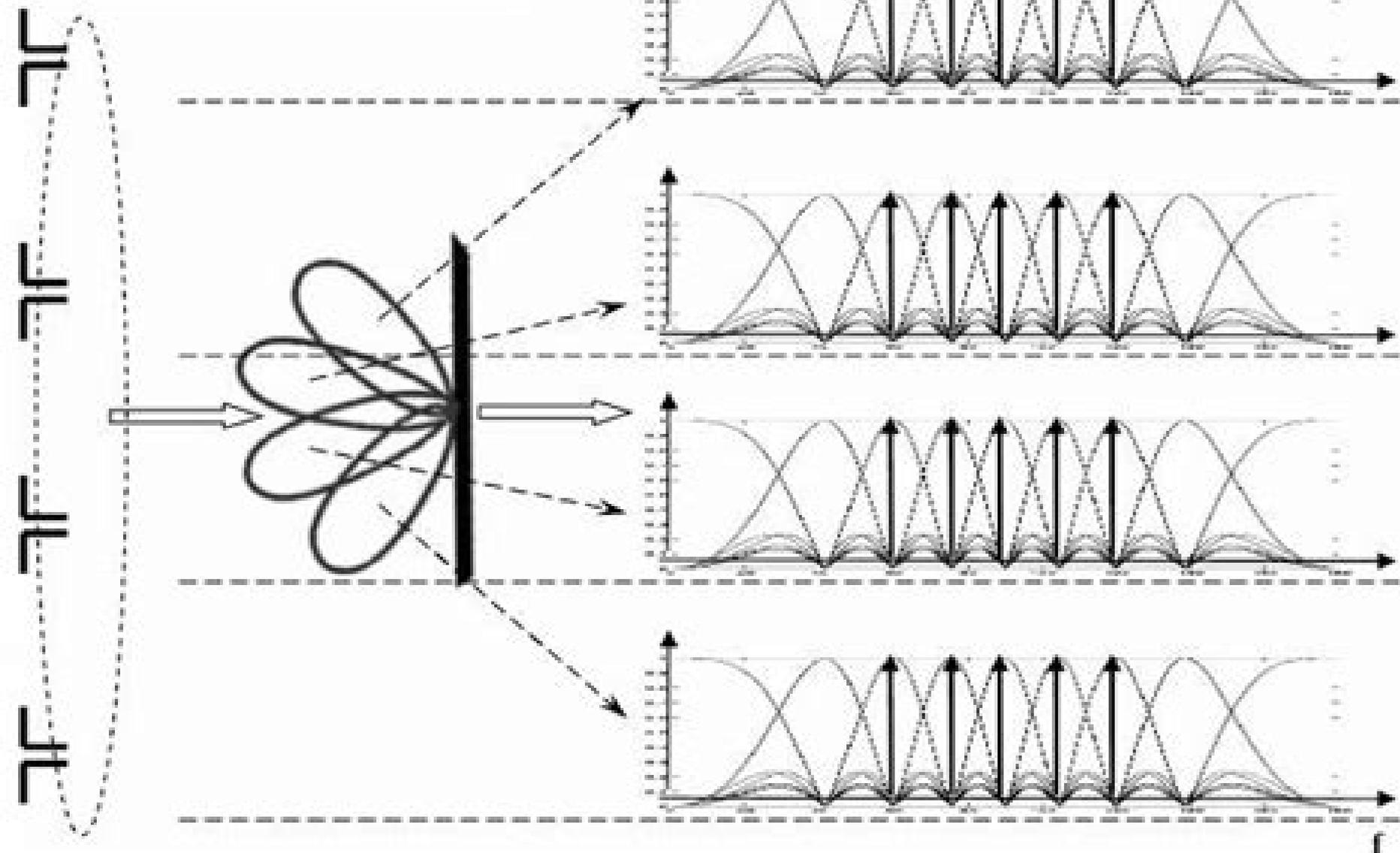


Digital Beamforming

The Estimations of Signals Amplitudes

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A Processing Of Ofdm Signals From Uav On Digital Antenna

