2007 41st Annual Conference on Information Sciences and Systems

Baltimore, MD
14-16 March 2007

Volume 1 of 2

IEEE Catalog Number: CFP0760A-PRT
ISBN: 978-1-4244-1036-1

TABLE OF CONTENTS

COOPERATIVE DIVERSITY I

ALGORITHMS FOR RELAYING VIA CHANNEL QUANTIZATIONIN FINITE 1
RATE FEEDBACK LIMITED SENSOR NETWORKS
R. Kannan, S. Wei, G. Deng, V. Chakravarthy, M. Rangaswamy, Louisiana State University

CROSS-LAYER RESOURCE ALLOCATION STRATEGIES FOR 7
QUALITY-OF-SERVICE DRIVEN OPPORTUNISTIC ROUTING OVER
WIRELESS RELAY NETWORKS
Lin Xie, Xi Zhang, Texas A&M University

THE RELAY CHANNEL WITH A WIRE-TAPPER 13
Melda Yuksel, Elza Erkip, Polytechnic University

DYNAMIC RESOURCE ALLOCATION FOR MULTI SOURCE-DESTINATION 19
RELAY NETWORKS
Onur Sahin, Elza Erkip, Polytechnic University

TOWARD MAXIMIZING THROUGHPUT IN WIRELESS RELAY 25
Meng Yu, Jing (Tiffany) Li, Rick S. Blum, Lehigh University

ALGORITHMS I

A MEAN CONVERGENCE ANALYSIS FOR PARTIAL UPDATE NLMS ALGORITHMS 31
Jinhong Wu, Miloš Doroslovački, the George Washington University

FEEDBACK AND WEIGHTING MECHANISMS FOR IMPROVING JACOBIAN 35
ESTIMATES IN THE ADAPTIVE SIMULTANEOUS PERTURBATION ALGORITHM
James C. Spall, the Johns Hopkins University

USER ALLOCATION IN MULTI-SYSTEM, MULTI-SERVICE SCENARIOS: 41
UPPER AND LOWER PERFORMANCE BOUND OF POLYNOMIAL TIME
ASSIGNMENT ALGORITHMS
Ingmar Blau, Gerhard Wunder, Fraunhofer German-Sinomobile Communications Lab

PROPORTIONATE-TYPE STEEPEST DESCENT AND NLMS ALGORITHMS 47
Kevin T. Wagner, Naval Research Laboratory; Miloš I. Doroslovački,
the George Washington University

DETECTION, ESTIMATION, AND FILTERING I

DETECTING INFORMATION FLOWS: IMPROVING CHAFF TOLERANCE BY 51
JOINT DETECTION
Ting He, Lang Tong, Cornell University

SUBSPACE SEQUENCE ESTIMATION 57
Michael Tinston, Yariv Ephraim, George Mason University

MAXIMUM A-POSTERIORI ESTIMATION IN LINEAR MODELS WITH A RANDOM 63
GAUSSIAN MODEL MATRIX
Ido Nevat, University of New South Wales; Ami Wiesel, Technion;
Jinhong Yuan, University of New South Wales; Yonina C. Eldar, Technion

JOINT DETECTION AND IDENTIFICATION OF AN UNOBSERVABLE CHANGE IN THE DISTRIBUTION OF A RANDOM SEQUENCE 68
Savaş Dayanik, Christian Goulding, H. Vincent Poor, Princeton University

BELIEF PROPAGATION BASED MULTIHEAD MULTITRACK DETECTION OVER CONVENTIONAL AND BIT-PATTERNED MEDIA STORAGE SYSTEMS 74
Jun Hu, Tolga M. Duman, Arizona State University; Erozan M. Kurtas, M. Fatih Erden, Seagate Technology

CODING I

ERASURE CODES WITH SMALL OVERHEAD FACTOR AND THEIR DISTRIBUTED STORAGE APPLICATIONS 80
Hiroaki Kameyama, Yuichi Sato, Fujitsu Laboratories Ltd.

ON GROUPS WITH A SHIFT STRUCTURE: THE SCHREIER MATRIX AND AN ALGORITHM 86
K. M. Mackenthun Jr.

NEAR-ML DECODING OF CRC CODES 92
Ragha Sudha Yalamarthy, Stephen G. Wilson, University of Virginia

GUIDELINES FOR CHANNEL CODE DESIGN IN QUASI-STATIC FADING CHANNELS 95
Meritxell Lamarca, Technical University of Catalonia; Hanqing Lou, Javier Garcia-Frias, University of Delaware

ANALOG CODING FOR DELAY-LIMITED APPLICATIONS 101
Mahmoud Taherzadeh, Amir. K. Khandani, University of Waterloo

MIMO I

PERFORMANCE ANALYSIS OF MIMO RECEIVERS UNDER IMPERFECT CSIT 107
Shyam Pandula, Bernd-Peter Paris, George Mason University

LIMITED FEEDBACK PRECODER DESIGN FOR SPATIALLY CORRELATED MIMO CHANNELS 113
Vasanthan Raghavan, Venugopal V. Veeravalli, University of Illinois, Urbana-Champaign; Akbar M. Sayeed, University of Wisconsin-Madison

