

Error Control Coding Solution Costello

Cryptology is the practice of hiding digital information by means of various obfuscatory and steganographic techniques. The application of said techniques facilitates message confidentiality and sender/receiver identity authentication, and helps to ensure the integrity and security of computer passwords, ATM card information, digital signatures, DVD and HDDVD content, and electronic commerce. Cryptography is also central to digital rights management (DRM), a group of techniques for technologically controlling the use of copyrighted material that is being widely implemented and deployed at the behest of corporations that own and create revenue from the hundreds of thousands of mini-transactions that take place daily on programs like iTunes. This new edition of our best-selling book on cryptography and information hiding delineates a number of different methods to hide information in all types of digital media files. These methods include encryption, compression, data embedding and watermarking, data mimicry, and scrambling. During the last 5 years, the continued advancement and exponential increase of computer processing power have enhanced the efficacy and scope of electronic espionage and content appropriation. Therefore, this edition has amended and expanded outdated sections in accordance with new dangers, and includes 5 completely new chapters that introduce newer more sophisticated and refined cryptographic algorithms and techniques (such as fingerprinting, synchronization, and quantization) capable of withstanding the evolved forms of attack. Each chapter is divided into sections, first providing an introduction and high-level summary for those who wish to understand the concepts without wading through technical explanations, and then presenting concrete examples and greater detail for those who want to write their own programs. This combination of practicality and theory allows programmers and system designers to not only implement tried and true encryption procedures, but also consider probable future developments in their designs, thus fulfilling the need for preemptive caution that is becoming ever more explicit as the transference of digital media escalates. Includes 5 completely new chapters that delineate the most current and sophisticated cryptographic algorithms, allowing readers to protect their information against even the most evolved electronic attacks

Conceptual tutelage in conjunction with detailed mathematical directives allows the reader to not only understand encryption procedures, but also to write programs which anticipate future security developments in their design

This book constitutes the reviewed proceedings of the first Conference on Future Generation Information Technology, FGIT 2009, held in Jeju Island, Korea, December 10-12, 2009. The 33 full papers presented together with two keynote papers were carefully selected from 1051 submissions. This book considers the best papers of the conference and issues such as data analysis, data processing, advanced computation models and security, software engineering, communication and networking.

An in-depth treatment of algorithms and standards for perceptual coding of high-fidelity audio, this self-contained reference surveys and addresses all aspects of the field. Coverage includes signal processing and perceptual (psychoacoustic) fundamentals, details on relevant research and signal models, details on standardization and applications, and details on performance measures and perceptual measurement systems. It includes a comprehensive bibliography with over 600 references, computer exercises, and MATLAB-based projects for use in EE multimedia, computer science, and DSP courses. An ftp site containing supplementary material such as wave files, MATLAB programs and workspaces for the students to solve some of the numerical problems and computer exercises in the book can be found at ftp://ftp.wiley.com/public/sci_tech_med/audio_signal

This book provides students and practicing chip designers with an easy-to-follow yet thorough, introductory treatment of the most promising emerging memories under development in the industry. Focusing on the chip designer rather than the end user, this book offers expanded, up-to-date coverage of emerging memories circuit design. After an introduction on the old solid-state memories and the fundamental limitations soon to be encountered, the working principle and main technology issues of each of the considered technologies (PCRAM, MRAM, FeRAM, ReRAM) are reviewed and a range of topics related to design is explored: the array organization, sensing and writing circuitry, programming algorithms and error correction techniques are reviewed comparing the approach followed and the constraints for each of the technologies considered. Finally the issue of radiation effects on memory devices has been briefly treated. Additionally some considerations are entertained about how emerging memories can find a place in the new memory paradigm required by future electronic systems. This book is an up-to-date and comprehensive introduction for students in courses on memory circuit design or advanced digital courses in VLSI or CMOS circuit design. It also serves as an essential, one-stop resource for academics, researchers and practicing engineers.

Desirable and Designable

Digital Signal Processing for Communication Systems

Undersea Fiber Communication Systems

In Search of the Next Memory

Computational Science and Technology

Mobile Computing

Written by one of the developers of the technology, Hashing is both a historical document on the development of hashing and an analysis of the applications of hashing in a society increasingly concerned with security. The material in this book is based on courses taught by the author, and key points are reinforced in sample problems and and researchers in mathematics, cryptography, and security will benefit from this overview of hashing and the complicated mathematics that it requires.

