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LIST OF SYMBOLS AND ABBREVIATIONS

SYMBOLS

\tilde{R}_n	- Achieved Spectral Efficiency
$Q_k(t)$	- Actual Queue Length
μ_A	- Average Arrival-Rate of the Traffic Process
$\overline{r}_i[n]$	- Average Data Rate for User i
$\overline{R}_k(t)$	- Average Data Rate at Time Slot t of User i
Q_i	- Average Queue Length
$\overline{U}_k(t)$	- Average Queue Length over the Average Window Size t_c
$\bar{\mu}$	- Average Service Rate
μ_C	- Average Service Rate of the Service Process
$E[\tilde{W}_j]$	- Average System Time (Including Waiting Time and Service Time) of user j
t_c	- Average Window Size (Time Slots)
ε	- Buffer Non-Empty Probability
Q	- Buffer State
H	- Channel State
Δf_c	- Coherent Bandwidth
$\{\Delta h_{ij}\}$	- CSIT Error
X_{ij}	- Data Symbol from the BS to User j on Subcarrier i
$D_{\max}^{(k)}$	- Delay Bound
\hat{d}_i	- Delay Estimate
$T_{HOL,i}$	- Delay of the Head-Of-Line (HOL) Packet of User i
r_i	- Delay Requirement

f_d	- Doppler frequency spread
$E_B(\theta)$	- Effective Bandwidth Function
$E_C(\theta)$	- Effective Capacity Function
e_j	- Estimated Channel Bit Rate
$\{\hat{h}_{ij}\}$	- Estimated Downlink CSIT
T_f	- Frame Duration
$\Gamma(m)$	- Complete Gamma function
$\Gamma(m,x)$	- Incomplete Gamma function
$\Lambda_C(\theta)$	- Gartner-Ellis Limit of the Service Process
l	- Length of the Packet in Bytes
a_n, g_n, γ_{pn}	- Mode Dependent Parameters
λ_n	- Number of Bits Per Frame Transmitted by the n^{th} Mode
$\mathcal{G}_k(t)$	- Number of Packets Arriving during Current Time Slot
N_{wl}	- Number of Packets in Wireless Links
$\pi_k(t)$	- Number of Packets to be Dropped
N_F	- Number of Subcarriers
$L^{(k)}$	- Number of Time Slots Allocated to k^{th} User
c	- Packet Class
$P_{out,j}$	- Packet Outage Probability on Subcarrier i
F	- Packet Size
$D_{k,i,l}$	- Packet Size (in Bits) that Belong to Queue i of User k
N_Q	- Packets Still Waiting for Service
$\Lambda_{k,i}$	- Packets to be Served
c_i	- Packets' Current Delay
$Pr(n)$	- Probability of received SNR at Mode n
$p_\gamma(\gamma)$	- Probability density function of SNR γ
Θ	- QoS Exponent
B	- QoS Priority Level

Y_{ij}	-	Received Symbol at Mobile User j on Subcarrier i
r_{ij}	-	Scheduled Data Rate of the j^{th} User on the i^{th} Subcarrier
BW	-	Signal Bandwidth
N_0	-	Single-Sided Power Spectral Density of Additive White Gaussian Noise
$\rho\{\}$	-	Spectral Radius of the Matrix
s_{ij}	-	Subcarrier Allocation Indicator
p_{ij}	-	Power Allocation Factor
W	-	System Spectral Bandwidth
P_0	-	Target Error Probability
P_{TOT}	-	The Average Total Power Constraint
h_{ij}	-	The Complex Channel Gain of the i^{th} Subcarrier for the j^{th} Mobile
$C_{k,i,l}$	-	The Time Left for the Packet that Becomes Urgent
$Z_{\bar{m},j}^T(t)$	-	Total Idle Time of the Server
M	-	Total Number of Packets in the Queue
N	-	Total Number of Packets Transmitted
p_n	-	Total Number of Successful Packet Transmissions
K	-	Total Number of Users
b_j	-	Total Packets Bits
$res_{\bar{m},j}(t)$	-	Total residue time of the server for the currently serving Packet
K^{N_f}	-	Total Search Space
t_n	-	Total Time on the System for User n
P	-	Transition Matrix
P_{ij}	-	Transmit Power Allocated from the Base Station to User j Through Subcarrier i
$Var[X_j]$	-	Variance of X_j
W_k	-	Weight for User k