PRECODER OPTIMIZATION FOR NONLINEAR MIMO TRANSCEIVER BASED ON ARBITRARY COST FUNCTION 119
Yi Jiang, University of Colorado; Daniel P. Palomary, Hong Kong University of Science and Technology; Mahesh K. Varanasi, University of Colorado

A NEW PRACTICAL DIRTY-PAPER CODING STRATEGY IN MIMO SYSTEMS 125
Insoo Hwang, Dongho Kim, Yungsoo Kim, Samsung Electronics Co., Ltd.; Vahid Tarokh, Harvard University

OPTIMAL GENERALIZED INVERSES FOR ZERO FORCING PRECODING 130
Ami Wiesel, Yonina C. Eldar and Shlomo Shamai (Shitz), Technion

ULTRA WIDEBAND

ULTRA-WIDEBAND CHANNEL MEASUREMENT CHARACTERIZATION FOR WIRELESS MAGNETIC RESONANCE IMAGING APPLICATIONS 135
Nayef A. Alsindi, Dagnachew Birru, Dong Wang, Philips Research North America

ACQUISITION PERFORMANCE COMPARISON OF ENERGY DETECTOR AND COHERENT UWB RECEIVERS 141
Kai Bai, Ning He, Cihan Tepedelenlioglu, Arizona State University

CODEWORD DESIGN FOR MULTIPLE-ACCESS PRECODED ULTRA-WIDEBAND COMMUNICATION SYSTEM 147
Xiaoli Wang, Hongya Ge, New Jersey Institute of Technology

ON THE CRLB AND LOW-COMPLEXITY CHANNEL ESTIMATION FOR UWB COMMUNICATIONS 151
Xiaoli Wang, Hongya Ge, New Jersey Institute of Technology

INFORMATION THEORY I

MINIMAX ROBUST WAVEFORM DESIGN FOR MIMO RADAR IN THE PRESENCE OF PSD UNCERTAINTIES 154
Yang Yang, Rick S. Blum, Lehigh University

NANOSCALE COMMUNICATION WITH BROWNIAN MOTION 160
Andrew W. Eckford, York University

SOME ANALOGIES BETWEEN THERMODYNAMICS AND SHANNON THEORY 166
Dragan Samardzija, Lucent Technologies

RATE DISTORTION THEORY IN CELLULAR SIGNALING 172
Burton W. Andrews, Pablo A. Iglesias, the Johns Hopkins University

MULTIPLE ACCESS I

ON ASYMPTOTIC EFFICIENCY FOR ASYNCHRONOUS CDMA 174
Gianmarco Romano, Domenico Ciuonzo, Francesco Palmieri, Seconda Università Di Napoli;
Pierluigi Salvo Rossi, Seconda Università Di Napoli, Norwegian University of Science and Technology

OUTAGE PROBABILITY OF A MULTI-USER COOPERATION PROTOCOL IN AN ASYNCHRONOUS CDMA CELLULAR UPLINK 179
Kanchan G. Vardhe, Daryl Reynolds, and Matthew Valenti, West Virginia University

SEQUENTIAL GEOMETRIC PROGRAMMING FOR 2 X 2 INTERFERENCE CHANNEL POWER CONTROL 185
Mohamad Charafeddine, Arogyaswami Paulraj, Stanford University

A SPECTRALLY EFFICIENT FREQUENCY HOPPING SCHEME 190
Qi Ling, Tongtong Li, Michigan State University

APPROACH TO OPTIMUM PERFORMANCE IN RANDOM SPREADING CDMA BY LINEAR-COMPLEX LAS DETECTORS 196
Yi Sun, the City College of New York

OPTIMAL SIGNATURE SEQUENCES THAT MAXIMIZE SUM CAPACITY IN FADING CDMA CHANNELS 202
Harish Venkatachari, Mahesh K Varanasi, University of Colorado, Boulder

SENSOR NETWORKS I

A NEW APPROACH TO ENERGY EFFICIENT SIGNAL DETECTION **208**
Rick S. Blum, Lehigh University; Brian M. Sadler, Army Research Laboratory

BOUNDING A STATISTICAL MEASURE OF NETWORK LIFETIME FOR WIRELESS SENSOR NETWORKS **214**
Muhammad U. Ilyas, Pradeep Ramuhalli, Hayder Radha, Michigan State University

COVERAGE-BASED INFORMATION RETRIEVAL FOR LIFETIME MAXIMIZATION IN SENSOR NETWORKS **220**
Tong Zhao, Qing Zhao, University of California

PROLONGING NETWORK LIFETIME VIA PARTIALLY CONTROLLED NODE DEPLOYMENT AND ADAPTIVE DATA PROPAGATION IN WSN **226**
Fangting Sun, Mark Shayman, University of Maryland

OPTIMAL PROGRESSIVE ERROR RECOVERY FOR WIRELESS SENSOR NETWORKS USING IRREGULAR LDPC CODES **232**
Saad Bin Qaisar, Hayder Radha, Michigan State University

BROADCAST CAPACITY OF A WSN EMPLOYING POWER CONTROL AND LIMITED RANGE DISSEMINATION **238**
Ananth V. Kini, Nikhil Singhal, Steven Weber, Drexel University

VIDEO SENSOR NODE FOR LOW POWER AD-HOC WIRELESS NETWORKS **244**
M. Chi, R. Etienne-Cummings, the Johns Hopkins University

