Distributed Antenna Systems Open Architecture For Future Wireless Communications Wireless Networks And Le Communications

Physical layer security has recently become an emerging technique to complement and significantly improve the communication security of wireless networks. Compared to cryptographic approaches, physical layer security is a fundamentally different paradigm where secrecy is achieved by exploiting the physical layer properties of the communication system, such as thermal noise, interference, and the time-varying nature of fading channels. Written by pioneering researchers, Physical Layer Security in Wireless Communications supplies a systematic overview of the basic concepts, recent advancements, and open issues in providing communication security at the physical layer. It introduces the key concepts, design issues, and solutions to physical layer security in single-user and multi-user communication systems, as well as large-scale wireless networks. The book starts with a brief introduction to physical layer security. The rest of the book is organized into four parts based on the different approaches used for the design and analysis of physical layer security techniques: Information Theoretic Approaches: introduces capacity-achieving methods and coding schemes for secure communication, as well as secret key generation and agreement over wireless channels Signal Processing Approaches: covers recent progress in applying signal processing techniques to design physical layer security enhancements Game Theoretic Approaches: discusses the applications of game theory to analyze and design wireless networks with physical layer security considerations Graph Theoretic Approaches: presents the use of tools from graph theory and stochastic geometry to analyze and design large-scale wireless networks with physical layer security constraints Presenting high-level discussions along with specific examples, illustrations, and references to conference and journal articles, this is an ideal reference for postgraduate students, researchers, and engineers that need to obtain a macro-level understanding of physical layer security and its role in future wireless communication systems.
Wireless mesh networks (WMN) encompass a new area of technology set to play an important role in the next generation wireless mobile networks. WMN is characterized by dynamic self-organization, self-configuration, and self-healing to enable flexible integration, quick deployment, easy maintenance, low costs, high scalability, and reliable services.
In the past several years, there has been an increasing trend in the use of Radio Frequency Identification (RFID) and Wireless Sensor Networks (WSNs) as well as in the integration of both systems due to their complementary nature, flexible combination, and the demand for ubiquitous computing. As always, adequate security remains one of the open areas of concern before wide deployment of RFID and WSNs can be achieved. Security in RFID and Sensor Networks is

the first book to offer a comprehensive discussion on the security challenges and solutions in RFID, WSNs, and integrated RFID and WSNs, providing an essential reference for those who regularly interface with these versatile technologies. Exposes Security Risks The book begins with a discussion of current security issues that threaten the effective use of RFID technology. The contributors examine multi-tag systems, relay attacks, authentication protocols, lightweight cryptography, and host of other topics related to RFID safety. The book then shifts the focus to WSNs, beginning with a background in sensor network security before moving on to survey intrusion detection, malicious node detection, jamming, and other issues of concern to WSNs and their myriad of applications. Offers Viable Solutions In each chapter, the contributors propose effective solutions to the plethora of security challenges that confront users, offering practical examples to aid in intuitive understanding. The last part of the book reviews the security problems inherent in integrated RFID & WSNs. The book ends with a glimpse of the future possibilities in these burgeoning technologies and provides recommendations for the proactive design of secure wireless embedded systems.

This book is an in-depth, systematic and structured technical reference on 3GPP's LTE-Advanced (Releases 10 and 11), covering theory, technology and implementation, written by an author who has been involved in the inception and development of these technologies for over 20 years. The book not only describes the operation of individual components, but also shows how they fit into the overall system and operate from a systems perspective. Uniquely, this book gives in-depth information on upper protocol layers, implementation and deployment issues, and services, making it suitable for engineers who are implementing the technology into future products and services. Reflecting the author's 25 plus years of experience in signal processing and communication system design, this book is ideal for professional engineers, researchers, and graduate students working in cellular communication systems, radio air-interface technologies, cellular communications protocols, advanced radio access technologies for beyond 4G systems, and broadband cellular standards. An end-to-end description of LTE/LTE-Advanced technologies using a top-down systems approach, providing an in-depth understanding of how the overall system works Detailed algorithmic descriptions of the individual components' operation and inter-connection Strong emphasis on implementation and deployment scenarios, making this a very practical book An in-depth coverage of theoretical and practical aspects of LTE Releases 10 and 11 Clear and concise descriptions of the underlying principles and theoretical concepts to provide a better understanding of the operation of the system's components Covers all essential system functionalities, features, and their inter-connections based on a clear protocol structure, including detailed signal flow graphs and block diagrams Includes methodologies and results related to link-level and system-level evaluations of LTE-Advanced Provides understanding and insight into the advanced underlying technologies in LTE-Advanced up to and including Release 11: multi-antenna

signal processing, OFDM, carrier aggregation, coordinated multi-point transmission and reception, eICIC, multi-radio coexistence, E-MBMS, positioning methods, real-time and non-real-time wireless multimedia applications