**Mohamed Thariq Hameed
Sultan, Marimuthu Uthayakumar, Kinga
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Array Beamforming Enabled Wireless Communications Zhenyu Xiao, Lipeng Zhu, Lin Bai, Xiang-Gen Xia, 2023-04-25 This book investigates the most advanced theories and methodologies of array beamforming with a focus on antenna array enabled wireless communication technology. Combining with the current development needs and trends of wireless communication technology around the world, the authors explore the potentials and challenges of large scale antenna array beamforming technology in next generation mobile communication and some important emerging application scenarios. The book first introduces the basic structure of antenna array hierarchical codebook and channel estimation with high dimensionality with which the time cost of searching the channel information can be effectively reduced. It then explicates high efficiency beamforming transmission methods for point to point transmission, full duplex point to point transmission and point to multipoint transmission where array beamforming enabled non orthogonal multiple access NOMA technologies for typical two user systems and general multi user systems are emphasized. The book also discusses array beamforming enabled unmanned aerial vehicle UAV communications and array beamforming enabled space air ground communications with the uniqueness and relative solutions for single UAV systems and multi UAV networks being analyzed. This will be a vital reference for researchers, students and professionals interested in wireless communications, array beamforming and millimeter wave communications.

Wireless Communications Andreas F. Molisch, 2022-11-15 An in depth and comprehensive treatment of wireless communication technology ranging from the fundamentals to the newest research results. The expanded and completely revised Third Edition of *Wireless Communications* delivers an essential text in wireless communication technology that combines mathematical descriptions with intuitive explanations of the physical facts that enable readers to acquire a deep understanding of the subject. This latest edition includes brand new sections on cutting edge research topics such as massive MIMO, polar codes, heterogeneous networks, non orthogonal multiple access as well as 5G cellular standards, WiFi 6 and Bluetooth Low Energy. Together with the re designed descriptions of fundamentals such as fading OFDM and multiple access, it provides a thorough treatment of all the technologies that underlie fifth generation and beyond systems. A complementary companion website provides readers with a wealth of old and new material including instructor resources available upon request. Readers will also find a thorough introduction to the applications and requirements of modern wireless services including video streaming, virtual reality and Internet of Things. Comprehensive explorations of wireless propagation mechanisms and channel models ranging from Rayleigh fading to advanced models for MIMO communications. Detailed discussions of single user communications fundamentals including modern coding techniques, multi carrier communications and single user MIMO. Extensive description of multi user communications including packet radio systems, CDMA scheduling, admission control, cellular and ad hoc network design and multi user MIMO. In depth examinations of advanced topics in wireless communication like speech and video coding, cognitive radio, NOMA.

network coding and wireless localization A comprehensive description of the key wireless standards including LTE 5G WiFi Bluetooth and an outlook to Beyond 5G systems Perfect for advanced undergraduate and graduate students with a basic knowledge of standard communications Wireless Communications will also earn a place in the libraries of researchers and system designers seeking a one stop resource on wireless communication technology

Aerospace Materials Mohamed Thariq Hameed Sultan,Marimuthu Uthayakumar,Kinga Korniejenko,Peter Madindwa Mashinini,Muhammad Imran Najeeb,Renga Rao Krishnamoorthy,2024-11-30 In the continuous pursuit of optimizing performance development of advanced materials with highly specific properties has consistently been a critical component of aerospace engineering s research Aerospace Materials Novel Technologies and Practical Applications puts strong emphasis on updating existing knowledge of a wide range of functional and structural materials and contextualizing it for industrial practice The volume not only comprehensively covers different classes of materials while providing an overview of each material s mechanical and physical properties as well as processing and testing but also offers state of the art guidance on their commercial use in the sector Furthermore it looks ahead to clarify what s still needed to adapt traditional and novel materials to ever changing aerospace technologies and related pressing sustainability challenges The breadth of technical expertise that this international group of researchers provides proves to be an invaluable asset for users in academia and established professionals alike Explores an array of materials focusing on their most technically advanced aerospace applications Includes historical review details on materials research and development specifically within the aerospace industry Spotlights a holistic sustainability led approach

Advanced Computer Architecture Junjie Wu,Haibo Chen,Xingwei Wang,2014-07-21 This book constitutes the refereed proceedings of the 10th Annual Conference on Advanced Computer Architecture ACA 2014 held in Shenyang China in August 2014 The 19 revised full papers presented were carefully reviewed and selected from 115 submissions The papers are organized in topical sections on processors and circuits high performance computing GPUs and accelerators cloud and data centers energy and reliability intelligence computing and mobile computing