NETWORK CODING

ON FEEDBACK FOR NETWORK CODING **248**
Christina Fragouli, Ecole Polytechnique Fédérale De Lausanne; Desmond Lun, and Muriel Médard, Massachusetts Institute of Technology; Payam Pakzad, Digital Fountain

HIGH-THROUGHPUT COOPERATIVE COMMUNICATIONS WITH COMPLEX FIELD NETWORK CODING **253**
Tairan Wang, Georgios B. Giannakis, University of Minnesota

ADAPTIVE NETWORK CODING WITH NOISY PACKETS **259**
Shirish S. Karande, Kiran Misra, Muhammad U. Ilyas, Hayder Radha, Michigan State University

DATA DISSEMINATION IN WIRELESS BROADCAST CHANNELS: NETWORK CODING OR COOPERATION? **265**
Ivana Stojanovic, Masoud Sharif, David Starobinski, Boston University

ON CODING FOR THE BROADCAST PHASE IN THE TWO-WAY RELAY CHANNEL **271**
Clemens Schnurr, Fraunhofer German-Sino Lab for Mobile Communications; Tobias J. Oechtering, Technical University of Berlin; Sławomir Stańczak, Fraunhofer German-Sino Lab for Mobile Communications

CONSENSUS ESTIMATION VIA BELIEF PROPAGATION **277**
Huaiyu Dai, Yanbing Zhang, North Carolina State University

GAME THEORY IN COMMUNICATIONS

POWER CONTROL AND RECEIVER DESIGN FOR ENERGY EFFICIENCY IN MULTIPATH CDMA CHANNELS WITH BANDLIMITED WAVEFORMS **282**
Stefano Buzzi, Valeria Massaro, Universit`A Degli Studi Di Cassino; H. Vincent Poor, Princeton University

A NEW DECENTRALIZED POWER ALLOCATION STRATEGY IN SINGLE-HOP WIRELESS NETWORKS **288**
Jamshid Abouei, Masoud Ebrahimi, Amir K. Khandani, University of Waterloo

A GAME-THEORETIC ANALYSIS OF DECODE-AND-FORWARD COOPERATION IN GAUSSIAN CHANNELS **294**
Yingda Chen, Shalinee Kishore, Lehigh University

MAX-MIN STRATEGIES FOR POWER-LIMITED GAMES IN THE PRESENCE OF CORRELATED JAMMING **300**
Shahrokh Farahmand, Georgios B. Giannakis, University of Minnesota; Xin Wang, Florida Atlantic University

A GAME-THEORETIC ANALYSIS OF DECODE-AND-FORWARD COOPERATION IN RAYLEIGH FADING CHANNELS **306**
Yingda Chen, Shalinee Kishore, Lehigh University

MINIMAX AND MAXMIN SOLUTIONS TO GAUSSIAN JAMMING IN BLOCK-FADING CHANNELS UNDER LONG TERM POWER CONSTRAINTS **312**
George T. Amariucai, Shuangqing Wei, Rajgopal Kannan, Louisiana State University

INFORMATION THEORY II

FINDING A NEEDLE IN A HAYSTACK (INVITED) **318**
Bruno Jedynak and Damianos Karakos, the Johns Hopkins University

PERFORMANCE OF COOPERATION STRATEGIES FOR A DIAMOND RELAY NETWORK **319**
Feng Xue, Sumeet Sandhu, Intel Corporation

CORRELATED SOURCES OVER AN ASYMMETRIC MULTIPLE ACCESS CHANNEL WITH ONE DISTORTION CRITERION **325**
Deniz Gündüz, Elza Erkip, Polytechnic University

THE POISSON FADING CHANNEL (INVITED) **331**
Kaushik Chakraborty, University of California at San Diego; Prakash Narayan, University of Maryland

VECTOR WYNER-ZIV CODING FOR VECTOR GAUSSIAN CEO PROBLEM **333**
Shih-Chun Lin, Hsuan-Jung Su, National Taiwan University

COOPERATION STRATEGIES FOR TWO CO-LOCATED RECEIVERS, WITH NO CSI AT THE TRANSMITTER **339**
Amichai Sanderovich, Avi Steiner, Shlomo Shamai (Shitz), Technion

COGNITIVE COMMUNICATIONS AND NETWORKS

PROFIT MAXIMIZING PRICING STRATEGIES FOR DYNAMIC SPECTRUM ALLOCATION **345**
Joydeep Acharya, Roy D. Yates, Rutgers University

POWER ALLOCATION FOR MULTI-ANTENNA MULTIPLE ACCESS CHANNELS IN COGNITIVE RADIO NETWORKS 351
Lan Zhang, Yan Xin, National University of Singapore; Ying-Chang Liang, Institute of Inforcomm Research

INTER-NETWORK RESOURCE SHARING AND IMPROVING THE EFFICIENCY OF BEYOND 3G SYSTEMS 357
Mehdi Bennis, University of Oulu; Jorma Lilleberg, Nokia Technology Platforms

OPPORTUNISTIC MAC PROTOCOLS FOR COGNITIVE RADIO BASED WIRELESS NETWORKS 363
Hang Su, Xi Zhang, Texas A&M University