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Wireless Receiver Architectures and Design presents the various designs and architectures of wireless receivers in the context of modern multi-mode and multi-standard devices. This one-stop reference and guide to designing low-cost low-power multi-mode, multi-standard receivers treats analog and digital signal processing simultaneously, with equal detail given to the chosen architecture and modulating waveform. It provides a complete understanding of the receiver's analog front end and the digital backend, and how each affects the other. The book explains the design process in great detail, starting from an analysis of requirements to the choice of architecture and finally to the design and algorithm development. The advantages and disadvantages of each wireless architecture and the suitability to a standard are given, enabling a better choice of design methodology, receiver lineup, analog block, and digital algorithm for a particular architecture. Whether you are a communications engineer working in system architecture and waveform design, an RF engineer working on noise and linearity budget and line-up analysis, a DSP engineer working on algorithm development, or an analog or digital design engineer designing circuits for wireless transceivers, this book is your one-stop reference and guide to designing low-cost low-power multi-mode multi-standard receivers. The material in this book is organized and presented to lead you from applied theory to practical design with plenty of examples and case studies drawn from modern wireless standards. Provides a complete description of receiver architectures together with their pros and cons, enabling a better choice of design methodology Covers the design trade-offs and algorithms between the analog front end and the digital modem – enabling an end-to-end design approach Addresses multi-mode multi-standard low-cost, low-power radio design – critical for producing the applications for Smart phones and portable internet devices

This is an edited book covering fundamentals, security theories and protocols, and hardware implementations for cryptography algorithms and security techniques in RFID. It is the first book to comprehensively cover RFID security issues and solutions. Part 1 deals with RFID fundamentals. Part 2 addresses RFID security protocols and techniques. Finally, the book discusses hardware implementation of security algorithms and protocols dedicated to RFID platforms and chips.

Supported by the expert-level advice of pioneering researchers, Orthogonal Frequency Division Multiple Access Fundamentals and Applications provides a comprehensive and accessible introduction to the foundations and applications of one of the most promising access technologies for current and future wireless networks. It includes authoritative coverage of the history, fundamental principles, key techniques, and critical design issues of OFDM

systems. Covering various techniques of effective resource management for OFDM/OFDMA-based wireless communication systems, this cutting-edge reference: Addresses open problems and supplies possible solutions Provides a concise overview of key techniques for adaptive modulation Investigates radio channel modeling in OFDMA-based wireless communication systems Details detection strategies of frequency-domain equalization for broadband communications Introduces a novel combination of OFDM and the orbital angular momentum of the electromagnetic field to improve performance Contains extensive treatment of adaptive MIMO beamforming suitable for multiuser access This valuable resource supplies readers with a macro-level understanding of OFDMA and its key issues, while providing a systematic manual for those whose work is directly related to practical OFDMA and other multiuser communication systems projects.

The emergence of quality-of-service (QoS) mechanisms continues to propel the development of real-time multimedia services such as VoIP and videoconferencing. However, many challenges remain in achieving optimized standardization convergence. Network Design for IP Convergence is a comprehensive, global guide to recent advances in IP network implementation. Providing an introduction to basic LAN/WAN/MAN network design, the author covers the latest equipment and architecture, addressing, QoS policies, and integration of services, among other topics. The book explains how to integrate the different layers of reference models and various technological platforms to mirror the harmonization that occurs in the real world of carrier networks. It furnishes appropriate designs for traditional and critical services in the LAN and carrier networks (both MAN and WAN), and it clarifies how a specific layer or technology can cause those services to malfunction. This book lays a foundation for understanding with concepts and applicability of QoS parameters under the multilayer scheme, and a solid explanation of service infrastructure. It goes on to describe integration in both real time and "not real time," elaborating on how both processes can co-exist within the same IP network and concluding with the designs and configurations of service connections. Learn How to Overcome Obstacles to Improve Technology This sweeping analysis of the implementation of IP convergence and QoS mechanisms helps designers and operators get past key obstacles, such as integrating platform layers and technologies and implementing various associated QoS concepts, to improve technology and standards.

