
WIRELESS COMMUNICATION USING DUAL ANTENNA ARRAYS

by
Da-shan Shiu

Foreword by Joseph M. Kahn

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Wireless Communication Using Dual Antenna Arrays

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Da-Shan Shiu



Wireless Communication Using Dual Antenna Arrays

Wireless Communication Using Dual Antenna Arrays Da-shan Shiu, 2005-12-17 At present the expansion of tetherless communications is a technological trend surpassed perhaps only by the explosive growth of the Internet Wireless systems are being deployed today mainly for telephony satisfying the individualized nations appetite for talk on the go and providing much needed communications infrastructure in developing countries The desire for wireless access to the Internet is starting to add fuel to the growth of tetherless communications Indeed the synergy of wireless and Internet technologies will lead to a host of exciting new applications some of which are not yet envisioned Future generation wireless systems will achieve capacities much higher than the systems of today by incorporating myriad improvements These innovations include transmission in higher frequency bands smart antennas multi user detection new forward error correction techniques and advanced network resource allocation techniques The term smart antenna usually refers to the deployment of multiple antennas at the base station site coupled with special processing of the multiple received signals Smart antennas can adaptively reject co channel interference and mitigate multipath fading and have been identified by many as a promising means to extend base station coverage increase system capacity and enhance quality of service **Wireless**

Communications Using Dual Antenna Arrays Da-Shan Shiu, 1999 **Advanced Antenna Array Engineering for 6G and Beyond Wireless Communications** Yingjie Jay Guo, Richard W. Ziolkowski, 2021-10-20 Advanced Antenna Array Engineering for 6G and Beyond Wireless Communications Reviews advances in the design and deployment of antenna arrays for future generations of wireless communication systems offering new solutions for the telecommunications industry Advanced Antenna Array Engineering for 6G and Beyond Wireless Communications addresses the challenges in designing and deploying antennas and antenna arrays which deliver 6G and beyond performance with high energy efficiency and possess the capability of being immune to interference caused by different systems mounted on the same platforms This timely and authoritative volume presents innovative solutions for developing integrated communications networks of high gain individually scannable multi beam antennas that are reconfigurable and conformable to all platforms thus enabling the evolving integrated land air and space communications networks The text begins with an up to date discussion of the engineering issues facing future wireless communications systems followed by a detailed discussion of different beamforming networks for multi beam antennas Subsequent chapters address problems of 4G 5G antenna collocation discuss differentially fed antenna arrays explore conformal transmit arrays for airborne platforms and present latest results on fixed frequency beam scanning leaky wave antennas as well as various analogue beam synthesizing strategies Based primarily on the authors extensive work in the field including original research never before published this important new volume Reviews multi beam feed networks array decoupling and de scattering methods Provides a systematic study on differentially fed antenna arrays that are resistant to interference caused by future multifunctional multi generation systems Features previously unpublished

material on conformal transmit arrays based on Huygen's metasurfaces and reconfigurable leaky wave antennas Includes novel algorithms for synthesizing and optimizing thinned massive arrays conformal arrays frequency invariant arrays and other future arrays Advanced Antenna Array Engineering for 6G and Beyond Wireless Communications is an invaluable resource for antenna engineers and researchers as well as graduate and senior undergraduate students in the field

Propagation Channel Characterization, Parameter Estimation, and Modeling for Wireless Communications

