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Manual

Communication  
Systems Engineering

Proakis Solution Manual

This book will help readers  
comprehend technical and

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Manual  
policy elements of  
telecommunication

particularly in the context of  
5G. It first presents an  
overview of the current  
research and standardization  
practices and lays down the

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global frequency spectrum allocation process. It further lists solutions to accommodate 5G spectrum requirements. The readers will find a considerable amount of information on 4G

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(LTE-Advanced), LTE-  
Advance Pro, 5G NR (New  
Radio); transport network  
technologies, 5G NGC (Next  
Generation Core), OSS  
(Operations Support  
Systems), network

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deployment and end-to-end  
5G network architecture.

Some details on multiple  
network elements (end  
products) such as 5G base  
station/small cells and the  
role of semiconductors in

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telecommunication are also provided. Keeping trends in mind, service delivery mechanisms along with state-of-the-art services such as MFS (mobile financial services), mHealth (mobile

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health) and IoT (Internet-of-Things) are covered at length. At the end, telecom sector 's burning challenges and best practices are explained which may be looked into for today 's and

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tomorrow's networks. The book concludes with certain high level suggestions for the growth of telecommunication, particularly on the importance of basic research, departure from ten-year evolution cycle



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and having a 20 – 30 year plan.

Explains the conceivable six  
phases of mobile

telecommunication ' s

ecosystem that includes R&D,

standardization,

product/network/device &

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application development, and  
burning challenges and best  
practices Provides an  
overview of research and  
standardization on 5G  
Discusses solutions to  
address 5G spectrum

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requirements while describing  
the global frequency  
spectrum allocation process  
Presents various case studies  
and policies Provides details  
on multiple network elements  
and the role of

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semiconductors in  
telecommunication Presents  
service delivery mechanisms  
with special focus on IoT  
Mechatronics has evolved  
into a way of life in  
engineering practice, and

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indeed pervades virtually  
every aspect of the modern

world. As the synergistic  
integration of mechanical,  
electrical, and computer  
systems, the successful  
implementation of

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mechatronic systems

requires the integrated expertise of specialists from each of these areas. De Provides the key practical considerations for deploying wireless LANs and a solid

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understanding of the  
emerging technologies.

Digital Communications is a classic book in the area that is designed to be used as a senior or graduate level text. The text is flexible and can

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easily be used in a one semester course or there is enough depth to cover two semesters. Its comprehensive nature makes it a great book for students to keep for reference in their



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professional careers. This all-inclusive guide delivers an outstanding introduction to the analysis and design of digital communication systems. Includes expert coverage of new topics:

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TurboCodes,

Turboequalization, Antenna

Arrays, Digital Cellular

Systems, and Iterative

Detection. Convenient,

sequential organization begins

with a look at the history and

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classification of channel  
models and builds from there.

UWB Communication

Systems

Computer, Informatics,

Cybernetics and Applications

5G Mobile Communications

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Principles of Digital

Communication

**This is a concise  
presentation of the concepts  
underlying the design of  
digital communication  
systems, without the detail**

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that can overwhelm students. Many examples, from the basic to the cutting-edge, show how the theory is used in the design of modern systems and the relevance of this theory will motivate students. The theory is

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**supported by practical algorithms so that the student can perform computations and simulations. Leading edge topics in coding and wireless communication make this an ideal text for**

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**students taking just one course on the subject.**

**Fundamentals of Digital Communications has coverage of turbo and LDPC codes in sufficient detail and clarity to enable hands-on implementation and**

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performance evaluation, as well as 'just enough' information theory to enable computation of performance benchmarks to compare them against. Other unique features include space-time communication and geometric



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Manual  
**insights into noncoherent  
communication and  
equalization.**

**This book concerns digital  
communication. Specifically,  
we treat the transport of  
bit streams from one  
geographical location to**

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another over various physical media, such as wire pairs, coaxial cable, optical fiber, and radio waves. Further, we cover the multiplexing, multiple access, and synchronization issues relevant to

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constructing communication networks that simultaneously transport bit streams from many users. The material in this book is thus directly relevant to the design of a multitude of digital communication systems,

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**including for example local and metropolitan area data networks, voice and video telephony systems, the integrated services digital network (ISDN), computer communication systems, voiceband data modems, and**