IP Multimedia Subsystem (IMS) technology, which merges the Internet with interactive telecommunications, represents the here and now for today's packet-switched networks. Consequently, anyone working with or around these converging fields needs to possess a fundamental understanding of IMS and how this technology is poised to change the way new applications are designed and deployed. IMS: A New Model for Blending Applications goes beyond most references in this field. Rather than offer the usual explanation of the standard itself, the authors address how IMS-based services

might be deployed in an operator's network. Leveraging the inside knowledge gained from years of working at the forefront of IMS research, the authors delineate the application layers and the applications that can be implemented using an IMS network. For those unfamiliar with IMS, they provide an overview of its key components and the signaling standards used for the implementation of an end-to-end IMS service. Significant concepts are conveyed through real-life vignettes that describe how end users might actually use interactive IMS applications in the course of their day. This approach mimics the way an operator's marketing organization might go about building a business case for IMS application deployment. While technical enough to meet the needs of engineers, this approach will greatly assist marketing, sales, and managerial professionals with gaining a basic understanding of IMS, as well as a sense of the numerous applications driving the field forward.

Stutzman's 3rd edition of Antenna Theory and Design provides a more pedagogical approach with a greater emphasis on computational methods. New features include additional modern material to make the text more exciting and relevant to practicing engineers; new chapters on systems, low-profile elements and base station antennas; organizational changes to improve understanding; more details to selected important topics such as microstrip antennas and arrays; and expanded measurements topic.

Network coding is an elegant and novel technique that allows nodes in the network to perform coding operations at the packet level. In particular, network coding represents a powerful approach to protect data from losses due to link disconnections and can also exploit the combination of multiple links to deliver data to users with the possibility of recoding at intermediate nodes. This phenomenon will reduce information congestion at some nodes or links, which will improve the network information flow such as to increase network throughput and robustness. This book is intended to provide the current R

Over the last three decades, interest in Infrared (IR) technology as a medium to convey information has grown considerably. This is reflected by the increasing number of devices such as laptops, PDAs, and mobile phones that incorporate optical wireless transceivers and also by the increasing number of optical wireless links available for indoor and

The rapid progress of mobile, wireless communication and embedded micro-sensing MEMS technologies has brought about the rise of pervasive computing. Wireless local-area networks (WLANs) and wireless personal-area networks (WPANs) are now common tools for many people, and it is predicted that wearable sensor networks will greatly improve everyday life as we know it. By integrating these technologies into a pervasive system, we can access information and use computing resources anytime, anywhere, and with any device. Wireless Ad Hoc Networking: Personal-Area, Local-

Area, and the Sensory-Area Networks covers these key technologies used in wireless ad hoc networks. The book is divided into three parts, each providing self-contained chapters written by international experts. Topics include networking architectures and protocols, cross-layer architectures, localization and location tracking, time synchronization, QoS and real-time, security and dependability, applications, modeling and performance evaluation, implementation and experience, and much more. The book is novel in its single source presentation of ad hoc networking and related key technologies and applications over the platforms of personal area, sensory area, and local area networks. It is a valuable resource for those who work in or are interested in learning about the pervasive computing environment.

This book brings together papers from the 2018 International Conference on Communications, Signal Processing, and Systems, which was held in Dalian, China on July 14–16, 2018. Presenting the latest developments and discussing the interactions and links between these multidisciplinary fields, the book spans topics ranging from communications, signal processing and systems. It is aimed at undergraduate and graduate electrical engineering, computer science and mathematics students, researchers and engineers from academia and industry as well as government employees.

This book provides an in-depth guide to femtocell technologies In this book, the authors provide a comprehensive and organized explanation of the femtocell concepts, architecture, air interface technologies, and challenging issues arising from the deployment of femtocells, such as interference, mobility management and self-organization. The book details a system level simulation based methodology addressing the key concerns of femtocell deployment such as interference between femto and macrocells, and the performance of both femto and macrocell layers. In addition, key research topics in interference modeling and mitigation, mobility management and Self-Organizing Network (SON) are highlighted. The authors also introduce HNB/HeNB standardization in 3GPP.. Furthermore, access methods (closed, open and hybrid), applications, timing synchronization, health issues, business models and security are discussed. The authors also provide a comparison between femtocells and other indoor coverage techniques such as picocells, repeaters, distributed antenna systems and radio over fiber. Lastly, both CDMA and OFDMA based femtocells are covered. Key Features: Provides a comprehensive reference on femtocells and related topics Offers the latest research results on femtocells based on simulation and measurements Gives an overview of indoor coverage techniques such as picocells, repeaters, distributed antenna systems, radio over fiber and femtocells Includes chapters on femtocell access network architecture, air interface technologies (GSM, UMTS, HSPA, WiMAX and LTE), femtocell simulation, interference analysis and mitigation in femto/macrocell networks, mobility management in femto/macrocell networks, femtocell self-organization and other key challenges such as timing synchronization and security faced by femtocell deployment Points to over 240 references from 3GPP, The Femto Forum, journals and conference proceedings This book will be an invaluable guide for