Xuefeng Yin, Xiang Cheng, 2016-10-24 A comprehensive reference giving a thorough explanation of propagation mechanisms channel characteristics results measurement approaches and the modelling of channels Thoroughly covering channel characteristics and parameters this book provides the knowledge needed to design various wireless systems such as cellular communication systems RFID and ad hoc wireless communication systems It gives a detailed introduction to aspects of channels before presenting the novel estimation and modelling techniques which can be used to achieve accurate models To systematically guide readers through the topic the book is organised in three distinct parts The first part covers the fundamentals of the characterization of propagation channels including the conventional single input single output SISO propagation channel characterization as well as its extension to multiple input multiple output MIMO cases Part two focuses on channel measurements and channel data post processing Wideband channel measurements are introduced including the equipment technology and advantages and disadvantages of different data acquisition schemes The channel parameter estimation methods are then presented which include conventional spectral based estimation the specular path model based high resolution method and the newly derived power spectrum estimation methods Measurement results are used to compare the performance of the different estimation methods The third part gives a complete introduction to different modelling approaches Among them both scattering theoretical channel modelling and measurement based channel modelling approaches are detailed This part also approaches how to utilize these two modelling approaches to investigate wireless channels for conventional cellular systems and some new emerging communication systems This three part approach means the book caters for the requirements of the audiences at different levels including readers needing introductory knowledge engineers who are looking for more advanced understanding and expert researchers in wireless system design as a reference Presents technical explanations illustrated with examples of the theory in practice Discusses results applied to 4G communication systems and other emerging communication systems such as relay CoMP and vehicle to vehicle rapid time variant channels Can be used as comprehensive tutorial for students or a complete reference for engineers in industry Includes selected illustrations in color Program downloads available for readers Companion website with program downloads for readers and presentation slides and solution manual for instructors Essential reading for Graduate students and researchers interested in the characteristics of propagation channel or who work in areas related to physical layer architectures air interfaces navigation and wireless sensing

MIMO System Technology for Wireless

Communications George Tsoulos, 2018-10-03 For broadband communications it was frequency division multiplexing For optical communications it was wavelength division multiplexing Then for all types of networks it was code division Breakthroughs in transmission speed were made possible by these developments heralding next generation networks of increasing capability in each case The basic idea is the same more channels equals higher throughput For wireless communications it is space time coding using multiple input multiple output MIMO technology Providing a complete treatment of MIMO under a single cover MIMO System Technology for Wireless Communications assembles coverage on all aspects of MIMO technology along with up to date information on key related issues Contributors from leading academic and industrial institutions around the world share their expertise and lend the book a global perspective They lead you gradually from basic to more advanced concepts from propagation modeling and performance analysis to space time codes various systems implementation options and limitations practical system development considerations field trials and network planning issues Linking theoretical analysis to practical issues the book does not limit itself to any specific standardization or research industrial initiatives MIMO is the catalyst for the next revolution in wireless systems and MIMO System Technology for Wireless Communications lays a thorough and complete foundation on which to build the next and future generations of wireless networks

Adaptation in Wireless Communications - 2 Volume Set Mohamed Ibnkahla, 2018-10-08 The widespread use of adaptation techniques has helped to meet the increased demand for new applications From adaptive signal processing to cross layer design Adaptation in Wireless Communications covers all aspects of adaptation in wireless communications in a two volume set Each volume provides a unified framework for understanding adaptation and relates various specializations through common terminologies In addition to simplified state of the art cross layer design approaches they also describe advanced techniques such as adaptive resource management 4G communications and energy and mobility aware MAC protocols

Modeling and Tools for Network Simulation Klaus Wehrle, Mesut Günes, James Gross, 2010-09-22 A crucial step during the design and engineering of communication systems is the estimation of their performance and behavior especially for mathematically complex or highly dynamic systems network simulation is particularly useful This book focuses on tools modeling principles and state of the art models for discrete event based network simulations the standard method applied today in academia and industry for performance evaluation of new network designs and architectures The focus of the tools part is on two distinct simulations engines OmNet and ns 3 while it also deals with issues like parallelization software integration and hardware simulations The parts dealing with modeling and models for network simulations are split into a wireless section and a section dealing with higher layers The wireless section covers all essential modeling principles for dealing with physical layer link layer and wireless channel behavior In addition detailed models for prominent wireless systems like IEEE 802 11 and IEEE 802 16 are presented In the part on higher layers classical modeling approaches for the network layer the transport layer and the application layer are presented in addition to modeling

approaches for peer to peer networks and topologies of networks The modeling parts are accompanied with catalogues of model implementations for a large set of different simulation engines The book is aimed at master students and PhD students of computer science and electrical engineering as well as at researchers and practitioners from academia and industry that are dealing with network simulation at any layer of the protocol stack

