig.4.2.2 Receiver of FFT-reduced MSE-OFDM
- Fig.4.3.1 Transmitter of MSE-OFDM indicating major signal processing blocks
- Fig.4.3.2 Receiver of MSE-OFDM highlighting the signal processing aspects
- Fig.4.3.3 BER for MSE-OFDM system with frequency offset in fading channel
- Fig.4.3.4 BER for CP-reduced MSE-OFDM system in fading channel for different values of frequency offset
- Fig.4.3.5 BER for MSE-OFDM system with timing offset in fading channel
- Fig.4.3.6 BER for MSE-OFDM system in fading channel for different values of timing offset
- Fig.4.3.7 BER for CP-reduced MSE-OFDM system with frequency and timing offset in multipath fading channel
- Fig.4.4.1 BER for MSE-OFDM system with joint estimation of channel and frequency offset
- Fig.5.3.1 A typical block schematic of MSE-OFDMA Transmitter for downlink
- Fig. 5.3.2 A typical frame structure of MSE-OFDMA transmitter for downlink
- Fig.5.3.3 A typical block schematic of MSE-OFDMA Receiver in downlink
- Fig. 5.3.4 BER performance of OFDMA and MSE-OFDMA systems for 8 users in one group
- Fig. 5.3.5 BER performance of MSE-OFDMA system for one frame with 4 groups with 8 users each
- Fig.5.3.6 BER of OFDMA and MSE-OFDMA with frequency offset
- Fig.5.3.7 Effect of variation of frequency offset on BER performance of MSE-OFDMA for 8 users

Fig.5.3.8 BER performance with the number of users in an MSE-OFDMA system with frequency offset

Fig.5.4.1 A typical block schematic of MSE-OFDMA Transmitter for uplink

Fig. 5.4.2 A typical block schematic of MSE-OFDMA Receiver in uplink

Fig.5.4.3 BER of OFDMA and MSE-OFDMA in uplink channel

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List of Tables

Table 2.1: Feature Summary of Several Wireless Technologies.

Table 2.2: ITU Vehicular Channel Models

Table-2.3.1 Bandwidth Efficiency Improvement in MSE-OFDM

Table-3.2.1 Simulation parameters for TD-MC-CDMA

Table.3.4.1 The system parameters proposed for 4G (LTE equivalent) application using TD-MC-CDMA

Table.3.4.2 Comparison of Some 4G proposals

Table.3.4.3 Comparison of proposed MA scheme with OFDMA and SC-FDMA

Table.4.3.1 Simulation parameters for MSE-OFDM

Table.5.3.1 Simulation parameters for MSE-OFDMA

Table.5.6.1 Computational complexity of MSE-OFDMA

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