RF engineers from operators, R&D engineers from femtocells hardware manufacturers, employees from regulatory bodies, radio network planners, academics and researchers from universities and research organizations. Students undertaking wireless communications courses will also find this book insightful.

The widespread use of image, audio, and video data makes media content protection increasingly necessary and urgent. For maximum safety, it is no longer sufficient to merely control access rights. In order to fully protect multimedia data from piracy or unauthorized use, it must be secured through encryption prior to its transmission or distribution. Multimedia Content Encryption: Techniques and Applications presents the latest research results in this dynamic field. The book begins with the history of multimedia encryption and then examines general performance requirements of encryption and fundamental encrypting techniques. It discusses common techniques of complete, partial, and compression-combined encryption; as well as the more specialized forms, including perception, scalable, and commutative encryption. In addition, the author reviews watermarking and joint fingerprint embedding and decryption. Later chapters discuss typical attacks on multimedia encryption, as well as the principles for designing secure algorithms and various applications. An exploration of open issues, up-and-coming topics, and areas for further research rounds out the coverage. Shiguo Lian is the author or co-author of more than fifty peer-reviewed journal and conference articles covering topics of network security and multimedia content protection, including cryptography, secure P2P content sharing, digital rights management (DRM), encryption, watermarking, digital fingerprinting, and authentication. By following the techniques outlined in this book, users will be better able to protect the integrity of their multimedia data and develop greater confidence that their data will not be misappropriated.

Parallel Computing Architectures and APIs: IoT Big Data Stream Processing commences from the point high-performance uniprocessors were becoming increasingly complex, expensive, and power-hungry. A basic trade-off exists between the use of one or a small number of such complex processors, at one extreme, and a moderate to very large number of simpler processors, at the other. When combined with a high-bandwidth, interprocessor communication facility leads to significant simplification of the design process. However, two major roadblocks prevent the widespread adoption of such moderately to massively parallel architectures: the interprocessor communication bottleneck, and the difficulty and high cost of algorithm/software development. One of the most important reasons for studying parallel computing architectures is to learn how to extract the best performance from parallel systems. Specifically, you must understand its architectures so that you will be able to exploit those architectures during programming via the standardized APIs. This book would be useful for analysts, designers and developers of high-throughput computing systems essential for big data stream processing emanating from IoT-driven cyber-physical systems (CPS). This pragmatic book: Devolves

uniprocessors in terms of a ladder of abstractions to ascertain (say) performance characteristics at a particular level of abstraction Explains limitations of uniprocessor high performance because of Moore's Law Introduces basics of processors, networks and distributed systems Explains characteristics of parallel systems, parallel computing models and parallel algorithms Explains the three primary categorical representatives of parallel computing architectures, namely, shared memory, message passing and stream processing Introduces the three primary categorical representatives of parallel programming APIs, namely, OpenMP, MPI and CUDA Provides an overview of Internet of Things (IoT), wireless sensor networks (WSN), sensor data processing, Big Data and stream processing Provides introduction to 5G communications, Edge and Fog computing Parallel Computing Architectures and APIs: IoT Big Data Stream Processing discusses stream processing that enables the gathering, processing and analysis of high-volume, heterogeneous, continuous Internet of Things (IoT) big data streams, to extract insights and actionable results in real time. Application domains requiring data stream management include military, homeland security, sensor networks, financial applications, network management, web site performance tracking, real-time credit card fraud detection, etc.
"Provides the reader with an overall picture of wireless communications, carefully expounds its technical details, not only covering a variety of main results and conclusions but also revealing the methodology used for their derivations"--
The rapid growth in mobile communications has led to an increasing demand for wideband high data rate communications services. In recent years, the Distributed Antenna System (DAS) has emerged as a promising candidate beyond 3G and 4G mobile communications. Distributed Antenna Systems: Open Architecture for Future Wireless Communications is a comprehensive technical guide that covers the fundamental concepts, recent advances and open issues of the DAS. The topic is explored with various key challenges in diverse scenarios, including architecture, capacity, connectivity, scalability, medium access control, scheduling, dynamic channel assignment and cross-layer optimization. The primary focus of this book is the introduction of concepts, effective protocols, system integration, performance analysis techniques, simulations and experiments, and more importantly, future research directions in the DAS. The first part of the book introduces DAS fundamentals, including channel models and theoretical issues, examining the capacity of the DAS with different structures. Concentrating on the MAC and protocols for the DAS, the second part of the book includes information on distributed signal processing, optimal resource allocation, cooperative MAC protocols, cross layer design, and distributed organization. The third part presents case studies and applications of the DAS, including experiment, RF engineering, and applications.
A Complete Reference for the 21st Century Until recently, much of the communications technology in the former Eastern bloc countries was largely unknown. Due to the historically competitive nature of East/West relations, scientific groups

