2002 IEEE Seventh International Symposium on Spread Spectrum Techniques and Applications

IEEE ISSSTA 2002
Prague, Czech Republic
September 2-5, 2002

PROCEEDINGS
Volume 1 of 3
CONTENTS

VOLUME 1

Invited papers ................................................................................................................................. 1 - 9

How far away is Infinity? Using Asymptotic Analyses in Multiple-Antenna Systems .................. 1
Prof. Ezio Biglieri, Politecnico Torino, Italy

Wireless Communication: a Power Efficiency Perspective .......................................................... 7
Prof. Behnaam Aazhang, Rice University, Houston, USA

Vector-valued Digital Communications ......................................................................................... 8
Prof. Jürgen Lindner, Univ. of Ulm, Germany

TAM-1 Session: CDMA I ................................................................................................................ 9 - 33

TAM-1.1
Transmit Wiener Filter for the Downlink of TDD DS-CDMA Systems ...................................... 9
M. Joham, K. Kusume, M. H. Gzara, W. Utschick and J. A. Nossek, Munich University of Technology, Germany

TAM-1.2
Link Performance of TD-SCDMA Systems ................................................................................. 14
Zhang Yi, Chang Yongyu, and Yang Dacheng, Beijing University of Posts and Telecommunications, China

TAM-1.3
Code-aided Blind Rate Detection for Multirate DS/CDMA Systems ........................................ 19
Stefano Buzzi, Università degli Studi di Cassino, Italy and Antonio De Maio,
Università degli Studi di Napoli, Italy

TAM-1.4
On the Performance of FDD WCDMA Closed Loop Transmit Diversity Modes in Nakagami and Ricean Fading Channels ................................................................. 24
Jyri Hämäläinen, Nokia Networks, Oulu, Finland, and Risto Wichman, Helsinki University of Technology, Finland

TAM-1.5
Improving Convolutional and Turbo Code Performance on the CDMA Forward Link ............ 29
Geoffrey G. Messier and Witold A. Krzymień, University of Alberta, Canada

TAM-2 Session: Channel Estimation .............................................................................................. 34 - 58

TAM-2.1
Channel Estimation for the Uplink of CDMA Systems with Linear MMSE Estimators: Lower Bounds and Optimal Sequences .......................................................... 34
Gerhard Wunder, Slawomir Stanczak, and Holger Boche, Heinrich-Hertz-Institut für Nachrichtentechnik, Berlin, Germany

TAM-2.2
Pilot Aided Channel Estimation for Short-Code DS-CDMA .................................................... 39
Ansgar Scherb, Volker Kuehn, Karl-Dirk Kammeyer, University of Bremen, Germany

TAM-2.3
Pilots for Joint Channel Estimation in Multi-User OFDM Mobile Radio Systems ................. 44
Ioannis Maniatis, Tobias Weber, Alexandros Sklavos and Yin Liu, University of Kaiserslautern, Germany

TAM-2.4
Blind Channel Estimation for Time-Slotted Code Division Multiple Access Mobile Radio Systems .................................................................................................................. 49
Michael Meuer, Y. Lu, T. Weber, C.A. Jötten, and P.W. Baier, University of Kaiserslautern, Germany

TAM-2.5
Channel Estimation with Linear Interpolation and Decision Feedback for UTRA FDD Downlink .................................................................................................................. 54
Klaus Knoche, Jürgen Rinas, and Karl-Dirk Kammeyer, University of Bremen, Germany
TAM-3 Session: UWB Signals ........................................................................................................... 59 - 82

TAM-3.1
Performance Analysis of Interference between UWB and SS Signals ........................................... 59
Kazuki Eshima and Ryuji Kolino, Yokohama National University, Japan, Yoshihiro Hase, Shingo Oomori
and Fujinobu Takahashi, Communication Research Laboratory, Tokyo, Japan

TAM-3.2
Spreading Properties of Time Hopping Codes in Ultra Wideband Systems ..................................... 64
C. Müller, S. Zeisberg, H. Seidel, and A. Finger, Dresden University of Technology, Germany

TAM-3.3
An Ultra-Wideband Indoor NLOS Radio Channel Amplitude Probability Density Distribution .......... 68
H. Luuediger, B. Kull, S. Zeisberg, and A. Finger, Technical University of Dresden, Germany