System and Control theory is one of the most exciting areas of contemporary engineering mathematics. From the analysis of Watt's steam engine governor - which enabled the Industrial Revolution - to the design of controllers for consumer items, chemical plants and modern aircraft, the area has always drawn from a broad range of tools and interaction between engineering and established areas of 'pure' and 'applied' mathematics. This impressive volume collects a discussion of more than fifty open problems which touch upon a variety of subfields, including: chaotic observers, nonlinear local controllability, discrete event and hybrid systems, neural network learning, matrix inequality

Proposed and explained by leading researchers, they are offered with the intention of generating further work, as well as inspiration for many other similar problems which may naturally arise from them. With extensive references, this book will be a useful reference source - as well as an excellent addendum to the textbooks in the area.

Coded Modulation Systems is an introduction to the subject of coded modulation in digital communication. It is designed for classroom use and for anyone wanting to learn the ideas behind this modern kind of coding. Coded modulation is signal encoding that takes into account the nature of the channel over which it is used. Traditional error bits in order to correct transmission errors. In coded modulation, continuous time signals and their phases and amplitudes play the major role. The coding can be seen as a patterning of these quantities. The object is still to correct errors, but more fundamentally, it is to conserve signal energy and bandwidth at a given error performance.

Trellis coded modulation (TCM) schemes encode the points of QAM constellations; lattice coding and set-partition techniques play major roles here. Continuous-phase modulation (CPM) codes encode the signal phase, and create constant envelope RF signals. The partial-response signaling (PRS) field includes intersymbol interference problems created by lowpass filtering. In addition to these topics, the book covers coding techniques of several kinds for fading channels, spread spectrum and repeat-request systems. The history of the subject is fully traced back to the formative work of Shannon in 1949. Full explanation of the basics and complete homework problems make the

During the past two decades, many communication techniques have been developed to achieve various goals such as higher data rate, more robust link quality,andmoreusercapacityinmorerigorouschannelconditions.Themost well known are, for instance, CDMA, OFDM, MIMO, multiuser OFDM, and UWB systems.All these systems havetheir own drawbacks that limit the system performance. Conventional way to overcome the drawback is to impose most of the computational e?ort in the receiver side and let the transmitter design much simpler than receiver. The fact is that, however, by leveraging reasonable computational e?ort to the transmitter, the receiver design can be greatly

has long been considered to limit the perf- mance of multiuser systems. Popular solutions to mitigate MAI issue include multiuser detection (MUD) or sophisticated signal processing for interference cancellation such as PIC or SIC. However, those solutions impose great b- den in the receiver. In this case, precoding o?er good solutions to a later in this book. This book is intended to provide a comprehensive review of precoding techniques for digital communications systems from a signal processing p- spective. The variety of selected precoding techniques and their applications makes this book quite di?erent from other texts about precoding techniques in digital communication

Digital Phase Modulation

Power Line Communications

Error Control Coding

Error Correction Coding

Algebraic and Stochastic Coding Theory

Trends in Computer Science

Model Predictive Control for Doubly-Fed Induction Generators and Three-Phase Power Converters describes the application of model predictive control techniques with modulator and finite control sets to squirrel cage induction motor and in doubly-fed induction generators using field orientation control techniques as both current control and direct power control. Sections discuss induction machines, their key modulation techniques, introduce the utility of model predictive control, review core concepts of vector control, direct torque control, and direct power control alongside novel approaches of MPC. Mathematical modeling of cited systems, MPC theory, their applications, MPC design and simulation in MATLAB are also considered in-depth. The work concludes by addressing implementation considerations, including generator operation under voltage sags or distorted voltage and inverters connected to the grid operating under distorted voltage. Experimental results are presented in full. Adopts model predictive control design for optimized induction machines geared for complex grid

dynamics Demonstrates how to simulate model predictive control using MATLAB and Simulink Presents information about hardware implementation to obtain experimental results Covers generator operation under voltage sags or distorted voltage

This book addresses 5G network capacity requirements with a new architecture for 5G Optical Backhaul Network. The author first describes the challenges for 5G backhaul network requirements and then the details of an Optical Backhaul Network for 5G. The author describes an architecture, in which small cells deploy as a cluster (i.e., 3-5 small cells in one cluster) where one small cell works as an aggregation point using an optical transceiver to backhaul the aggregated traffic to the nearest optical network unit, before it then goes to the core network. This book also illustrates the optical link budget analysis that can be used to determine the availability and the performances of the optical backhaul link in different deployment scenarios and different weather conditions. Provides a single-source reference to the basics of free space laser communication with ambient light compensation; Offers timely information, blending theory and practice; Written to be accessible to readers with varying backgrounds, including numerous illustrations; Provides hands-on experience through practical

examples, which can be put to work to deploy and optimize cellular networks.