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**satellite communication systems. We extract the common principles underlying these and other applications and present them in a unified framework. This book is intended for designers and would-be designers of**

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**digital communication systems. To limit the scope to manageable proportions we have had to be selective in the topics covered and in the depth of coverage. In the case of advanced information, coding, and**

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**detection theory, for example, we have not tried to duplicate the in-depth coverage of many advanced textbooks, but rather have tried to cover those aspects directly relevant to the design of digital**

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**communication systems.**

**Combining theoretical knowledge and practical applications, this advanced-level textbook covers the most important aspects of contemporary digital communication systems.**



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**Introduction to Digital  
Communication Systems  
focuses on the rules of  
functioning digital  
communication system blocks,  
starting with the  
performance limits set by  
the information theory.**

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**Drawing on information relating to turbo codes and LDPC codes, the text presents the basic methods of error correction and detection, followed by baseband transmission methods, and single- and**

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**multi-carrier digital modulations. The basic properties of several physical communication channels used in digital communication systems are explained, showing the transmission and reception**

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methods on channels suffering from intersymbol interference. The text also describes the most recent developments in the transmission techniques specific to wireless communications used both in

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wireline and wireless systems. The case studies are a unique feature of this book, illustrating elements of the theory developed in each chapter. Introduction to Digital Communication Systems provides a concise

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**approach to digital communications, with practical examples and problems to supplement the text. There is also a companion website featuring an instructors' solutions manual and presentation**

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slides to aid understanding.

**Offers theoretical and practical knowledge in a self-contained textbook on digital communications**  
**Explains basic rules of recent achievements in digital communication**

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systems such as MIMO, turbo codes, LDPC codes, OFDMA, SC-FDMA Provides problems at the end of each chapter with an instructors' solutions manual on the companion website Includes case studies and representative



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**communication system**

**examples such as DVB-S, GSM,  
UMTS, 3GPP-LTE**

**The first comprehensive and  
up-to-date reference on**

**mechatronics, Robert**

**Bishop's The Mechatronics**

**Handbook was quickly**

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**embraced as the gold standard in the field. With updated coverage on all aspects of mechatronics, The Mechatronics Handbook, Second Edition is now available as a two-volume set. Each installment offers**

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**focused coverage of a particular area of mechatronics, supplying a convenient and flexible source of specific information. This seminal work is still the most exhaustive, state-of-the-art**

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**treatment of the field  
available. Focusing on the  
most rapidly changing areas  
of mechatronics, this book  
discusses signals and  
systems control, computers,  
logic systems, software, and  
data acquisition. It begins**

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with coverage of the role of control and the role modeling in mechatronic design, setting the stage for the more fundamental discussions on signals and systems. The volume reflects the profound impact the

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**development of not just the  
computer, but the  
microcomputer, embedded  
computers, and associated  
information technologies and  
software advances. The final  
sections explore issues  
surrounding computer**

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**software and data  
acquisition. Covers modern  
aspects of control design  
using optimization  
techniques from H2 theory  
Discusses the roles of  
adaptive and nonlinear  
control and neural networks**

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**and fuzzy systems Includes  
discussions of design  
optimization for mechatronic  
systems and real-time  
monitoring and control  
Focuses on computer hardware  
and associated issues of  
logic, communication,**



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**networking, architecture,  
fault analysis, embedded  
computers, and programmable  
logic controllers**

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**Applications**

**RF and Microwave**

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**and Applications with the**  
**C6713 and C6416 DSK**

**Optimizing, Innovating, and**  
**Capitalizing on Information**  
**Systems for Operations**

*Ultrawideband (UWB)*

*Page 50/210*

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*communication systems offer  
an unprecedented  
opportunity to impact the future  
communication world. The  
enormous available bandwidth,  
the wide scope of the data rate /  
range trade-off, as well as the*

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*potential for very low-cost  
operation leading to pervasive  
usage, all present a unique  
opportunity for UWB systems to  
impact the way people and  
intelligent machines  
communicate and interact with*

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*their environment. The aim of this book is to provide an overview of the state of the art of UWB systems from theory to applications. Due to the rapid progress of multidisciplinary UWB research, such an*

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*overview can only be achieved  
by combining the areas of  
expertise of several scientists in  
the field. More than 30 leading  
UWB researchers and  
practitioners have contributed  
to this book covering the major*