TAM-3.4
A Novel Chirp Modulation Spread Spectrum Technique for Multiple Access ............................... 73
Stephan Hengstler, Agilent Technologies, Inc., USA, Dayalan P. Kasilingam, and Antonio H. Costa,
University of Massachusetts Dartmouth, USA

TAM-3.5
Adaptive Predistortion for Amplifier Linearization for UMTS Terminals ....................................... 78
A. Springer and A. Gerdenitsch and R. Weigel University of Linz, Austria, Z. Li, CDHK, Shanghai, China

TAM-4 Session: FH/Satellite ............................................................................................................. 83 - 107

TAM-4.1
Frequency Hop Selection in the Bluetooth Radio System ............................................................. 83
Jaap C. Haartsen, Ericsson Technology Licensing AB, Emmen, The Netherlands and Stefan Zirbes,
Ericsson Eurolab Deutschland GmbH, Nürnberg, Germany

TAM-4.2
An Incremental Redundancy Hybrid ARQ Scheme Using Punctured MDS Codes for Frequency-
Hopping Channels ......................................................................................................................... 88
Katsumi Sakakibara, Tadashi Nakashima and Jiro Yamakita, Okayama Prefectural University,
Soja, Japan

TAM-4.3
Performance of CDMA-ALOHA in Shadowed Mobile Satellite and Stratospheric Platform Channels .......... 93
Tetsushi Ikegami, Yasuhiro Mori, and Masato Ohta, Meiji University, Kawasaki, Japan

TAM-4.4
Optimum Power Allocation in CDMA Mobile Satellite Diversity System ......................................... 98
Ernestina Cianca, “University of Rome “Tor Vergata”, Roma, Italy, Silvia De Fina, H3G Italia S.p.A.
Roma, Italy, Marina Riggieri* and Ramjee Prasad, Aalborg University, Denmark

TAM-4.5
Modified MAXIMIN Adaptive Array Algorithm for Frequency-Hopping System ........................ 103
Hyuck M. Kwon, Raja D Balakrishnan and Bagawan S. Nuroho, Wichita State University, USA

TPM-1 Session: Multicarrier Systems I .......................................................................................... 108 - 159

TPM-1.1
Performance Comparison of Multi-Code Fixed Spreading Length Scheme and Variable Spreading
Length Scheme for Multi-Rate MC-CDMA ..................................................................................... 108
Mizhou Tan and Yeheskel Bar-Ness, New Jersey Institute of Technology, USA

TPM-1.2
The Effect of Clock Frequency Offsets on Downlink MC-DS-CDMA .............................................. 113
Heidi Steendam and Marc Moeneclaey, Ghent University, Belgium

TPM-1.3
Time-Frequency Localized CDMA for Downlink Multi-Carrier Systems ........................................ 118
Anders Persson, Tony Ottosson and Erik Ström, Chalmers University of Technology, Göteborg, Sweden

TPM-1.4
A Symbol Synchronizer for MC-SS and Its Performance ............................................................... 123
Shigetaka Goto and Akira Ogawa, Meijo University, Nagoya, Japan
TPM-1.5
Effect of Chip Shaping on the Performance of Band-limited Multicarrier CDMA Systems .......................... 128
Ho H. Nguyen, University of Saskatchewan, Canada

TPM-1.6
Performance Analysis on the Effect of Phase Noise in OFDM Systems ..................................................... 133
Songping Wu and Yeheskel Bar-Ness, New Jersey Institute of Technology, USA

TPM-1.7
CDMA versus OFDM. A Performance Comparison in Selective Fading Channels ....................................... 139
Ilian Martoyo, Henrik Schober and Friedrich K. Jondral, University of Karlsruhe, Germany

TPM-1.8
Outage Capacities of a Multi-Carrier WLAN Downlink under Different Resource Sharing Techniques ....... 144
Christian Ihars and Yeheskel Bar-Ness, New Jersey Institute of Technology, USA

TPM-1.9
Performance of Multicarrier CDMA with Successive Interference Cancellation with Estimation Error in a Multipath Fading Channel .......................................................... 150
Jeffrey Andrews and Teresa Meng, Stanford University, USA

TPM-2 Session: Sequences-I ................................................................. 160 - 207

TPM-2.1
Very Efficient Wireless Frequency Usage by Coherent Addition of Multipath Signals Using Periodic Sequence Set without Crosscorrelation ......................................................... 160
Naoki Suehiro, University of Tsukuba, Japan, Toshiaki Inumo, Soka University, Tokyo, Japan and Noriyoshi Kuroyanagi, Tokyo Institute of Engineering, Japan