operated independently, without the benefit of open communication on theoretical frameworks and experimental technologies. As these countries have begun to bridge the gap and work in a more cooperative environment, the need has grown for a comprehensive guide which assimilates all the information in this vast knowledge bank. Ionosphere and Applied Aspects of Radio Communication and Radar meets the demand for an updated reference on this continually evolving global technology. This book examines the changes that have occurred in the past two or three decades. It thoroughly reviews ionospheric radio propagation, over-horizon and above-horizon radars, and miniature ionospheric stations used for investigating nonregular phenomena occurring in the ionosphere. In addition, it also comprehensively discusses land-satellite and satellite-satellite communications. This volume also reviews an area that has been all but ignored in previous works: the effects of plasma irregularities on radio waves propagation through the inhomogeneous ionosphere. Here, a heavy focus is placed on the effects of these irregular phenomena. And due to the recent wireless revolution, more attention than ever has been aimed on improving the efficiency of land-satellite and satellite-satellite communication networks, which are fully addressed. Included are— Transport processes and photochemistry reactions occurring in the regular homogeneous ionosphere Nonlinear phenomena occurring in the irregular ionosphere Instabilities in the inhomogeneous disturbed ionosphere Various ambient natural and artificial sources and corresponding plasma irregularities Written by two leading scientists, this book will be an invaluable guide to anyone working in this ever-changing field.
While still in the early stages of research and development, cognitive radio is a highly promising communications paradigm with the ability to effectively address the spectrum insufficiency problem. Written by those pioneering the field, Cognitive Radio Networks: Architectures, Protocols, and Standards offers a complete view of cognitive radio-incl
The Wireless Metropolitan Area Network (WirelessMAN) is a promising Broadband Wireless Access (BWA) technology that provides high-speed, high-bandwidth efficiency and high-capacity multimedia services for both residential and enterprise applications. Mobile WiMAX: Toward Broadband Wireless Metropolitan Area Networks examines the basic concepts, rec
Driven by the demand for high-data-rate, millimeter wave technologies with broad bandwidth are being explored in high-speed wireless communications. These technologies include gigabit wireless personal area networks (WPAN), high-speed wireless local area networks (WLAN), and high-speed wireless metropolitan area networks (WMAN). As a result of this technological push, standard organizations are actively calling for specifications of millimeter wave applications in the above wireless systems. Providing the guidance needed to help you navigate through these new technologies, Millimeter Wave Technology in Wireless PAN, LAN, and MAN covers the fundamental concepts, recent advances, and potential

that these millimeter wave technologies will offer with respect to circuits design, system architecture, protocol development, and standardization activities. The book presents essential challenges and solutions related to topics that include millimeter wave monolithic integrated circuit (MMIC), packaging technology of millimeter wave system and circuits, and millimeter wave channel models. With numerous figures, tables and references, this text allows speedy access to the fundamental problems, key challenges, open issues, future directions, and further readings on millimeter wave technologies in relation to WPAN, WLAN, and WMAN.

Focusing on an important and complicated topic in wireless network design, Wireless Quality of Service: Techniques, Standards, and Applications systematically addresses the quality-of-service (QoS) issues found in many types of popular wireless networks. In each chapter, the book presents numerous QoS challenges encountered in real-world applications and delineates ways to overcome these obstacles. Some of the challenges explored are performance impairments in WLAN hotspots, video streaming applications, and broadband wireless access. The techniques and mechanisms covered to tackle these problems include medium access and call admission control techniques, a parameter tuning algorithm, the QoS-enabling features of IEEE 802.11e, a Markov chain model, a probe-based distributed admission control mechanism, topology-transparent scheduling protocols, and a novel multicast congestion control mechanism. Addressing advanced topics and future directions, the expert contributors acknowledge the need for more research to solve several open issues. In the meantime, they offer innovative solutions to solve current QoS problems.

