

Digital Communication over Fading Channels

A Unified Approach to Performance Analysis

Marvin K. Simon

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**David T. Wong, Peng-Yong Kong, Ying-
Chang Liang, Kee C. Chua**



Digital Communication Over Fading Channels A Unified Approach To Performance Analysis:

Digital Communication Over Fading Channels Marvin K. Simon, Mohamed-Slim Alouini, 2000-08-14 A unified presentation broad coverage single volume convenience This timesaving reference provides a unified approach to the performance analysis of digital communication systems over generalized fading channels Employing alternative forms of such classical mathematical functions as the Gaussian Q function the Marcum Q function and the incomplete Gamma function the book expresses communication system error probability performance in terms of the moment generation function MGF of the fading process This MGF based approach provides the unifying backbone of the book *Digital Communication over Fading Channels* discusses in detail coherent differentially coherent and noncoherent communication systems as well as a large variety of fading channel models typical of communication links found in the real world Coverage also includes single and multichannel reception and in the case of the latter a large variety of diversity types For each combination of communication type channel fading model and diversity type the average bit error rate and or symbol error rate is expressed in an easy to evaluate form Special features include Important results previously scattered over many publications now in a single volume Simplified results heretofore available only in complex forms Extremely broad coverage of topics Explores practical applications including the problem of optimum combining in the presence of co channel interference **Digital**

Communication over Fading Channels Marvin K. Simon, Mohamed-Slim Alouini, 2004-12-06 The four short years since *Digital Communication over Fading Channels* became an instant classic have seen a virtual explosion of significant new work on the subject both by the authors and by numerous researchers around the world Foremost among these is a great deal of progress in the area of transmit diversity and space time coding and the associated multiple input multiple output MIMO channel This new edition gathers these and other results previously scattered throughout numerous publications into a single convenient and informative volume Like its predecessor this Second Edition discusses in detail coherent and noncoherent communication systems as well as a large variety of fading channel models typical of communication links found in the real world Coverage includes single and multichannel reception and in the case of the latter a large variety of diversity types The moment generating function MGF based approach for performance analysis introduced by the authors in the first edition and referred to in literally hundreds of publications still represents the backbone of the book's presentation Important features of this new edition include An all new comprehensive chapter on transmit diversity space time coding and the MIMO channel focusing on performance evaluation Coverage of new and improved diversity schemes Performance analyses of previously known schemes in new and different fading scenarios A new chapter on the outage probability of cellular mobile radio systems A new chapter on the capacity of fading channels And much more *Digital Communication over Fading Channels* Second Edition is an indispensable resource for graduate students researchers investigating these systems and practicing engineers responsible for evaluating their performance *Digital Communication over Fading Channels* Marvin K.

Simon, Mohamed-Slim Alouini, 2005-01-28 The four short years since *Digital Communication over Fading Channels* became an instant classic have seen a virtual explosion of significant new work on the subject both by the authors and by numerous researchers around the world. Foremost among these is a great deal of progress in the area of transmit diversity and space time coding and the associated multiple input multiple output MIMO channel. This new edition gathers these and other results previously scattered throughout numerous publications into a single convenient and informative volume. Like its predecessor this Second Edition discusses in detail coherent and noncoherent communication systems as well as a large variety of fading channel models typical of communication links found in the real world. Coverage includes single and multichannel reception and in the case of the latter a large variety of diversity types. The moment generating function MGF based approach for performance analysis introduced by the authors in the first edition and referred to in literally hundreds of publications still represents the backbone of the book's presentation. Important features of this new edition include: An all new comprehensive chapter on transmit diversity space time coding and the MIMO channel focusing on performance evaluation. Coverage of new and improved diversity schemes. Performance analyses of previously known schemes in new and different fading scenarios. A new chapter on the outage probability of cellular mobile radio systems. A new chapter on the capacity of fading channels. And much more. *Digital Communication over Fading Channels* Second Edition is an indispensable resource for graduate students, researchers investigating these systems and practicing engineers responsible for evaluating their performance.

Wireless Broadband Networks David T. Wong, Peng-Yong Kong, Ying-Chang Liang, Kee C. Chua, 2009-04-01 An introduction to theories and applications in wireless broadband networks. As wireless broadband networks evolve into future generation wireless networks, it's important for students, researchers, and professionals to have a solid understanding of their underlying theories and practical applications. Divided into two parts, the book presents: Enabling Technologies for Wireless Broadband Networks: orthogonal frequency division multiplexing and other block based transmissions, multi input multi output antenna systems, ultra wideband, medium access control, mobility, resource management, routing protocols for multi hop wireless broadband networks, radio resource management for wireless broadband networks, and quality of service for multimedia services. Systems for Wireless Broadband Networks: long term evolution, cellular networks, wireless broadband networking with WiMax, wireless local area networks, wireless personal area networks, and convergence of networks. Each chapter begins with an introduction and ends with a summary, appendix, and a list of resources for readers who would like to explore the subjects in greater depth. The book is an ideal resource for researchers in electrical engineering and computer science and an excellent textbook for electrical engineering and computer science courses at the advanced undergraduate and graduate levels.