This book walks the reader through the next step in the evolution of NAND flash memory technology, namely the development of 3D flash memories, in which multiple layers of memory cells are grown within the same piece of silicon. It describes their working principles, device architectures, fabrication techniques and practical implementations, and highlights why 3D flash is a brand new technology. After reviewing market trends for both NAND and solid state drives (SSDs), the book digs into the details of the flash memory cell itself, covering both floating gate and emerging charge trap technologies. There is a plethora of different materials and vertical integration schemes out there. New memory cells, new materials, new architectures (3D Stacked, BiCS and P-BiCS, 3D FG, 3D VG, 3D advanced architectures); basically, each NAND manufacturer has its own solution. Chapter 3 to chapter 7 offer a broad overview of how 3D can materialize. The 3D wave is impacting emerging memories as well and chapter 8 covers 3D RRAM (resistive RAM) crosspoint arrays. Visualizing 3D structures can be a challenge for the human brain: this is way all these chapters contain a lot of bird's-eye views and cross sections along the 3 axes. The second part of the book is devoted to other important aspects, such as advanced packaging technology (i.e. TSV in chapter 9) and error correction codes, which have been leveraged to improve flash reliability for decades. Chapter

10 describes the evolution from legacy BCH to the most recent LDPC codes, while chapter 11 deals with some of the most recent advancements in the ECC field. Last but not least, chapter 12 looks at 3D flash memories from a system perspective. Is 14nm the last step for planar cells? Can 100 layers be integrated within the same piece of silicon? Is 4 bit/cell possible with 3D? Will 3D be reliable enough for enterprise and datacenter applications? These are some of the questions that this book helps answering by providing insights into 3D flash memory design, process technology and applications.

A thoroughly up-to-date revision of this successful book this text aims to give the professional engineer or graduate student a fully comprehensive yet practical understanding of the principles and technological issues of this major subject. The book contains a strong tutorial element and real-world orientation.

Bounds, Codes, Decoders, Analysis and Applications

Disappearing Cryptography

14th International Symposium, AAECC-14, Melbourne, Australia, November 26-30, 2001. Proceedings

Model Predictive Control for Doubly-Fed Induction Generators and Three-Phase Power Converters

A Collection of Contributions in Honour of Jack van Lint

Turbo Codes

The AAECC Symposia Series was started in 1983 by Alain Poli (Toulouse), who, together with R. Desq, D. Lazard, and P. Camion, organized the ?rst conference. Originally the acronym AAECC meant "Applied Algebra and Error-Correcting Codes". Over the years its meaning has shifted to "Applied Algebra, Algebraic Algorithms, and Error-Correcting Codes", reflecting the growing importance of complexity in both decoding algorithms and computational algebra. AAECC aims to encourage cross-fertilization between algebraic methods and their applications in computing and communications. The algebraic orientation is towards ?nite ?elds, complexity, polynomials, and graphs. The applications orientation is towards both theoretical and practical error-correction coding, and, since AAECC 13 (Hawaii, 1999), towards

cryptography. AAECC was the ?rst symposium with papers connecting Gr ?obner bases with E-C codes. The balance between theoretical and practical is intended to shift regularly; at AAECC-14 the focus was on the theoretical side. The main subjects covered were: – Codes: iterative decoding, decoding methods, block codes, code construction. – Codes and algebra: algebraic curves, Gr ?obner bases, and AG codes. – Algebra: rings and ?elds, polynomials. – Codes and combinatorics: graphs and matrices, designs, arithmetic. – Cryptography. – Computational algebra: algebraic algorithms. – Sequences for communications.

The last ten years have seen a great flowering of the theory of digital data modulation. This book is a treatise on digital modulation theory, with an emphasis on these more recent innovations. It has its origins in a collaboration among the authors that began in 1977. At that time it seemed odd to us that the subjects of error-correcting codes and data modulation were so separated; it seemed also that not enough understanding underlay the mostly ad hoc approaches to data transmission. A great many others were intrigued, too, and the result was a large body of new work that makes up most of this book. Now the older disciplines of detection theory and coding theory have been generalized and applied to the point where it is hard to tell where these end and the theories of signal design and modulation begin.

