Near-Capacity Multi-Functional MIMO Systems: Sphere-Packing, Iterative Detection and Cooperation
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DESCRIPTION

Providing an all-encompassing self-contained treatment of Near-Capacity Multi-Functional MIMO Systems, the book starts by categorizing the family of Multiple-Input Multiple-Output (MIMO) schemes as diversity techniques, multiplexing schemes, multiple access arrangements and beam-forming techniques. Sophisticated coherent and low-complexity non-coherent MIMO receivers dispensing with channel estimation are considered in both classic and cooperation-aided scenarios. It is demonstrated that in the presence of correlated shadow-fading, cooperation-assisted systems may be expected to outperform their non-cooperative counterparts. The book contains a 100-page chapter on the unified treatment of all block codes in the context of high-flexibility, cutting-edge irregular Linear Dispersion Codes (LDC), which approach the MIMO-capacity. The majority of the book’s solutions are in the optimum sphere-packing frame-work.

- Sophisticated amalgam of five year’s near-capacity MIMO research
- Detailed examination of wireless landscape, including the fields of channel coding, spacetime coding and turbo detection techniques
- Novel tool of Extrinsic Information Transfer Charts (EXIT) used to address recent developments
- Material presented logically, allowing advanced readers to turn directly to any specific chapter of interest
- One of the only books to cover these subjects, giving equal weighting to each
ABOUT THE AUTHOR

Lajos Hanzo  FREng, FIEEE, FIET, DSc received his degree in electronics in 1976 and his doctorate in 1983. During his 31-year career in telecommunications he has held various research and academic posts in Hungary, Germany and the UK. Since 1986 he has been with the School of Electronics and Computer Science, University of Southampton, UK, where he holds the chair in telecommunications. He has co-authored 17 books on mobile radio communications totaling in excess of 10 000 pages, published in excess of 800 research papers, acted as TPC Chair of several IEEE conferences, presented keynote lectures and been awarded a number of distinctions. Currently he is directing an academic research team, working on a range of research projects in the field of wireless multimedia communications sponsored by industry, the Engineering and Physical Sciences Research Council (EPSRC) UK, the European IST Programme and the Mobile Virtual Centre of Excellence (VCE), UK. He is an enthusiastic supporter of industrial and academic liaison and he offers a range of industrial courses. He is also an IEEE Distinguished Lecturer as well as a Governor of both the IEEE ComSoc and the VTS. He is the acting Editor-in-Chief of the IEEE Press. For further information on research in progress and associated publications please refer to http://www-mobile.ecs.soton.ac.uk.

Osamah Rashed Alamri received his BS degree with first class honours in electrical engineering from King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Saudi Arabia, in 1997, where he was ranked first with a 4.0 GPA. In 2002, he received his MS degree in electrical engineering from Stanford University, California, USA. He submitted his PhD thesis in October 2006 and published in excess of 20 research papers while working towards his PhD degree with the Communications Group, School of Electronics and Computer Science, University of Southampton, UK. His research interests include sphere packing modulation, space-time coding, turbo coding and detection, multi-dimensional mapping and MIMO systems. At the time of writing he is continuing his investigations as a post-doctoral researcher.

Mohammed El-Hajjar received his BEng degree (with distinction) in electrical engineering from the American University of Beirut (AUB), Lebanon, and his MSc degree (with distinction) in radio frequency communication systems from the University of Southampton, UK. Since October 2005, he has been working towards his PhD degree with the Communications Group, School of Electronics and Computer Science, University of Southampton, UK. He is the recipient of several academic awards from the AUB as well as the University of Southampton. His research interests include sphere packing modulation, space-time coding, differential space-time spreading, adaptive transceiver design and cooperative communications. In 2008 he completed his PhD thesis and joined Ensigma in Chepstow, Wales, UK, as a wireless system architect.

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