Adaptive Signal Processing in Wireless Communications Mohamed Ibnkahla, 2017-12-19 Adaptive techniques play a key role in modern wireless communication systems The concept of adaptation is emphasized in the Adaptation in Wireless Communications Series through a unified framework across all layers of the wireless protocol stack ranging from the physical layer to the application layer and from cellular systems to next generation wireless networks This specific volume Adaptive Signal Processing in Wireless Communications is devoted to adaptation in the physical layer It gives an in depth survey of adaptive signal processing techniques used in current and future generations of wireless communication systems Featuring the work of leading international experts it covers adaptive channel modeling identification and equalization adaptive modulation and coding adaptive multiple input multiple output MIMO systems and cooperative diversity It also addresses other important aspects of adaptation in wireless communications such as hardware implementation reconfigurable processing and cognitive radio A second volume in the series Adaptation and Cross layer Design in Wireless Networks cat no 46039 is devoted to adaptation in the data link network and application layers

Performance Analysis and Improvement in MIMO Communication Systems Xuhui Ding, Dekang Liu, Ziyi Yang, Gaoyang Li, Neng Ye, Kai Yang, 2025-07-04 This book focuses on the modeling and analysis of large scale array communication systems to solve the computational complexity problems caused by high dimensional arrays This is achieved by providing an in depth study on several major topics such as channel estimation delay estimation angle estimation and joint angle delay estimation Both principles and engineering practice have been addressed with more weight placed on engineering practice The energy efficiency optimization problem of multi antenna communication system is studied according to the actual situation of imperfect channel information and non ideal hardware and the corresponding high energy efficiency signal processing algorithm is proposed The book benefits researchers engineers and graduate students in the fields of wireless communications and signal processing etc

Single- And Multi-Carrier MIMO Transmission for Broadband Wireless Systems Ramjee Prasad, Muhammad Imadur Rahman, Sekhar Suvra Das, 2022-09-01 The main focus of Single and Multi Carrier MIMO Transmission for Broadband Wireless Systems is to provide the basic understanding of the underlying techniques related to PHY MAC design of future wireless systems It includes basic concepts related to single and multi carrier transmissions together with MIMO techniques Discussions related to different recent standards that use single and multi carrier transmissions are also explained Single and Multi Carrier MIMO Transmission for Broadband Wireless Systems provides a comprehensive and holistic approach to the variety of technical solutions Future system design would require these different technologies to work together and not

independently Therefore it is very important to analyze the effects and gains when they are put together in a unified platform This is the prime focus of this book Moreover the authors include recent research results which are not yet published in another form The book is intended to be used for lectures in graduate level courses at universities PhD level students should also find it useful as this book will outline the fundamental concepts and design methods for PHY and MAC layers of future wireless systems This book can also be used as a reference by engineers and developers in the industry as well as by researchers in academia For professionals system architects and managers who play a key role in the selection of a baseline system concept for future wireless standards such as IMT Advanced type architecture the authors will include discussions analysis and guidelines to highlight overall system level perspective

Reviewing **Wireless Communication Using Dual Antenna Arrays Wireless Communication Using Dual Antenna Arrays**: Unlocking the Spellbinding Force of Linguistics

In a fast-paced world fueled by information and interconnectivity, the spellbinding force of linguistics has acquired newfound prominence. Its capacity to evoke emotions, stimulate contemplation, and stimulate metamorphosis is really astonishing. Within the pages of "**Wireless Communication Using Dual Antenna Arrays Wireless Communication Using Dual Antenna Arrays**," an enthralling opus penned by a highly acclaimed wordsmith, readers set about an immersive expedition to unravel the intricate significance of language and its indelible imprint on our lives. Throughout this assessment, we shall delve to the book is central motifs, appraise its distinctive narrative style, and gauge its overarching influence on the minds of its readers.

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