DETECTING PRIMARY TRANSMITTERS VIA COOPERATION AND MEMORY IN COGNITIVE RADIO 369
A. Betran-Martinez, O. Simeone, Y. Bar-Ness, CWCSPR, NJIT

MODULATION AND COMMUNICATIONS SYSTEMS

COOPERATIVE RELAYING WITH CARRIER FREQUENCY UNCERTAINTY 370
Satya Prakash Ponnaluri, Stephen G. Wilson, University of Virginia

EMITTER LOCALIZATION AND VISUALIZATION (ELVIS): A BACKWARD RAY TRACING ALGORITHM FOR LOCATING EMITTERS 376
Aliye Özge Kaya, Larry Greenstein, Rutgers University; Dmitry Chizhik,
Reinaldo Valenzuela, Bell Labs; Nader Moayeri, National Institute of Standards and Technology

COMMUNICATION-BASED MOTION PLANNING 382
Alex Fridman, Jay Modi, Steven Weber, and Moshe Kam, Drexel University

EFFECT OF CARRIER OFFSET ON THE CLASSIFICATION OF DIGITAL MODULATION SIGNALS BASED ON THE PRODUCT OF TWO CONSECUTIVE SIGNAL VALUES 388
H. Mustafa, M. Doroslovački, the George Washington University

PERFORMANCE EVALUATION OF VOICE CALL OVER AN IP BASED NETWORK 392
N.Sulaiman, R.Carrasco, G.Chester, Newcastle University

THE CAPACITY OF NONCOHERENT CONTINUOUS-PHASE FREQUENCY SHIFT KEYING 396
Shi Cheng, Rohit Iyer Seshadri, Matthew C. Valenti, West Virginia University;
Don Torrieri, U.S. Army Research Lab

COOPERATIVE DIVERSITY II

HALF-DUPLEX COOPERATIVE TRANSMISSION FOR THE RELAY CHANNEL WITH FLOW OPTIMIZATION 402
Tan F. Wong, University of Florida; Tat M. Lok, Chinese University of Hong Kong; John M. Shea, University of Florida

ACHIEVABLE RATE REGION OF A TWO PHASE BIDIRECTIONAL RELAY CHANNEL 408
Tobias J. Oechtering, Technical University of Berlin; Clemens Schnurr,
Fraunhofer German-Sino Lab for Mobile Communications; Igor Bjelakovic, Holger Boche,
Technical University of Berlin

ON DISCRETE MEMORYLESS RELAY CHANNELS WITH DESIGNABLE TRANSMITTER SIDE INFORMATION 414
Youjian (Eugene) Liu, Bin Xu, Mahesh K. Varanasi, University of Colorado, Boulder

MULTIUSER DIVERSITY IN WIRELESS NETWORKS: A DIVERSITY-MULTIPLEXING PERSPECTIVE 419
Kaushik Josiam, Dinesh Rajan, Southern Methodist University

ALGORITHMS II

ON MATRIX MULTIPLICATION USING PROGRAMMABLE GRAPH ARCHITECTURE 420
Manish Kumar Shukla, A. Yavuz Oruc, University of Maryland

WEIGHTED SUM-RATE OPTIMIZATION FOR MULTIUSER MIMO SYSTEMS 425
Shuying Shi, Martin Schubert, Holger Boche, Fraunhofer German-Sino Lab For Mobile Communications MCI

FPGA ARCHITECTURE OF STABLE-SORTING ON A LARGE DATA VOLUME: APPLICATION TO VIDEO SIGNALS 431
Kumara Ratnayake, Aishy Amer, Concordia University

A DECOMPOSITION OF THE DOWNLINK UTILITY MAXIMIZATION PROBLEM 437
Johannes Brehmer, Wolfgang Utschick, Munich University of Technology

DETECTION, ESTIMATION, AND FILTERING II

COPING WITH NOISE IN E. COLI CHEMOTAXIS 442
Burton W. Andrews, the Johns Hopkins University; Tau-Mu Yi, University of California, Irvine; Pablo A. Iglesias, the Johns Hopkins University

HIDDEN MARKOV MODELS AS SELF-ORGANIZING MAPS TO EXPLOIT TIME DEPENDENCIES IN DATA CLUSTERING 444
Kejing Liu, Javier Garcia-Frias, University of Delaware

A MULTI-TIER MODEL FOR BER PREDICTION OVER WIRELESS RESIDUAL CHANNELS 450
Yongju Cho, Electronics and Telecommunications Research Institute, Michigan State University; Syed Ali Khayam, Hayder Radha, Michigan State University; Jaegon Kim, Jinwoo Hong, Electronics and Telecommunications Research Institute

DATA DETECTION AND ESTIMATION OF FIXED SYMBOL-TIMING IN FLAT FADING CHANNELS 456
Tadesse Ghirmai, Jackson State University

THE ESTIMATION AND REMOVAL OF UNKNOWN BACKGROUND SIGNATURES IN RAMAN-SHIFT SPECTRA VIA SWTPE 462
Abhijit Yeshwantpur, Hughes Network Systems; Joel M. Morris, University of Maryland, Baltimore County

CODING II

THE DESIGN OF THE MAXIMUM-LIKELIHOOD DECODING ALGORITHM OF LDPC CODES OVER BEC 463
Ki-Moon Lee, Hayder Radha, Michigan State University