Ubiquitous and pervasive technologies such as RFID and smart computing promise a world of networked and interconnected devices. Everything from tires to toothbrushes could soon be in communications range, heralding the dawn of an era in which today's Internet of People gives way to tomorrow's Internet of Things- where billions of obje

Focusing on the future network architecture and its main principles, Converging NGN Wireline and Mobile 3G Networks with IMS provides a comprehensive view of the methods, functions, network elements, and the interfaces among them that enable the building of a service agnostic and access agnostic session control layer based on the IMS standards. After an introduction to IMS principles with market trends, technological innovations, migration issues, and global standards, the book describes converged session control and multimedia handling with ID management, service profiles, and event and applications triggering as well as admission procedures for different types of access networks. Subsequent chapters tackle the all-important aspects of IP charging mechanisms, service-based quality of service, security, border control, and legacy services, enabling a thorough appreciation of the full network requirements. Wherever possible, the author points out the convergence of standards and details different specifications and terminology for TISPAN and 3GPP. Delivering deep insight into the role of IMS in fixed line and mobile networks, this book explains the new technologies from concepts to detailed techniques to give a clear understanding of how the next generation of converged communication can be achieved with managed quality, security, and chargeability.

Multimedia service provisioning is believed to be one of the prerequisites to guarantee the success of next-generation wireless networks. Examining the role of multimedia in state-of-the-art wireless systems and networks, Broadband Mobile Multimedia: Techniques and Applications presents a collection of introductory concepts, fundamental tech

With the increased functionality demand for mobile speed and access in our everyday lives, broadband wireless networks have emerged as the solution in providing high data rate communications systems to meet these growing needs. Broadband Wireless Access Networks for 4G:

Theory, Application, and Experimentation presents the latest trends and research on mobile ad hoc networks, vehicular ad hoc networks, and routing algorithms which occur within various mobile networks. This publication smartly combines knowledge and experience from enthusiastic scholars and expert researchers in the area of wideband and broadband wireless networks. Students, professors, researchers, and other professionals in the field will benefit from this book's practical applications and relevant studies.

The escalating demand for ubiquitous computing along with the complementary and flexible natures of Radio Frequency Identification (RFID) and Wireless Sensor Networks (WSNs) have sparked an increase in the integration of these two dynamic technologies. Although a variety of applications can be observed under development and in practical use, there

Organized into three parts, Resource, Mobility, and Security Management in Wireless Networks and Mobile Communications examines the inherent constraint of limited bandwidth and unreliable time-varying physical link in the wireless system, discusses the demand to realize the service continuity in the single-hop or multi-hop wireless networks, and explores trusted communication in mobile computing scenarios. Focusing on the background, technique survey, protocol design, and analytical methods, the book discusses standards in 802.11x/3G/4G, HotSpot Wireless, Bluetooth sensor networks, and access control in wireless Ad Hoc networks. Other topics include call admission control (CAC), routing, multicast, medium access control (MAC), scheduling, bandwidth adaptation, handoff management, location management, network mobility, secure routing, key management, authentication, security, privacy, and performance simulation and analysis. This book is a comprehensive source of information on basic concepts, major issues, design approaches, future research directions, and the interaction between these components. With its broad coverage allowing for easy cross reference, the book also provides detailed techniques for eliminating bandwidth insufficiency, increasing location management performance, and decreasing the associated authentication traffic. Features: Offers competitive, self-contained information on resource, mobility, and security management in wireless networks Explains the interaction and coupling among the most important components in wireless networks Examines background, applications, and standard protocols Addresses challenges and solutions in key management of wireless sensor networks Covers how to provide effective and efficient authentication and key agreements for cellular access security