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*topics relevant to UWB. These topics include UWB signal processing, UWB channel measurement and modeling, higher-layer protocol issues, spatial aspects of UWB signaling, UWB regulation*

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*and standardization, implementation issues, and UWB applications as well as positioning. The book is targeted at advanced academic researchers, wireless designers, and graduate students wishing*



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*to greatly enhance their  
knowledge of all aspects of UWB  
systems*

*The full text downloaded to  
your computer With eBooks you  
can: search for key concepts,  
words and phrases make*

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*introduces the basic techniques used in modern communication systems and provides fundamental tools and methodologies used in the analysis and design of these systems. The authors*

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*emphasise digital communication systems, including new generations of wireless communication systems, satellite communications, and data transmission networks. A*

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*background in calculus, linear algebra, basic electronic circuits, linear system theory, and probability and random variables is assumed.*

*The Conference on Computer, Informatics, Cybernetics and*

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*Applications 2011 aims to facilitate an exchange of information on best practices for the latest research advances in the area of computer, informatics, cybernetics and applications, which mainly*



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*includes computer science and engineering, informatics, cybernetics, control systems, communication and network systems, technologies and applications, others and emerging new topics.*

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*variety of exercises that may be solved on the computer using MATLAB. By design, the treatment of the various topics is brief. The authors provide the motivation and a short introduction to each topic,*

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*Manual*  
*establish the necessary  
notation, and then illustrate the  
basic concepts by means of an  
example. Important Notice:  
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or the product text may not be*

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*Kellogg on Technology &*

*Innovation*

*Concepts and Technologies*

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*Neuro-Fuzzy Equalizers for  
Mobile Cellular Channels*

*Communication Systems*

*Engineering*

**Thorough coverage of basic  
digital communication system  
principles ensures that**

*Page 70/210*

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**readers are exposed to all basic relevant topics in digital communication system design. The use of CD player and JPEG image coding standard as examples of systems that employ modern**

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**communication principles  
allows readers to relate the  
theory to practical systems.  
Over 180 worked-out  
examples throughout the book  
aids readers in understanding  
basic concepts. Over 480**



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**problems involving applications to practical systems such as satellite communications systems, ionospheric channels, and mobile radio channels gives readers ample opportunity to**

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**practice the concepts they  
have just learned. With an  
emphasis on digital**

**communications,**

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**introduces the basic**

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**principles underlying the analysis and design of communication systems. In addition, this book gives a solid introduction to analog communications and a review of important mathematical**

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equalization, synchronization,  
and wireless communications.  
Includes basic coverage of  
analog modulation such as  
amplitude modulation, phase  
modulation, and frequency**

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**modulation as well as  
demodulation methods.**

**Since the first edition of this  
book was published seven  
years ago, the field of  
modeling and simulation of  
communication systems has**

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**grown and matured in many ways, and the use of simulation as a day-to-day tool is now even more common practice. With the current interest in digital mobile communications, a primary**



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**area of application of modeling and simulation is now in wireless systems of a different flavor from the 'traditional' ones. This second edition represents a substantial revision of the**

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**first, partly to accommodate the new applications that have arisen. New chapters include material on modeling and simulation of nonlinear systems, with a complementary section on**

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**related measurement techniques, channel modeling and three new case studies; a consolidated set of problems is provided at the end of the book.**

**Equalizers are present in all**

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**forms of communication systems. Neuro-Fuzzy Equalizers for Mobile Cellular Channels details the modeling of a mobile broadband communication channel and designing of a neuro-fuzzy**

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**adaptive equalizer for it. This book focuses on the concept of the simulation of wireless channel equalizers using the adaptive-network-based fuzzy inference system (ANFIS). The book highlights a study of**

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**currently existing equalizers for wireless channels. It discusses several techniques for channel equalization, including the type-2 fuzzy adaptive filter (type-2 FAF), compensatory neuro-fuzzy**

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**filter (CNFF), and radial basis function (RBF) neural network. Neuro-Fuzzy Equalizers for Mobile Cellular Channels starts with a brief introduction to channel equalizers, and the nature of mobile cellular**

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**channels with regard to the frequency reuse and the resulting CCI. It considers the many channel models available for mobile cellular channels, establishes the mobile indoor channel as a**