UNIVERSAL CONTEXT BASED DECODING WITH NON-SYSTEMATIC LOW-DENSITY PARITY-CHECK CODES 469
Li Wang, Gil I. Shamir, University of Utah; Joseph J. Boutros, ENST

A UNION BOUND APPROXIMATION FOR RAPID PERFORMANCE EVALUATION OF PUNCTURED TURBO CODES 474
Ioannis Chatzigeorgiou, Miguel R. D. Rodrigues and Ian J. Wassell, University of Cambridge; Rolando Carrasco, University of Newcastle

PEG ALGORITHM BASED INTERLEAVERS DESIGN FOR IDMA SYSTEM 480
Zhisong Bie, Weiling Wu, Beijing University of Posts and Telecommunications

A PRACTICAL HYBRID-ARQ PROTOCOL USING NONCOHERENT ORTHOGONAL MODULATION 484
Syed Amaar Ahmad, Matthew C. Valenti, West Virginia University

MIMO II

ESTIMATION OF BLOCK-FADING CHANNELS WITH REDUCED-RANK CORRELATION MATRIX 490
O. Simeone, Njit, Politecnico Di Milano; U. Spagnolini, Politecnico Di Milano

LOW COMPLEXITY ANTENNA SELECTION FOR SPATIAL MULTIPLEXING SYSTEMS WITH VBLAST DETECTION 494
Youngtaek Bae, Jungwoo Lee, Seoul National University

A NEW LATTICE-REDUCTION-BASED RECEIVER FOR MIMO SYSTEMS 499
Jun Niu, I-Tai Lu, Polytechnic University

EFFECTS OF MUTUAL COUPLING ON THE DIVERSITY ORDER OF EGT SYSTEMS 505
Nahal Maleki, University of Tehran; Ebrahim Karami, University of Oulu; Mohsen Shiva, University of Tehran

JOINT ML CHANNEL TRACKING AND DECODING FOR MIMO CHANNELS 511
Ebrahim Karami, Markku Juntti, University of Oulu

IMAGE PROCESSING

GENERAL RECONSTRUCTION OF LAPLACIAN PYRAMID AND ITS DUAL FRAME SOLUTIONS 514
Lijie Liu, the Johns Hopkins University; Lu Gan, the University of Liverpool; Trac D. Tran, the Johns Hopkins University

A NEW AUTOMATED QUALITY ASSESSMENT ALGORITHM FOR NIGHT VISION IMAGE FUSION 518
Yin Chen, Rick S. Blum, Lehigh University

ON THE PASCAL TRANSFORM AND THRESHOLD SELECTION 524
Thomas J. Goodman, Maurice F. Aburdene, Bucknell University

ON CAPACITY OF AUTOMATIC TARGET RECOGNITION SYSTEMS UNDER THE CONSTRAINT OF PCA-ENCODING 530
Xiaohan Chen, Natalia A. Schmid, West Virginia University

FUSION FOR COMPONENT BASED FACE RECOGNITION 535
Yanjun Yan, Lisa Ann Osadciw, Syracuse University

OFDM

CHANNEL-ADAPTIVE OPTIMAL OFDMA SCHEDULING **536**
Xin Wang, Florida Atlantic University; Georgios B. Giannakisy, Yingqun Yuy, University of Minnesota

DIFFERENTIAL SPACE-FREQUENCY GROUP CODES FOR MIMO-OFDM **542**
Engin Zeydan, Uf Tureli, Stevens Institute of Technology

LOW COMPLEXITY CHANNEL TRACKING FOR ADAPTIVE MMSE CHANNEL ESTIMATION IN OFDM **548**
Kyowon Jeong, Jungwoo Lee, Seoul National University

COOPERATIVE MULTIPLE TRELLIS CODED MODULATION FOR OFDM SYSTEMS **553**
Jialing Li, Andrej Stefanov, Polytechnic University

CONSTANT ENVELOPE ORTHOGONAL FREQUENCY-DIVISION MULTIPLEXING PHASE MODULATION FOR RADAR PULSE COMPRESSION **558**
John P. Stralka, Gerard G. L. Meyer, the Johns Hopkins University

COORDINATE INTERLEAVING OVER PARALLEL GAUSSIAN CHANNELS **560**
K. V. Srinivas, K. Giridhar, R. D. Koilpillai, Indian Institute of Technology, Madras

MULTIPLE ACCESS II

A SCHEME FOR MULTIUSER COMMUNICATIONS BASED ON ENERGY DIVISION **561**
Pierluigi Salvo Rossi, Norwegian University of Science and Technology, Second University of Naples; Gianmarco Romano, Second University of Naples; Francesco Palmieri, Second University of Naples; Davide Mattera, University of Naples "Federico Ii"; Stefano Marano, University of Salerno

IMPACT OF THE NUMBER OF USERS ON ERROR PROBABILITIES IN MULTIUSER DIVERSITY SYSTEMS **566**
Youngwook Ko, Cihan Tepedelenlioğlu, Arizona State University

ON THE STABILITY OF HYBRID ALOHA **570**
Huahui Wang, Tongtong Li, Michigan State University

THE RATE REGION OF A COOPERATIVE SCHEDULING SYSTEM **576**
Anantharaman Balasubramanian, Lingjia Liu, Scott L. Miller, and Jean-François Chamberland, Texas A&M University