Despite our emphasis on the events of the last ten years, we have included all the traditional topics of digital phase modulation. Signal space concepts are developed, as are simple phase-shift-keyed and pulse-shaped modulations; receiver structures are discussed, from the simple linear receiver to the Viterbi algorithm; the effects of channel filtering and of hardlimiting are described. The volume thus serves well as a pedagogical book for research engineers in industry and second-year graduate students in communications engineering. The production of a manageable book required that many topics be left out.

Mobile multimedia broadcasting compasses a broad range of topics including radio propagation, modulation and demodulation, error control, signal compression and coding, transport and time slicing, system on chip real-time implementation in hardware, software and system levels. The major goal of this technology is to bring multimedia enriched contents to handheld devices such as mobile phones, portable digital assistants, and media players through radio transmission or internet protocol (IP) based broadband networks. Research and development of mobile multimedia broadcasting technologies are now explosively growing and regarded as new killer applications. A number of mobile multimedia broadcasting standards related to transmission, compression and multiplexing now coexist and are being extensively further developed. The development and implementation of mobile multimedia broadcasting systems are very challenging tasks and require the huge efforts of the related industry, research and regulatory authorities so as to bring the success. From an implementation design and engineering practice point of view, this book aims to be the ?rst single volume to provide a comprehensive and highly coherent treatment for multiple standards of mobile multimedia broadcasting by covering basic principles, algorithms, design trade-off, and well-compared implementation system examples. This book is organized into 4 parts with 22 chapters.

Description This book provides a detailed overview of the evolution of undersea communications systems, with emphasis on the most recent breakthroughs of optical submarine cable technologies based upon Wavelength Division Multiplexing, optical amplification, new-generation optical fibers, and high-speed digital electronics. The role played by submarine-communication systems in the development of high-speed networks and associated market demands for multiplying Internet and broadband services is also covered. Importance of This Topic This book will fill the gap between highly specialized papers from large international conferences and broad-audience technology review updates. The book provides a full overview of the evolution in the field and conveys the dimension of the large undersea projects. In addition, the book uncovers the myths surrounding marine operations and installations in that domain, which have remained known so far to only very few specialists.

Distributed Applications and Interoperable Systems

16th IFIP WG 6.1 International Conference, DAIS 2016, Held as Part of the 11th International Federated Conference on Distributed Computing Techniques, DisCoTec 2016, Heraklion, Crete, Greece, June 6-9, 2016, Proceedings

Future Generation Information Technology

Mathematical Methods and Algorithms

Performance Analysis and Modeling of Digital Transmission Systems

Applied Algebra, Algebraic Algorithms and Error-Correcting Codes

Coding theory, system theory, and symbolic dynamics have much in common. A major new theme in this area of research is that of codes and systems based on graphical models. This volume contains survey and research articles from leading researchers at the interface of these subjects.

This book is an expanded third edition of the book Performance Analysis of Digital Transmission Systems, originally published in 1990. Second edition of the book titled Digital Transmission Systems: Performance Analysis and Modeling was published in 1998. The book is intended for those who design communication systems and networks. A computer network designer is interested in selecting communication channels, error protection schemes, and link control protocols. To do this efficiently, one needs a mathematical model that accurately predicts system behavior. Two basic problems arise in mathematical modeling: the problem of identifying a system and the problem of applying a model to the system analysis. System identification consists of selecting a class of mathematical objects to describe fundamental properties of the system behavior. We use a specific class of hidden Markov models (HMMs) to model communication systems. This model was introduced by C. E. Shannon more than 50 years ago as a Noisy Discrete Channel with a finite number of states. The model is described by a finite number of matrices whose elements are estimated on the basis of experimental data. We develop several methods of model identification and show their relationship to other methods of data analysis, such as spectral methods, autoregressive moving average (ARMA) approximations, and rational transfer function approximations.

Combining theoretical knowledge and practical applications, this advanced-level textbook covers the most important aspects of contemporary digital communication systems. 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. 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 multi-carrier digital modulations. The basic properties of several physical communication channels used in digital communication systems are explained, showing the transmission and reception 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 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 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 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 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 communication system examples such as DVB-S, GSM, UMTS, 3GPP-LTE