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**Rayleigh fading channel,  
presents the channel  
equalization problem, and  
focuses on various equalizers  
for mobile cellular channels.  
The book discusses  
conventional equalizers like**

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**LE and DFE using a simple LMS algorithm and transversal equalizers. It also covers channel equalization with neural networks and fuzzy logic, and classifies various equalizers. This being a fairly**

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**new branch of study, the book considers in detail the concept of fuzzy logic controllers in noise cancellation problems and provides the fundamental concepts of neuro-fuzzy. The**

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**final chapter offers a recap and explores venues for further research. This book also establishes a common mathematical framework of the equalizers using the RBF model and develops a**

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**mathematical model for ultra-wide band (UWB) channels using the channel co-variance matrix (CCM). Introduces the novel concept of the application of adaptive-network-based fuzzy**

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**inference system (ANFIS) in  
the design of wireless channel  
equalizers Provides model  
ultra-wide band (UWB)  
channels using channel co-  
variance matrix Offers a  
formulation of a unified radial**

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**basis function (RBF)  
framework for ANFIS-based  
and fuzzy adaptive filter (FAF)  
Type II, as well as  
compensatory neuro-fuzzy  
equalizers Includes extensive  
use of MATLAB® as the**

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**simulation tool in all the above cases**

**Adapting the development of information systems for operations management is essential for the effectiveness of an organization's business**



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**strategy. Optimizing,  
Innovating, and Capitalizing  
on Information Systems for  
Operations presents research  
on the applications of  
information systems and its  
influence on business and**

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**operations management.**

**Highlighting case studies,  
frameworks and**

**methodologies, this book aims  
to be useful for practitioners  
and academics in the fields of  
decision, management, and**

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**social sciences.**

**Cognitive Underwater**

**Acoustic Networking**

**Techniques**

**Kernel Methods in**

**Bioengineering, Signal and**

**Image Processing**

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**Fundamentals of Digital  
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Implementing TDD  
Theory, Design, and  
Deployment**

We welcome you to the First  
International Conference on Arts

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and Technology (ArtsIT 2009),  
hosted by CSIE of the National Ilan  
University and co-organized by the  
National Science Council, ICST,  
College of EECS at National Ilan  
University, Software Simulation  
Society in Taiwan, ISAC, TCA,

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NCHC, CREATE-NET, and

Institute for Information Industry.

ArtsIT2009 was held in Yilan,

Taiwan, during September 24–25,

2009. The conference comprised the

following themes: • New Media

Technologies (Evolutionary systems

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that create arts or display art works,  
such as tracking sensors, wearable  
computers, mixed reality, etc. ) •

Software Art (Image processing or  
computer graphics techniques that  
create arts, including algorithmic art,  
mathematic art, advanced modeling

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and rendering, etc. ) • Animation

Techniques (2D or 3D computer

animations, AI-based animations,

etc. ) • Multimedia (Integration of

different media, such as virtual

reality systems, audio, performing

arts, etc. ) • Interactive Methods



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(Vision-based tracking and  
recognition, interactive art, etc. )

The conference program started with  
an opening ceremony, followed by  
three keynote speeches and four  
technical sessions distributed over a  
period of two days. Two poster

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Manual  
sessions, one hour each, were  
scheduled before the afternoon oral

sessions. An Int- active Arts

Exhibition was held in conjunction

with ArtsIT 2009. Twelve well-

known digital arts teams from

Taiwan exhibited 15 artworks in this

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event, including 10 int- active  
installation arts, 4 video arts, and 1  
digital print. The conference  
received around 50 submissions  
from 15 different countries.  
Revised to reflect all the current  
trends in the digital communications

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field, this all-inclusive guide delivers an outstanding introduction to the analysis and design of digital communication systems. Includes expert coverage of new topics: Turbocodes, Turboequalization, Antenna Arrays, Digital Cellular

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Systems, and Iterative Detection.

Convenient, sequential organization begins with a look at the history and classification of channel models and builds from there.

Based on the popular Artech House classic, Digital Communication

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Systems Engineering with Software-Defined Radio, this book provides a practical approach to quickly learning the software-defined radio (SDR) concepts needed for work in the field. This up-to-date volume guides readers on how to quickly

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prototype wireless designs using SDR for real-world testing and experimentation. This book explores advanced wireless communication techniques such as OFDM, LTE, WLA, and hardware targeting.