DISCRETE MEMORYLESS INTERFERENCE CHANNELS WITH FEEDBACK **581**
Jinhua Jiang, Yan Xin, Hari Krishna Garg, National University of Singapore

RANDOM ACCESS CHANNEL WITH RETRANSMISSION GAIN **585**
Junmin Shi, Rutgers Business School-Newark; Yi Sun, City College of New York

SENSOR NETWORKS II

COLLECTOR RECEIVER DESIGN FOR DATA COLLECTION AND LOCALIZATION IN SENSOR-DRIVEN NETWORKS 591
Bharath Ananthasubramaniam, and Upamanyu Madhow, University of California

SENSOR LOCATION THROUGH LINEAR PROGRAMMING WITH ARRIVAL ANGLE CONSTRAINTS 597
Camillo Gentile, John Shiu, National Institute of Standards and Technology

RANDOM WALK MODELS FOR GEOGRAPHIC DATA PROPAGATION IN WIRELESS SENSOR NETWORKS 604
Silvija Kokalj-Filipović, Roy Yates, Predrag Spasojević, Rutgers University

AN EM TECHNIQUE FOR MULTIPLE TRANSMITTER LOCALIZATION 610
Jill K. Nelson, George Mason University; Maya R. Gupta, University of Washington

TRADEOFF ANALYSIS AND OPTIMIZATION OF SECURITY AND SPATIAL RESOLUTION FOR SENSOR NETWORKS 616
Emrah Tomur, Middle East Technical University; Y. M. Erten, Tobb Economy and Technology University

THE IMPACT OF RECEIVE DIVERSITY IN THE PRESENCE OF CORRELATION IN WIRELESS SENSOR NETWORKS 621
Sivanvitha Devarakonda, Hayder Radha, Michigan State University

ACOUSTIC MICRO-DOPPLER GAIT SIGNATURES FOR HUMANS AND ANIMALS 627
Z. Zhang, the Johns Hopkins University; P.O. Pouliquen, the Johns Hopkins University; A. Waxman, Bae Systems; A.G. Andreou, the Johns Hopkins University

ROUTING IN WIRELESS NETWORKS

SYSTEM-LEVEL PERFORMANCE OF CELLULAR MULTIHOP RELAYING WITH MULTIUSER SCHEDULING 631
Mohamad Charafeddine, Stanford University; Özgür Oymany, Sumeet Sandhu, Intel Research Laboratories

ROBUST ROUTING IN WIRELESS MULTI-HOP NETWORKS 637
Yuchen Wu, Alejandro Ribeiro, and Georgios B. Giannakis, University of Minnesota

ENERGY EFFICIENT ROUTING FOR STATISTICAL INFERENCE OF MARKOV RANDOM FIELDS 643
Animashree Anandkumar and Lang Tong, Cornell University; Ananthram Swami, Army Research Laboratory

DISTRIBUTED SPECTRUM-EFFICIENT ROUTING ALGORITHMS IN WIRELESS NETWORKS 649
Deqiang Chen, Martin Haenggi, and J. Nicholas Laneman, University of Notre Dame

INTERFERENCE MITIGATING IN WIRELESS NETWORKING USING PRIOR KNOWLEDGE 655
Kejing Liu, Stephan Bohacek, and Javier Garcia-Frias, University of Delaware

ROUTING STRATEGIES IN BROADBAND MULTIHOP COOPERATIVE NETWORKS 661
Bo Gui, Lin Dai, and Leonard J. Cimini, Jr., University of Delaware

OPTICAL COMMUNICATIONS

COHERENT OPTICAL CDMA WITH LOW MAI 667
A. Brinton Cooper III, Jacob B. Khurgin, Shuangmei Xu, and Jin U. Kang, the Johns Hopkins University

COOPERATIVE STOCHASTIC CONTROL FOR OPTICAL BEAM TRACKING **673**
Arash Komaee, University of Maryland

MULTI-INPUT MULTI-OUTPUT FREE SPACE OPTICAL SATELLITE COMMUNICATION LINKS **679**
V. Weerackody, A. R. Hammons, and D. J. Tebben, the Johns Hopkins University

OPTIMAL HYBRID RF-WIRELESS OPTICAL COMMUNICATION FOR MAXIMUM EFFICIENCY AND RELIABILITY **684**
Sarma Vangala and Hossein Pishro-Nik, University of Massachusetts

A RIGOROUS OPTICAL DPSK TRANSCEIVER MODEL AND BER CALCULATION USING THE KLSE METHOD **690**
Qun Zhang, Minnesota State University; Curtis R. Menyuk, University of Maryland, Baltimore County

PRECODING FOR NON-LINEAR INTERFERENCE LIMITED WDM SYSTEMS **696**
Kirtan N. Modi and Maïté Brandt-Pearce, University of Virginia

SOURCE CODING AND COMPRESSION

OPPORTUNISTIC SAMPLING BY LEVEL-CROSSING **701**
Karen M. Gua and Andrew C. Singer, University of Illinois at Urbana-Champaign

SLEPIAN-WOLF CODING USING PARITY APPROACH AND SYNDROME APPROACH **708**
Peiyu Tan, Kai Xie, and Jing Li (Tiffany), Lehigh University