Automated and Autonomous Navigation Powered by GNSS Mauro Cardone,2025-04-25 This book is the result of one year investigation in all the available technologies necessary to build an efficient navigation system usable on rovers moving on the ground and at the sea centered on GNSS Global Navigation Satellite System It is used as instruction note for the calls for tender in the Italian Space Agency It targets the applications of automated and autonomous navigation for the following types of rover trains at level 2 of ERTMS ETCS autonomous cars starting from level 3 of SAE MASS Maritime Autonomous Surface Ships at level 4 of IMO The material is already edited for the using of professionals and engineers who need to build a navigation system on top of COTS hardware The topics cover in a thorough view all the necessary subjects to build an efficient positioning system for the rover enabling coping with all kind of environments and all interferences and always warranting a minimum level of the positioning KPIs reliability availability integrity and accuracy The localization system built

according to these guidelines will be ready to be certified and the product will be at TRL 6 i e technology demonstrated in the relevant environment

Smart Grid and Innovative Frontiers in Telecommunications Xiang Li, Yuhong Liu, Fan Wu, 2025-01-08 This book constitutes the refereed proceedings of the 8th EAI International Conference on Smart Grid Inspired Future Technologies SmartGift 2024a which was a virtual event held during March 23 24 2024 The 11 full papers presented in this volume were carefully reviewed and selected from 39 submissions They are grouped into the following topics wireless communication and distribution network artificial intelligence technologies security in wireless communication system design for smart grid and IoT

Electrical & Electronics Abstracts, 1997 *Conference Record*, 2005

OFDM Modulation Using Digital Signal Processing Kit (DSK), 2013 *Development of a Receiver Processor for UAV Video Signal Acquisition and Tracking Using Digital Phased Array Antenna* Fevzi Aytac Kaya, 2010 Air dominance is a key factor concerning today s warfare Obtaining air dominance requires having a high degree of situational awareness Unmanned aerial vehicles UAVs have gained popularity for surveillance and reconnaissance missions and provide situational awareness to ground based military units During operations it is necessary to maintain an uninterrupted data and control link between the UAV and the ground control station GCS This requires GCS antennas with signal tracking capability The work on this research was based on an ongoing project that originally started in 2002 The ultimate purpose is to design and build a digital phased array antenna system that can automatically acquire track demodulate and decode video signals from a UAV using commercial off the shelf COTS equipment Previous work done includes integration of hardware components and development of software modules that allow the array system to auto track signals from a UAV as well as decode the video signals in a standard format The research in this thesis focused on allowing the system to demodulate the video signals acquired by the digital tracking array The baseband demodulation technique implemented was previously tested with video signals A new technique utilizing tangent type demodulation of signals was also implemented and tested using a bench top test setup

Investigating the Impacts of Code Complexity and Antenna Diversity on the OFDM Signal Yahniqie Barrett, 2009 *Remote Sensing, Processing and Transmission of Data for an Unmanned Aerial Vehicle* Donald Benton Howard, 1994 This thesis chronicles the development of a proof of concept stand alone Unattended Ground Sensor UGS that can be used to sense and process signals associated with the motion of large vehicles troops or aircraft The results of this signal processing are then transmitted to an Unmanned Aerial Vehicle UAV The UGS uses acoustic and seismic sensors to provide data to a Digital Signal Processing DSP computer Digital signal processing algorithms can be independently developed in the C programming language and linked with the software developed for this project

Peak to Average Power Reduction for Multi-antenna of OFDM Systems Madhan Jaganthan, 2008 *Characterization of Commercial OFDM Signal Features Using Spectrally-based Entropic Processing* Anita M. Edmonds (CAPT, USAF.), 2005

Integrated Sensing and Communications Fan Liu, Christos Masouros, Yonina C. Eldar, 2023-07-18 The coming generations of wireless network

technologies will serve not only as a means of connecting physical and digital environments but also to set the foundation for an intelligent world in which all aspects are interconnected sensed and endowed with intelligence Beyond merely providing communication capabilities future networks will have the capacity to see and interpret the physical world This development compels us to re imagine the design of current communication infrastructures and terminals taking into account crucial aspects such as fundamental constraints and tradeoffs information extraction and processing technologies issues of public security and privacy as well as the emergence of numerous new applications This field of research is known as Integrated Sensing and Communications ISAC and it has ushered in a paradigm shift towards the omnipresence of radio devices This book provides the first comprehensive introduction to the ISAC theoretical and practical framework Each chapter is authored by a group of world leading experts including over 10 IEEE Fellows Readers can expect to gain both a broad overview and detailed technical insights into the latest ISAC innovations