TPM-2.2
Comparison of the Sum Capacities of the m-O, PN/O and PN Signature Sequence Sets .......................... 165
Frederik Vanhaverbeke and Marc Moeneclaey, TELIN/DIGCOM Ghent University, Belgium

TPM-2.3
Extension of Family Size of ZCZ Sequence Sets Derived from Perfect Sequences and Unitary Matrices ...... 170
Hideyuki Torii and Makoto Nakamura, Kanagawa Institute of Technology, Japan

TPM-2.4
Matrices with Bounded Correlation ....................................................................................................... 175
A.Z.Tirkel and T.E.Hall, Monash University, Australia

TPM-2.5
Signature Optimization for DS-CDMA with Limited Feedback ................................................................. 180
Wiroonsak Santipach and Michael L. Honig, Northwestern University, Evanston, USA

TPM-2.6
Design of Despreading Sequences with Low Cross-Correlation Properties ............................................. 185
Katsuya Mizutani and Ryuji Kohno, Yokohama National University, Japan

TPM-2.7
New 4-Phase Complementary Codes Compressing a Pulse to a Width of Several Sub-pulses ................. 189
Hiroshi Takase and Masanori Shinriki, Nippon Institute of Technology, Saitama, Japan and Reiji Sato, Keio University, Yokohama, Japan

TPM-2.8
Design of Subsets of Complex Spreading Sequences ............................................................................... 194
Hai Huyen Dai, *Australian Telecommunications Research Institute, Hans Jurgen Zepernicken, Australian Telecommunications Cooperative Research Centre, Perth, Australia and Sven Nordholm*

TPM-2.9
Analysis of Design Spreading Code for Zero Correlation Zone ................................................................. 199
Jin Hou and Moon Ho Lee, Chonbuk National University, Republic of Korea and Ju Yong Park, Seonam University, Naunwon, Korea
TPM-2.10
A New Quadriphase Jacket Sequence for Perfect Zero Cross Correlation
Xinhaochen, South-Central University for Ethnic Communities, China, RunRong and MoonHo Lee
Chonbuk National University, Korea

TPM-3 Session: Code Acquisition I ................................................................. 208 - 257

TPM-3.1
Applications of Maximum Likelihood Algorithm in Asynchronous CDMA Systems
Pei Xiao and Erik Ström, Chalmers University of Technology, Göteborg, Sweden

TPM-3.2
Multi Dwell Architectures for DS-CDMA Code Acquisition in Fading Channels
Carlo Caimi, Giovanni E Corazza and Alessandro Vanelli-Coralli, University of Bologna, Italy

TPM-3.3
Performance of Blind Channel Estimation in Long Code DS-CDMA Systems
Daniel I. Iglesia, Carlos J. Escudero and Luis Castro, Universidad de La Coruña, Spain

TPM-3.4
A Comparative Study of Code Acquisition Using Antenna Diversity and Beamforming Techniques
M. Katz, J. Linatti and S. Glisic, University of Oulu, Finland

TPM-3.5
Analysis of DS-SS Serial Search Code Acquisition Using Search Strategy with False Acquisition Memory
Jan Šimáška, Academy of Sciences of the Czech Republic, Praha, Czech Republic

TPM-3.6
Differential Post Detection Integration Technique in the Return Link of Satellite CDMA Systems
Giovanni Emanuele Corazza, Paola Salmi, Alessandro Vanelli-Coralli and Marco Villanti, University of Bologna, Italy

TPM-3.7
A Robust Synchronization Procedure for Blind Estimation of the Symbol Period and the Timing Offset in Spread Spectrum Transmissions
Celine Bouder, Stephane Azou and Gilles Barel, Laboratoire d'Electronique et Systèmes de Télécommunications, CNRS, Brest, France

TPM-3.8
Resource Allocation and RAKE-Synchronization in Direct-Sequece CDMA-Networks
Alois M.J. Goiser, TU-Wien, Austria

TPM-3.9
Two-Dimensional Code Acquisition in Slow- and Fast-Fading Channels
M. Katz, J. Linatti and S. Glisic, University of Oulu, Finland

TPM-3.10
Initial Acquisition Performance of Bi-orthogonal Modulations Systems Using Differential Detector
Kouji Ohuchi and Kouichi Matsumo, Shizuoka University, Japan, Hiromasa Habuchi, Ibaraki University, Japan