Readers will gain an understanding

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of the core concepts behind wireless hardware, such as the radio frequency front-end, analog-to-digital and digital-to-analog converters, as well as various processing technologies. Moreover, this volume includes chapters on



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timing estimation, matched filtering, frame synchronization message decoding, and source coding. The orthogonal frequency division multiplexing is explained and details about HDL code generation and deployment are provided. The book

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concludes with coverage of the WLAN toolbox with OFDM beacon reception and the LTE toolbox with downlink reception. Multiple case studies are provided throughout the book. Both MATLAB and Simulink source code are included to assist

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readers with their projects in the field.

"This book presents an extensive introduction to the field of kernel methods and real world applications. The book is organized in four parts: the first is an introductory chapter

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providing a framework of kernel  
methods; the others address

Bioengineering, Signal Processing  
and Communications and Image

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*In this supplementary text, MATLAB is used as a computing tool to explore traditional DSP topics and solve problems to gain insight. This greatly expands the range and complexity of problems that students can*

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*effectively study in the course. Since DSP applications are primarily algorithms implemented on a DSP processor or software, a fair amount of programming is required. Using interactive software such as MATLAB makes it possible to place more emphasis on learning new and difficult concepts than on programming algorithms.*

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*Interesting practical examples are discussed and useful problems are explored.*

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*This book summarizes the latest research on cognitive network-layer methods and smart*



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*adaptive physical-layer methods in underwater networks. Underwater communication requires extendable and delay-tolerant underwater acoustic networks capable of supporting multiple frequency bands, data rates and transmission ranges. The book also discusses a suitable foreground communication stack for mixed*

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*mobile/static networks, a technology that requires adaptive physical layer waveforms and cognitive network strategies with underlying cooperative and non-cooperative robust processes. The goal is to arrive at a universally applicable standard in the area of Underwater Internet-of-Things [ISO/IEC 30140, 30142, 30143]. The book is the*

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*second spin-off of the research project*

*RACUN, after the first RACUN-book*

*"Underwater Acoustic Networking*

*Techniques" ([https://link.springer.com/book/](https://link.springer.com/book/10.1007%2F978-3-642-25224-2)*

*10.1007%2F978-3-642-25224-2)*

*This volume, RF and Microwave*

*Applications and Systems, includes a wide*

*range of articles that discuss RF and*

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*microwave systems used for communication and radar and heating applications.*

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*Specific voice and data commercial systems are investigated more thoroughly in individual chapters that follow. Detailed discussions of military electronics, avionics, and radar (both military and automotive) are provided in separate chapters. A chapter focusing on FR/microwave energy used for therapeutic medicine is also provided.*

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*Systems considerations including thermal, mechanical, reliability, power management, and safety are discussed in separate chapters. Engineering processes are also explored in articles about corporate initiatives, cost modeling, and design reviews. The book closes with a discussion of the underlying physics of electromagnetic*

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*propagation and interference. In addition to new chapters on WiMAX and broadband cable, nearly every existing chapter features extensive updates and several were completely rewritten to reflect the massive changes areas such as radio navigation and electronic warfare.*

*This book is a tutorial on digital techniques*

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*for waveform generation, digital filters, and digital signal processing tools and techniques The typical chapter begins with some theoretical material followed by working examples and experiments using the TMS320C6713-based DSPStarter Kit (DSK) The C6713 DSK is TI's newest signal processor based on the C6x processor*



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*(replacing the C6711 DSK)*

*Introduction to Digital Communication  
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*First International Conference, ArtsIT*

*2009, Yi-Lan, Taiwan, September 24-25,*

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*Emerging Technologies in Wireless LANs*

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applied mathematics  
underlying each solution  
so that readers can go  
deeper into the theory  
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processing that will  
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processing Informed by  
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practical systems such  
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channel distortion,  
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linear algebra, basic  
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linear system theory,  
and probability and  
random variables is  
assumed.

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world a significant tool to use in this  
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and de-risking power system equipment in highly realistic, flexible, and repeatable conditions. Controller hardware-in-the-loop (CHIL) and power hardware-in-the-loop (PHIL) are the two main HIL simulation

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optical fibers, and wireless channels. Analysis and intuitive interpretations are developed for channel noise models, followed by coverage of the principles of detection, coding, and decoding. The various concepts covered

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