Multiple Antenna Doppler Compensation for OFDM Systems Peter Klenner,2011

Automatic Transmit Power Control for Power Efficient Communications in UAS. Wantao Li,2020 Nowadays unmanned aerial vehicles UAV have become one of the most popular tools that can be used in commercial scientific agricultural and military applications As drones become faster smaller and cheaper with the ability to add payloads the usage of the drone can be versatile In most of the cases unmanned aerials systems UAS are equipped with a wireless communication system to establish a link with the ground control station to transfer the control commands video stream and payload data However with the limited onboard calculation resources in the UAS and the growing size and volume of the payload data computational complex signal processing such as deep learning cannot be easily done on the drone Hence in many drone applications the UAS is just a tool for capturing and storing data and then the data is post processed off line in a more powerful computing device The other solution is to stream payload data to the ground control station GCS and let the powerful computer on the ground station to handle these data in real time With the development of communication techniques such as orthogonal frequency division multiplexing OFDM and multiple input multiple output MIMO transmissions it is possible to increase the spectral efficiency over large bandwidths and consequently achieve high transmission rates However the drone and the communication system are usually being designed separately which means that regardless of the situation of the drone the communication system is working independently to provide the data link Consequently by taking into account the position of the drone the communication system has some room to optimize the link budget efficiency In this master thesis a power efficient wireless communication downlink for UAS has been designed It is achieved by developing an automatic transmit power control system and a custom OFDM communication system The work has been divided into three parts research of the drone communication system an optimized communication system design and finally FPGA implementation In the first part an overview on commercial drone communication schemes is presented and discussed The advantages and disadvantages shown are the source of inspiration for improvement With these ideas an

optimized scheme is presented In the second part an automatic transmit power control system for UAV wireless communication and a power efficient OFDM downlink scheme are proposed The automatic transmit power control system can estimate the required power level by the relative position between the drone and the GCS and then inform the system to adjust the power amplifier PA gain and power supply settings To obtain high power efficiency for different output power levels a searching strategy has been applied to the PA testbed to find out the best voltage supply and gain configurations Besides the OFDM signal generation developed in Python can encode data bytes to the baseband signal for testing purpose Digital predistortion DPD linearization has been included in the transmitter s design to guarantee the signal linearity In the third part two core algorithms IFFT and LUT based DPD have been implemented in the FPGA platform to meet the real time and high speed I O requirements By using the high level synthesis design process provided by Xilinx Corp the algorithms are implemented as reusable IP blocks The conclusion of the project is given in the end including the summary of the proposed drone communication system and envisioning possible future lines of research

UAV Swarm Enabled Communications

Samer Sarwat Nageeb Hanna,2021 Multi UAV deployments create new opportunities for wireless communications By coordinating the UAVs they can act as a virtual antenna array and use multiantenna communication schemes like distributed MIMO and distributed beamforming BF Distributed MIMO enables a swarm of UAVs to transmit multiple data streams simultaneously to a multiantenna ground station GS thus improving the spectral efficiency Due to the line of sight propagation between the swarm and the GS the MIMO channel is highly correlated leading to limited multiplexing gains By optimizing the UAV positions the swarm can attain the maximum capacity given by the single user bound To achieve this capacity we propose a centralized approach using block coordinate descent and distributed iterative approach using linear controllers Distributed BF can extend the communication range of a remotely deployed swarm avoiding energy waste in travel towards the destination radio In order to beamform the UAVs typically rely on the destination feedback however noisy feedback degrades the BF gains To limit the degradation we developed an analytical framework to predict the BF gains at a given SNR and used it to optimize the signaling with the destination The proposed framework was verified experimentally in the lab and using UAV mounted software defined radios SDR We also developed a feedback free BF approach that eliminates the need for destination feedback entirely in a LOS channel In this approach one BF radio acts as a guide and moves to point the beam of the remaining radios towards the destination This approach tolerates localization error and was demonstrated using SDRs As for the security considerations they apply beyond UAVs to any wireless device Security considerations include radio authentication and interpreting unauthorized signals For device authentication we leveraged the radios RF fingerprint extracted using deep learning and formulated an open set classification problem to reject signals from unauthorized transmitters We compared several approaches and studied the training dataset impact on performance To blindly decode unauthorized signals we proposed the dual path network DPN combining digital signal processing and deep learning for

modulation classification and blind symbol decoding DPN design yields interpretable outputs and by jointly estimating the unknown parameters it improves the modulation classification accuracy

Lookup Tables for Amplifier Linearization Majed Mowaffaq Jandali,2007

Channels □□□,2009

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