UNIVERSAL QUADRATIC LOWER BOUNDS ON SOURCE CODING ERROR EXPONENTS **714**
Cheng Chang, Anant Sahai, University of California at Berkeley

RATE-DISTORTION ANALYSIS OF MULTIPLIERLESS LIFTING-BASED IDCT APPROXIMATIONS **720**
Lijie Liu and Trac D. Tran, the Johns Hopkins University

PERFORMANCE STUDY ON VARIOUS SPARSE REPRESENTATIONS METHODS USING REDUNDANT FRAMES **726**
Mehmet Akçakaya, Vahid Tarokh, Harvard University

EXIT CHART ANALYSIS FOR A SINGLE SOURCE TURBO COMPRESSION SCHEME **730**
Bilal Riaz, Jan Bajcsy, Mcgill University

EXPLOITING PRIOR KNOWLEDGE IN THE RECOVERY OF NON-SPARSE SIGNALS FROM NOISY RANDOM PROJECTIONS **731**
Iñaki Esnaola, Javier Garcia-Frias, University of Delaware

SPECIAL SESSION ON VLSI

AN ATTEMPT TOWARDS CHARGE-DOMAIN LOGIC (CDL) **732**
Koichi Itoh, Masashi Yamazaki, and Shinji Nakamura, Tamagawa University;
Yasuo Nagazumi, GDS, Inc.

ARCHITECTURE OF A μRFID WITH INTEGRATED ANTENNA IN 3D SOI-CMOS **737**
E. Choi, A.G. Andreou, the Johns Hopkins University

SINGLE PHOTON AVALANCHE DETECTORS INTSMC 0.18 μM TECHNOLOGY **741**
M. Adlerstein, A.G. Andreou, the Johns Hopkins University

A MULTIPLYING DIGITAL-TO-ANALOG CONVERTOR (MDAC) BY CHARGE-DOMAIN OPERATION 745
Junko Ikari, Shinji Nakamura, Tamagawa University; Yasuo Nagazumi, GDS, Inc.

DESIGN OF ULTRA WIDE BAND TRANSMITTER IN 3D SOI-CMOS 750
Z. Zhang, A.G .Andreou, The Johns Hopkins University

EFFICIENT DESIGNS FOR ADDER COMPARATOR 754
Hisako Adachi, Shinji Nakamura, Tamagawa University

ADDRESS DATA EVENT REPRESENTATION FOR EFFICIENT NEUROMORPHIC INTER-CHIP COMMUNICATION 755
J. Georgiou, University of Cyprus; A.G.Andreou, The Johns Hopkins University

SENSOR NETWORKS III

NONPARAMETRIC PROBABILITY DENSITY ESTIMATION FOR SENSOR NETWORKS USING QUANTIZED MEASUREMENTS 759
Aleksandar Dogandzic, Benhong Zhang, Iowa State University

A POWER SENSOR NETWORK FOR IDENTIFICATION OF HETEROGENEOUS WIRELESS NETWORKS 765
Goran Ivkovic, Predrag Spasojevic, and Ivan Seskar, Rutgers University

DYNAMIC SELF-CALIBRATION IN COLLABORATIVE WIRELESS NETWORKS USING BELIEF PROPAGATION WITH GAUSSIAN-PARTICLE FILTERING 771
Yanbing Zhang, Huaiyu Dai, North Carolina State University

DECODING A FUNCTION FROM NOISY SENSOR DATA: A FACTOR GRAPH APPROACH 777
João Barros, University of Porto; Michael Tuechler, Contraves Space Agency

ALOHA FOR WIRELESS SENSOR NETWORKS WITH RANDOM FREQUENCY OFFSETS 782
Kirtan N. Modi, Satya Ponnaluri, Stephen G. Wilson and Maite Brandt-Pearce, University of Virginia

TOPICS IN NETWORKING

RELAY PLACEMENT AND MOVEMENT CONTROL FOR REALIZATION OF FAULT-TOLERANT AD HOC NETWORKS 783
Abhishek Kashyap, Mark Shayman, University of Maryland

QUANTUM SWITCHING NETWORKS WITH CLASSICAL ROUTING 789
Rahul Ratan, Manish Kumar Shukla, and A. Yavuz Oruç, University of Maryland

HEAVY TRAFFIC ANALYSIS OF A MULTI-CLASS LOSS LINK WITH PREEMPTION 794
Zhen Zhao, Steven Weber, and Jaudelice C. De Oliveira, Drexel University

WIRELESS MULTICASTING WITH CHANNEL UNCERTAINTY 800
Jie Lu, Colorado State University; Anthony Ephremides, University of Maryland

HOW MANY USERS SHOULD BE TURNED ON IN A MULTI-ANTENNA BROADCAST CHANNEL? 806
Wei Dai, Youjian (Eugene) Liu, and Brian Rider, University of Colorado, Boulder

A PROPOSAL FOR THE SECURITY OF PEER-TO-PEER (P2P) NETWORKS: A PRICING MODEL INSPIRED BY THE THEORY OF COMPLEX NETWORKS 812

