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Editorial

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This is the second part of the special issue "Space-Time Coding and Its Applications." In this part, there are ten papers covering capacity of space-time coded systems, space-time code designs, decoding methods for space-time coded transmissions, and MIMO systems.

The first paper by C. B. Papadias and G. J. Foschini is in the area of capacity issues of space-time coded MIMO systems. This paper considers some capacity issues of some space-time coded systems. It proposes attainable capacities that mean the capacities achieved by different techniques with the use of progressively stronger known encoding/decoding techniques.

The second three papers are in the area of space-time code designs. The paper by W. Firmanto, B. Vucetic, J. Yuan, and Z. Chen presents a design of space-time turbo trellis coded modulation by proposing a new recursive space-time trellis coded modulation. The proposed scheme is less than 3 dB away from the theoretical capacity bound for MIMO channels. The paper by H.-J. Su and E. Geraniotis considers some detailed design issues and tradeoffs of a space-time coded MIMO system. The paper by S. A. Zummo and S. A. Al-Semari presents an 8PSK trellis space-time code design that is suitable for rapid fading channels. They propose two approaches or their design: (i) to maximize the symbol-wise Hamming distance between signals leaving from or remerging to the same encoder's state; (ii) to partition a set based on maximizing the sum of squared Euclidean distances and also the branch-wise Hamming distance.

The next three papers focus on the topic of channel estimation for space-time coded systems. The paper by B. Chen, A. P. Petropulu, and L. De Lathauwer addresses the problem of blind identification of a convolutive MIMO system with more inputs than outputs. It considers the problem in the frequency domain where, for each frequency, it constructs two tensors based on cross-polyspectra of the output. Innovative solutions are proposed to resolve frequency dependent scaling and permutation ambiguities. The paper by H. A. Çırpan, E. Panayırcı, and E. Çekli considers the problem of blind estimation of space-time coded signals along with the channel parameters. In this paper, both conditional and unconditional maximum likelihood approaches are developed and iterative solutions are proposed. The paper by K. F. Lee and D. B. Williams considers space-time coded orthogonal frequency division multiplexing (OFDM) systems with multi-transmit antennas. In this paper, a low complexity, bandwidth efficient, pilot-symbol-assisted channel estimator for multi-transmit antenna OFDM systems is proposed.

The final three papers are in the area of decoding/demodulation of space-time coded systems. The paper by N. Sellami, I. Fijalkow, and M. Siala presents a low complexity turbo-detector scheme for space-time coded frequency selective MIMO channels. The paper by H. Vikalo and B. Hassibi presents a sphere decoder for sequence detection in multiple-antenna communication systems over dispersive channels. The sphere decoder provides the ML sequence estimate with computational complexity comparable to standard space-time decision-feedback equalizing (DFE) algorithms. The paper by G. Wang, A. Song and X.-G. Xia introduces linear equalization to reduce a convolutive MIMO channel to a flat MIMO channel that may possibly be only partially known. Detection of differential space-time

modulation becomes hence feasible. Multiple symbol decision feedback detection is considered for improved performance.

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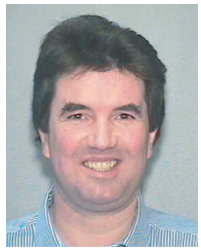

Dirk Slock received the engineer's degree from the University of Gent, Belgium in 1982. In 1984, he was awarded a Fulbright scholarship for Stanford University, USA, where he received his M.S. in Electrical Engineering, M.S. in Statistics, and Ph.D. in Electrical Engineering in 1986, 1989, and 1989, respectively. While at Stanford, he developed new fast recursive least-squares algorithms for adaptive filtering. In 1989–1991, he was a member of the research staff at the Philips Research Laboratory, Belgium. In 1991, he joined the Eurecom Institute where he is now Associate Professor. At Eurecom, he teaches statistical signal processing and speech coding for mobile communications. His research interests include DSP for mobile communications: antenna arrays for (semi-blind) equalization/interference cancellation and spatial division multiple access, space-time processing and audio coding. More recently, he has been focusing on receiver design, downlink antenna array processing, and speech coding for third generation systems, and introducing spatial multiplexing in existing wireless systems. He received one best journal paper award from the IEEE-SP and one from EURASIP in 1992. He is the coauthor of two IEEE-Globecom98 best student paper awards. He has been an Associate Editor for the IEEE-SP Transactions.

Vahid Tarokh received his Ph.D. degree in Electrical Engineering from the University of Waterloo, Ontario, Canada in 1995. From August 1995 to May 1996, he was employed by the Coordinated Science Laboratory of the University of Illinois Urbana-Champaign, as a visiting Professor. He then joined the AT&T Labs-Research, where he was employed as a Senior Member of Technical Staff, Principal Member of Technical Staff, and the Head of the Department of Wireless Communications and Signal Processing until August 2000. In the fall of 2000, Dr. Tarokh joined the Department of Electrical Engineering and Computer Sciences of MIT as an Associate Professor, where he is currently employed. Dr. Tarokh received numerous awards including the 1987 Gold Tablet of the Iranian Math Society, the 1995 Governor General of Canada's Academic Gold Medal, the 1999 IEEE Information Theory Society Prize Paper Award (jointly with A. R. Calderbank and N. Seshadri), and more recently the 2001 Alan T. Waterman Award.

Xiang-Gen Xia received his B.S. degree in mathematics from Nanjing Normal University, Nanjing, China, his M.S. degree in mathematics from Nankai University, Tianjin, China, and his Ph.D. degree in Electrical Engineering from the University of Southern California, Los Angeles, USA in 1983, 1986, and 1992, respectively. He was a Lecturer at Nankai University, China during 1986–1988, a Teaching Assistant at University of Cincinnati, USA during 1988–1990, a Research Assistant at the University of Southern California, USA during 1990–1992, and a Research Scientist at the Air Force Institute of Technology during 1993–1994. He was a Senior/Research Staff Member at Hughes Research Laboratories, Malibu, California, during 1995–1996. In September 1996, he joined the Department of Electrical and Computer Engineering, University of Delaware, Newark, Delaware, USA, where he is currently an Associate Professor. His current research interests include communication systems including equalization and coding; SAR and ISAR imaging of moving targets, wavelet transform and multirate filterbank theory and applications; time-frequency analysis and synthesis; and numerical analysis and inverse problems in signal/image processing. Dr. Xia has over 80 refereed journal articles published, and four U.S. patents awarded. He is the author of the book "Modulated Coding for Intersymbol Interference Channels" (New York, Marcel Dekker, 2000). Dr. Xia received the National Science Foundation (NSF) Faculty Early Career Development (CAREER) Program Award in 1997, the Office of Naval Research (ONR) Young Investigator Award in 1998, and the Outstanding Overseas Young Investigator Award from the National Nature Science Foundation of China in 2001. He also received the Outstanding Junior Faculty Award of the Engineering School of the University of Delaware in 2001. He is currently an Associate Editor of the IEEE Transactions on Mobile Computing, the IEEE Transactions on Signal Processing and the EURASIP Journal on Applied Signal Processing. He is also a Member of the Signal Processing for Communications Technical Committee in the IEEE Signal Processing Society.