TPM-4 Session: Interference Cancellation ......................................................... 258 - 302

TPM-4.1
Impact of Out-of-Cell Interference on Strongest-Users-Only CDMA Detectors
Benjamin M. Zaidel and Shlomo Shamai (Shitz), Technion - IIT, Haifa, Israel, and Sergio Verdú, Princeton Univ. USA

TPM-4.2
Iterative Interference Cancellation and Decoding for a Coded UWB-TH-CDMA System in AWGN Channel
A. Bayesteh and Masoumeh Nasiri-Kenari, Sharif Univer. of Technology, Tehran, Iran

TPM-4.3
On the Interference Suppression in DS-CDMA Systems
Kari Pajukoski, Kari Horneman and Jukka Nuutinen, Nokia, Oulu Finland
TPM-4.4
Performance of Adaptive Chip Equalization for the WCDMA Downlink in Fast Changing Environments .... 273
Oliver Prator, Carsten Unger, Andre Zoch and Gerhard P. Fettweis, Dresden University of Technology, Germany

TPM-4.5
Perturbation Method of Interference Cancellation in Multi-Path CDMA Systems ................................... 278
Chin Chien Lu, Computer and Communication Research Laboratory, ITRI, Taiwan

TPM-4.6
Multistage Hybrid Interference Canceller for Asynchronous Multirate DS-CDMA Systems ............................ 283
in AWGN and Flat Rayleigh Channels
Taufik Abrão, Universidade Estadual de Londrina, Brazil and Paul Jean E. Jeszensky,
Escola Politécnica da Universidade de São Paulo, Brazil

TPM-4.7
Uplink Interference Analysis of LMDS Networks Applying CDMA with Interference Cancellation ................. 288
Csaba Novák, Dávid Tóth and János Bito, Budapest University of Technology and Economics, Hungary

TPM-4.8
Multistage Parallel Interference Canceller for Asynchronous Multirate DS-CDMA Systems
in AWGN and Flat Rayleigh Channels .............................................. 293
Paul Jean E. Jeszensky, Escola Politécnica da Universidade de São Paulo, Brazil and Taufik Abrão
Universidade Estadual de Londrina, Brazil

TPM-4.9
MMSE-based Adaptive Equalizer with Effective Use of Pilot Signal for Multi-Carrier CDMA System ............ 298
Shigehiko Tsumura and Shinsuke Hara, Osaka University, Japan

VOLUME 2

WAM-1 Session: Space-Time Coding .................................................. 303 - 337

WAM-1.1
Decoding Space-Time Codes with BLAST Architectures ............................................................................. 303
Ezio Biglieri and Giorgio Taricco, Politecnico di Torino, Italy, Antonia Tulino, Università del Sannio, Italy

WAM-1.2
Layered Space Time Coding with Joint Iterative Detection, Channel Estimation and Decoding ................. 308
Ka Leong Lo, Zhuo Chen, Paul Alexander and Branka Vucetic, University of Sydney, Australia

WAM-1.3
Combined Array Processing and Space-Time Turbo Coded Modulation for WCDMA Downlink
over Frequency-Selective Rayleigh Fading Channels ...................................................................................... 313
Djordje Tujkovic and Emiliano Sottani, University of Oulu, Finland

WAM-1.4
Space Time Block Coding for 4 Antennas with Coding Rate 1 ................................................................. 318
Americo Correia and Mario M. Silva, IST, Lisbon, Portugal

WAM-1.5
Performance Evaluation of Space-Time Spreading and Orthogonal Transmit Diversity in CDMA2000 .......... 323
Gang Wu and Shixin Cheng, Southeast University, Nanjing, China
Haifeng Wang and Jorma Lilleberg, Nokia Mobile Phones, Oulu, Finland

WAM-1.6
Performance Analysis of MCFH Systems with Orthogonal Space-Time Block Codes .............................. 328
Mehdi Ansari-Sadraabadi and Masoumeh Nasirani-Kenari, Sharif University of Technology, Tehran, Iran

WAM-1.7
Comparison of Layered and Diversity Approaches for Increasing WCDMA Data Rates
in Frequency-Selective MIMO Channels ........................................................................................................ 333
Markku J. Heikkilä and Kari Majonen, Nokia Mobile Phones, Oulu, Finland