Daniel O. Rice, Loyola College in Maryland

SIGNAL PROCESSING

A NEW DESIGN PARADIGM FOR MIMO DISPERSIVE CHANNEL DF EQUALIZER **814**
Davide Mattera, Università Degli Studi Di Napoli Federico Ii;
Francesco Palmieri, Seconda Università Degli Studi Di Napoli

APPROACHING OPTIMAL PERFORMANCE BY LATTICE-REDUCTION AIDED SOFT DETECTORS **818**
Wei Zhang, Xiaoli Ma, Georgia Institute of Technology

ON BLIND ADAPTIVE DECISION FEEDBACK EQUALIZATION FOR BLOCK QAM SIGNALS **823**
Arlene Cole-Rhodes, Antoinette Beasley, Morgan State University

ITERATIVE FREQUENCY DOMAIN CHANNEL ESTIMATION AND EQUALIZATION FOR SINGLE CARRIER SYSTEM **829**
Hong Liu, Philip Schniter, Ohio State University

DISCRETE-TIME DITHERING TECHNIQUE FOR DESIGNING TIME-VARYING SIGNAL ADAPTED FILTER BANKS **838**
Peter Vouras, Trac Tran, the Johns Hopkins University

ECHO-CANCELLATION FOR ULTRASONIC DATA TRANSMISSION THROUGH A METAL CHANNEL **841**
Richard Primerano, Kevin Wanuga, Joseph Dorn, Moshe Kam, and Kapil Dandekar, Drexel University

SPACE TIME CODING

POWER-EFFICIENT RELAY SELECTION FOR DECENTRALIZED DISTRIBUTED SPACE-TIME BLOCK CODING **846**
Lu Zhang, Lin Dai, Leonard J. Cimini, Jr., University of Delaware

A NEW FULL RATE FULL DIVERSITY ORTHOGONAL SPACE-TIME BLOCK CODE FOR THREE TRANSMIT ANTENNAS **851**
Ning Yang, Masoud Salehi, Northeastern University

A NEW GENERIC MAXIMUM-LIKELIHOOD METRIC EXPRESSION FOR SPACE-TIME BLOCK CODES WITH APPLICATIONS TO DECODING **857**
Jeff Leuschner, Shahram Yousefi, Queen's University

PERFORMANCE OF SPACE-TIME CODED SYSTEMS WITH TRANSMIT ANTENNA SELECTION **863**
Tansal Gucluoglu, Kadir Has University; Tolga M. Duman, Arizona State University

SPECTRAL-EFFICIENT GRASSMANN CODES FOR NON-COHERENT MIMO SYSTEMS **869**
Zoran Utkovski, Juergen Lindner, University of Ulm

BEAMFORMING

A SEMI-BLIND ADAPTIVE GSM BEAMFORMER USING RE-ENCODED DATA **870**
Myung-Hoon Yeon and John J. Shynk, University of California; Richard P. Gooch, Applied Signal Technology, Inc.

CHIP-LEVEL COORDINATED INTERFERENCE-AWARE BEAMFORMING FOR MIMO-CDMA IN FREQUENCY-SELECTIVE BROADCAST CHANNELS 874
Jin He, and Masoud Salehi, Northeastern University

A HIGH-THROUGHPUT CROSS-LAYER SCHEME FOR DISTRIBUTEDWIRELESS ADHOC NETWORKS 878
Athina P. Petropulu, Lun Dong, Drexel University; H. Vincent Poor, Princeton University

PERFORMANCE EVALUATION OF QUANTIZED FEEDBACK BEAMFORMING IN IEEE 802.11N 884
Xiantao Su and, Leonard J. Cimini, University of Delaware; Larry J. Greenstein, Rutgers University; Douglas S. Chan and Brett Douglas, Cisco Systems

ON UTILITY-BASED POWER CONTROL AND RECEIVE BEAMFORMING 889
Sławomir Stańczak, Fraunhofer German-Sino Lab For Mobile Communications; Angela Feistel, Technical University of Berlin

SECURITY AND SECRECY

DETECTING MALICIOUS BEHAVIOR IN COOPERATIVE DIVERSITY 895
Sintayehu Dehnie, Husrev T. Sencar, and Nasir Memon, Polytechnic University

A FRAMEWORK FOR ESTIMATING THE CAPACITY OF MULTI CHANNEL DIGITAL IMAGE WATERMARKING 900
Kalyan. R. Kothinti, Wichita State University; Vyagreswara Rao Namuduri, DMRL; Kamesh R. Namuduri, Wichita State University

SECRET COMMUNICATION VIA MULTI-ANTENNA TRANSMISSION 905
Zang Li, Wade Trappe, Roy Yates, Rutgers University

TOWARDS OPTIMAL DESIGN OF DATA HIDING ALGORITHMS AGAINST NONPARAMETRIC ADVERSARY MODELS 911
Alvaro A. Cárdenas, University of California; George V. Moustakides, University of Patras; John S. Baras, University of Maryland

SECRECY THROUGHPUT OF BLOCK-FADING CHANNELS WITH NO CHANNEL STATE INFORMATION AT TRANSMITTER 917
Xiaojun Tang, Ruoheng Liu, and Predrag Spasojevic, Rutgers University

LOSSLESS COMPRESSION-BASED STEGANALYSIS OF LSB EMBEDDED IMAGES 923
Charles Boncelet, University of Delaware; Lisa Marvel, US Army Research Laboratory