Wireless Communications Bin Tian, 2024-05-06 This book presents the basic concepts, principles, and technologies of wireless communication. The author focuses on the characteristics of the channel, the performance degradation, and various technologies to improve the

performance of the wireless communication system The upper technologies involved in building wireless performance are also discussed and a prototype of the system is presented

Multi-Carrier Technologies for Wireless Communication

Carl R. Nassar, Bala Natarajan, Zhiqiang Wu, David A. Wiegandt, S. Alireza Zekavat, Steve Shattil, 2006-07-06 Multi carrier technologies have emerged as important instruments in telecommunications OFDM is in the forefront with its adoption by the IEEE 802.11 standards committee and the European HYPERLAN standards group Following OFDM MC CDMA is also demonstrating considerable promise when compared to competing technologies According to the authors these technologies are just the beginning in the coming multi carrier revolution In Multi Carrier Technologies for Wireless Communication the authors explain how a common multi carrier platform is being designed for DS CDMA TDMA OFDM and MC CDMA systems Findings are presented which show how this multi carrier platform enhances network capacity and probability of error performance Specific results include 1 innovation in multi carrier technologies that are enabling them to become an integral part of TDMA and DS CDMA systems and 2 the design of multi carrier systems to overcome PAPR problems in e.g. OFDM Multi Carrier Technologies for Wireless Communication is an important book for engineers who work with DS CDMA TDMA OFDM or MC CDMA systems and are seeking new ways of exploiting the wireless medium based on a smarter signal processing

Handbook on Advancements in Smart Antenna Technologies for Wireless Networks Sun, Chen, Cheng, Jun, Ohira, Takashi, 2008-07-31 Provides information on smart antenna technologies featuring contributions with in depth descriptions of terminologies concepts methods and applications related to smart antennas in various wireless systems

Signal Processing for Mobile Communications Handbook Mohamed Ibnkahla, 2004-08-16 In recent years a wealth of research has emerged addressing various aspects of mobile communications signal processing New applications and services are continually arising and future mobile communications offer new opportunities and exciting challenges for signal processing The Signal Processing for Mobile Communications Handbook provides

Orthogonal Frequency Division

Multiplexing with Diversity for Future Wireless Systems Khoa N. Le, 2012 The book examines several aspects of Orthogonal Frequency Division Multiplexing OFDM employing linear diversity techniques such as inter carrier interference bit error rate peak to average power and inter block interference It should be a useful reference

MIMO Wireless Networks

Bruno Clerckx, Claude Oestges, 2013-01-23 This book is unique in presenting channels techniques and standards for the next generation of MIMO wireless networks Through a unified framework it emphasizes how propagation mechanisms impact the system performance under realistic power constraints Combining a solid mathematical analysis with a physical and intuitive approach to space time signal processing the book progressively derives innovative designs for space time coding and precoding as well as multi user and multi cell techniques taking into consideration that MIMO channels are often far from ideal Reflecting developments since the first edition was published this book has been thoroughly revised and now includes new sections and five new chapters respectively dealing with receiver design multi user MIMO multi cell MIMO MIMO

implementation in standards and MIMO system level evaluation Extended introduction to multi dimensional propagation including polarization aspects Detailed and comparative description of physical models and analytical representations of single and multi link MIMO channels covering the latest standardized models Thorough overview of space time coding techniques covering both classical and more recent schemes under information theory and error probability perspectives Intuitive illustration of how real world propagation affects the capacity and the error performance of MIMO transmission schemes Detailed information theoretic analysis of multiple access broadcast and interference channels In depth presentation of multi user diversity resource allocation and non linear MU MIMO precoding techniques with perfect and imperfect channel knowledge Extensive coverage of cooperative multi cell MIMO OFDMA networks including network resource allocation optimization coordinated scheduling beamforming and power control interference alignment joint processing massive and network MIMO Applications of MIMO and Coordinated Multi Point CoMP in LTE LTE A and WiMAX Theoretical derivations and results contrasted with practical system level evaluations highlighting the performance of single and multi cell MIMO techniques in realistic deployments

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