Used to explain complicated economic behavior for decades, game theory is quickly becoming a tool of choice for those serious about optimizing next generation wireless systems. Illustrating how game theory can effectively address a wide range of issues that until now remained unresolved, Game Theory for Wireless Communications and Networking provides a systematic introduction to the application of this powerful and dynamic tool. This comprehensive technical guide explains game theory basics, architectures, protocols, security, models, open research issues, and cutting-edge advances and applications. It describes how to employ game theory in infrastructure-based wireless networks and multihop networks to reduce power consumption—while improving system capacity, decreasing packet loss, and enhancing network resilience. Providing for complete cross-referencing, the text is organized into four parts: Fundamentals—introduces the fundamental issues and solutions in applying different games in different wireless domains, including wireless sensor networks, vehicular networks, and OFDM-based wireless systems Power Control Games—considers issues and solutions in power control games Economic Approaches—reviews applications of different economic approaches, including bargaining and auction-based approaches Resource Management—explores how to use the game theoretic approach to address radio resource management issues The book explains how to apply the game theoretic model to address specific issues, including resource allocation, congestion control, attacks, routing, energy management, packet forwarding, and MAC. Facilitating quick and easy reference to related optimization and algorithm methodologies, it

supplies you with the background and tools required to use game theory to drive the improvement and development of next generation wireless systems.

Nowadays energy crisis and global warming problems are hanging over everyone's head, urging much research work on energy saving. In the ICT industry, which is becoming a major consumer of global energy triggered by the telecommunication network operators experiencing energy cost as a significant factor in profit calculations, researchers have start

Cooperative devices and mechanisms are increasingly important to enhance the performance of wireless communications and networks, with their ability to decrease power consumption and packet loss rate and increase system capacity, computation, and network resilience. Considering the wide range of applications, strategies, and benefits associated with cooperative wireless communications, researchers and product developers need a succinct understanding of relevant theory, fundamentals, and techniques to navigate this challenging field. Cooperative Wireless Communications provides just that. Assesses Applications, Benefits, and Methods of Cooperative Strategies This comprehensive reference handbook contains useful background to develop and implement cooperative mechanisms for infrastructure-based wireless systems and self-organizing multi-hop wireless networks (e.g., ad hoc, mesh, peer-to-peer, and sensor networks). It introduces key cooperative strategies and details recent improvements to a variety of cooperative mechanisms and frameworks applicable in diverse scenarios. Addressing fundamentals and techniques, this invaluable reference: Offers comprehensive guidance on technical, practical, and deployment aspects of cooperative strategies and the latest IEEE standard specifications Explores key challenges and solutions in 3G, B3G, 4G WiMAX, and ad hoc, mesh, and sensor networks Covers cooperative diversity, virtual MIMO, cognitive radio networks, and resource and mobility management Discusses energy efficiency, relaying strategy, routing, MAC, topology control, and security Provides Guidance to Resolve Key Challenges A distinct introduction to different cooperative mechanisms, cooperation frameworks in diverse scenarios, and recent improvements to wireless network performance, this one-stop reference consolidates the essential information and guidance that readers will need to resolve key challenges in various protocol issues from a cooperation perspective.

This book offers a comprehensive explanation on how to dimension, plan, and optimize WiMAX networks. The first part of the text introduces WiMAX networks architecture, physical layer, standard, protocols, security mechanisms, and highly related radio access technologies. It covers system framework, topology, capacity, mobility management, handoff management, congestion control, medium access control (MAC), scheduling, Quality of Service (QoS), and WiMAX mesh networks and security. Enabling easy understanding of key concepts and technologies, the second part presents practical examples and illustrative figures to explain planning techniques and optimization algorithms. The author provides both theoretical and practical information to ensure in-depth, realistic results.

The exponential increase in mobile device users and high-bandwidth applications has pushed the current 3G and 4G wireless networks to their capacity. Moreover, it is predicted that mobile data traffic will continue to grow by over 300 percent by 2017. To