- $W_{k,i,l}$ - Weight of the to-be-Served Packets
- Z_{ij} - Zero Mean Complex Gaussian Noise with Unit Variance

ABBREVIATIONS

ACPS	-	Adaptive Cross-layer Packet Scheduling
AMC	-	Adaptive Modulation and Coding
APA	-	Adaptive Power Allocation
AWGN	-	Additive White Gaussian Noise
AODV	-	Ad-hoc On Demand Vector
APP	-	APPLication Layer
ATM	-	Asynchronous Transfer Mode
AR	-	Auto Regressive
ARQ	-	Automatic Repeat ReQuest
BW	-	Band Width
BS	-	Base Station
BER	-	Bit Error Rate
BWA	-	Broadband Wireless Access
BC	-	Broadcast Channel
BATD	-	Buffer Aware and Traffic Dependent
CSI	-	Channel State Information
CSIT	-	Channel State Information at the Transmitter
CDMA	-	Code Division Multiple Access
CBR	-	Constant Bit Rate
CPF	-	Conventional Proportional Fair
DSL	-	Digital Subscriber Line
DVB	-	Digital Video Broadcasting
DMT	-	Discrete Multi Tone
DSA	-	Dynamic Subcarrier Allocation
EC	-	Effective Capacity
EXP	-	EXPonential Rule
FFT	-	Fast Fourier Transform
FTP	-	File Transfer Protocol

FSMC	-	Finite State Markov Chain
FCFS	-	First Come First Served
FIFO	-	First-In-First-Out
FEC	-	Forward Error Correction
FDD	-	Frequency Division Duplexing
FDMA	-	Frequency Division Multiple Access
GPS	-	Generalized Processor Sharing
GSM	-	Global System for Mobile communication
GI	-	Guard Interval
HOL	-	Head Of Line
HDR	-	High Data Rate
IEEE	-	Institute of Electrical and Electronics Engineers
ISI	-	Inter Symbol Interference
IFQ	-	InterFace Queue
IPTV	-	Internet Protocol TeleVision
IPv6	-	Internet Protocol version 6
IFFT	-	Inverse Fast Fourier Transform
KKT	-	Karush-Kuhn Tucker
LCR	-	Level Crossing Rate
LA	-	Link Adaptation
LAN	-	Local Area Network
LTE	-	Long Term Evolution
MDU	-	Maximum Delay Utility
MSC	-	Maximum Sum Capacity
MAC	-	Medium Access Control
MMSE	-	Minimum Mean Square Error
MS	-	Mobile Station
M-LWDF	-	Modified- Largest Weighted Delay First
MC	-	Multi Carrier

MCPF	-	Multi Carrier Proportional Fair
MCQPF	-	Multi Carrier QoS Proportional Fair
OSI	-	Open System Interconnection
OFDMA	-	Orthogonal Frequency Division Multiple Access
OFDM	-	Orthogonal Frequency Division Multiplexing
PD	-	Packet Dependent
PDP	-	Packet Dropping Probability
PER	-	Packet Error Rate
PS	-	Packet Scheduler
PHY	-	PHYSical Layer
PASTA	-	Poisson Arrival See Time Average
PSD	-	Power Spectral Density
PF	-	Proportional Fair
QPF	-	QoS Proportional Fair
QAM	-	Quadrature Amplitude Modulation
QoS	-	Quality of Service
QSI	-	Queue State Information
RLC	-	Radio Link Control
RR	-	Round Robin
SINR	-	Signal-to-Interference-Noise-Ratio
SNR	-	Signal-to-Noise-Ratio
SC	-	Single Carrier
SCPF	-	Single Carrier Proportional Fair
SISO	-	Single Input Single Output
SDMA	-	Space Division Multiple Access
TV	-	TeleVision
3GPP TS	-	Third Generation Partnership Project Technical Specification
TDD	-	Time Division Duplexing

TDMA	-	Time Division Multiple Access
UMTS	-	Universal Mobile Telecommunications Systems
VoIP	-	Voice over Internet Protocol
WFQ	-	Weighted Fair Queuing
WLAN	-	Wireless Local Area Network
WWW	-	World Wide Web
WiMax	-	Worldwide Interoperability for Microwave Access