handle this spectacular growth, the development of improved wireless networks for the future ha
The Definitive Guide to LTE Technology Long-Term Evolution (LTE) is the next step in the GSM evolutionary path beyond 3G technology, and it is strongly positioned to be the dominant global standard for 4G cellular networks. LTE also represents the first generation of cellular networks to be based on a flat IP architecture and is designed to seamlessly support a variety of different services, such as broadband data, voice, and multicast video. Its design incorporates many of the key innovations of digital communication, such as MIMO (multiple input multiple output) and OFDMA (orthogonal frequency division multiple access), that mandate new skills to plan, build, and deploy an LTE network. In Fundamentals of LTE , four leading experts from academia and industry explain the technical foundations of LTE in a tutorial style—providing a comprehensive overview of the standards. Following the same approach that made their recent Fundamentals of WiMAX successful, the authors offer a complete framework for understanding and evaluating LTE. Topics include Cellular wireless history and evolution: Technical advances, market drivers, and foundational networking and communications technologies Multicarrier modulation theory and practice: OFDM system design, peak-to-average power ratios, and SC-FDE solutions Frequency Domain Multiple Access: OFDMA downlinks, SC-FDMA uplinks, resource allocation, and LTE-specific implementation Multiple antenna techniques and tradeoffs: spatial diversity, interference cancellation, spatial multiplexing, and multiuser/networked MIMO LTE standard overview: air interface protocol, channel structure, and physical layers Downlink and uplink transport channel processing: channel encoding, modulation mapping, Hybrid ARQ, multi-antenna processing, and more Physical/MAC layer procedures and scheduling: channel-aware scheduling, closed/open-loop multi-antenna processing, and more Packet flow, radio resource, and mobility management: RLC, PDCP, RRM, and LTE radio access network mobility/handoff procedures
Analyze Key Security Mechanisms and Approaches with this practical primer, the first book on the market to cover critical IPv6 security considerations. Dan Minoli, author of over 50 books on telecommunications and networks, and Jake Kouns, Chairman, CEO and CFO of the Open Security Foundation, discuss IPv6 security vulnerabilities, considerations, and mechanisms, and survey approaches for ensuring reliable and controlled IPv6 migration. The authors pool knowledge from industry resources, RFCs, and their own considerable security experience, discussing key IPv6 features, security issues, and potential exploitation of IPv6 protocol. They examine use of firewalls and encryption, and the fundamental topic of IPSec in IPv6 environments. Protect Networks from New and Growing Threats An increasing amount of mission-critical commercial and military operations are supported by distributed, mobile, always-connected, hybrid public-private networks, especially IPv6-based networks. The number of attackers or inimical agents continues to grow, and all computing environments must feature high-assurance security mechanisms. Even administrators in pure IPv4 environments require at least a rudimentary understanding of IPv6 security principles to safeguard traditional networks. This comprehensive book explains why security savvy approaches are indispensible and includes considerations for mixed IPv4 and IPv6 migration environments. More than an exhaustive treatment of IPv6 and security topics, this text is a point of departure for anyone adjusting to this technological transition and subtending security

considerations. About the Authors Daniel Minoli, director of terrestrial systems engineering for SES Americom, has done extensive work with IPv6, including four books on the subject. Jake Kouns (CISSP, CISA, CISM), director of information security and network services for Markel Corporation, is also co-founder and president of the Open Security Foundation.

Cyber Physical Systems: Architectures, Protocols and Applications helps you understand the basic principles and key supporting standards of CPS. It analyzes different CPS applications from the bottom up, extracting the common characters that form a vertical structure. It presents mobile sensing platforms and their applications toward interrelated paradigms, highlighting and briefly discussing different types of mobile sensing platforms and the functionalities they offer. It then looks at the naming, addressing, and profile services of CPS and proposes a middleware component to meet the requirements of dynamic applications and sensors/actuators deployment/configurations across different platforms. The middle chapters of the book present a context-aware sensor search, selection, and ranking model which addresses the challenge of efficiently selecting a subset of relevant sensors out of a large set of sensors with similar functionality and capabilities. The authors consider various topics in the energy management of CPS and propose a novel energy-efficient framework. They also present the fundamental networking technologies of CPS and focus on machine-to-machine communications for CPS, specifically the open technologies such as IPv6-based solutions that can be integrated into IoT and enable wireless sensor communications. In the book's final chapters, the authors bring you up to date on mobile cloud computing (MCC) research activities that enhance the capabilities of resource-constrained smart devices in CPS sensory environments. They also present a few representative CPS applications, including connected healthcare, gaming in public transport crowds, and a series of MCC-enabled emerging CPS applications. You will find that these application fields fully demonstrate the great potential of applying CPS in public life.

Advanced Antenna Systems for 5G Network Deployments: Bridging the Gap between Theory and Practice provides a comprehensive understanding of the field of advanced antenna systems (AAS) and how they can be deployed in 5G networks. The book gives a thorough understanding of the basic technology components, the state-of-the-art multi-antenna solutions, what support 3GPP has standardized together with the reasoning, AAS performance in real networks, and how AAS can be used to enhance network deployments. Explains how AAS features impact network performance and how AAS can be effectively used in a 5G network, based on either NR and/or LTE Shows what AAS configurations and features to use in different network deployment scenarios, focusing on mobile broadband, but also including fixed wireless access Presents the latest developments in multi-antenna technologies, including Beamforming, MIMO and cell shaping, along with the potential of different technologies in a commercial network context Provides a deep understanding of the differences between mid-band and mm-Wave solutions

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