An unparalleled learning tool and guide to error correction coding Error correction coding techniques allow the detection and correction of errors occurring during the transmission of data in digital communication systems. These techniques are nearly universally employed in modern communication systems, and are thus an important component of the modern information economy. Error Correction Coding: Mathematical Methods and Algorithms provides a comprehensive introduction to both the theoretical and practical aspects of error correction coding, with a presentation suitable for a wide variety of audiences, including graduate students in electrical engineering, mathematics, or computer science. The pedagogy is arranged so that the mathematical concepts are presented incrementally, followed immediately by applications to coding. A large number of exercises expand and deepen students' understanding. A unique feature of the book is a set of programming laboratories, supplemented with over 250 programs and functions on an associated Web site, which provides hands-on experience and a better understanding of the material. These laboratories lead students through the implementation and evaluation of Hamming codes, CRC codes, BCH and R-S codes, convolutional codes, turbo codes, and LDPC codes. This text offers both "classical" coding theory-such as Hamming, BCH, Reed-Solomon, Reed-Muller, and convolutional codes-as well as modern codes and decoding methods, including turbo codes, LDPC codes, repeat-accumulate codes, space time codes, factor graphs, soft-decision decoding, Guruswami-Sudan decoding, EXIT charts, and iterative decoding. Theoretical complements on performance and bounds are presented. Coding is also put into its communications and information theoretic context and connections are drawn to public key cryptosystems. Ideal as a classroom resource and a professional reference, this thorough guide will benefit electrical and computer engineers, mathematicians, students, researchers, and scientists.

Coded Modulation Systems

3D Flash Memories

Essentials of Error-Control Coding

Error-Correction Coding and Decoding

Fourth International Conference, HiPEAC 2009

Theory and Applications for Narrowband and Broadband Communications over Power Lines

This book discusses both the theory and practical applications of self-correcting data, commonly known as error-correcting codes. The applications included demonstrate the importance of these codes in a wide range of everyday technologies, from smartphones to secure communications and transactions. Written in a readily understandable style, the book presents the authors' twenty-five years of research organized into five parts: Part I is concerned with the theoretical performance attainable by using error correcting codes to achieve communications efficiency in digital communications systems. Part II explores the construction of error-correcting codes and explains the different families of codes and how they are designed. Techniques are described for producing the very best codes. Part III addresses the analysis of low-density parity-check (LDPC) codes, primarily to calculate their stopping sets and low-weight codeword spectrum which determines the performance of th ese codes. Part IV deals with decoders designed to realize optimum performance. Part V describes applications which include combined error correction and detection, public key cryptography using Goppa codes, correcting errors in passwords and watermarking. This book is a valuable resource for anyone interested in error-correcting codes and their applications, ranging from non-experts to professionals at the forefront of research in their field. This book is open access under a CC BY 4.0 license.

This text explains the general principles of how wireless systems work, how mobility is supported, what the underlying infrastructure is and what interactions are needed among different functional components. Designed as a textbook appropriate for undergraduate or graduate courses in Computer Science (CS), Computer Engineering (CE), and Electrical Engineering (EE), Introduction to Wireless and Mobile Systems third edition focuses on qualitative descriptions and the realistic explanations of relationships between wireless systems and performance parameters. Rather than offering a thorough history behind the development of wireless technologies or an exhaustive list of work being carried out, the authors help CS, CE, and EE students learn this exciting technology through relevant examples such as understanding how a cell phone starts working as soon as they get out of an airplane. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

The books in this series present leading-edge research in the field of computer research, technology and applications. Each contribution has been carefully selected for inclusion based on the significance of the research to the field. Summaries of all chapters are gathered at the beginning of the book and an in-depth index is presented to facilitate access.

Providing in-depth treatment of error correction Error Correction Coding: Mathematical Methods and Algorithms, 2nd Edition provides a comprehensive introduction to classical and modern methods of error correction. The presentation provides a clear, practical introduction to using a lab-oriented approach. Readers are encouraged to implement the encoding and decoding algorithms with explicit algorithm statements and the mathematics used in error correction, balanced with an algorithmic development on how to actually do the encoding and decoding. Both block and stream (convolutional) codes are discussed, and the mathematics required to understand them are introduced on a "just-in-time" basis as the reader progresses through the book. The second edition increases the impact and reach of the book, updating it to discuss recent important technological advances. New material includes: Extensive coverage of LDPC codes, including a variety of decoding algorithms. A comprehensive introduction to polar codes, including systematic encoding/decoding and list decoding. An introduction to fountain codes. Modern applications to systems such as HDTV, DVB-T, and cell phones Error Correction Coding includes extensive program files (for example, C++ code for all LDPC decoders and polar code decoders), laboratory materials for students to implement algorithms, and an updated solutions manual, all of which are perfect to help the reader understand and retain the content. The book covers classical BCH, Reed Solomon, Golay, Reed Muller, Hamming, and convolutional codes which are still component codes in virtually every modern communication system. There are also fulsome discussions of recently developed polar codes and fountain codes that serve to educate the reader on the newest developments in error correction.

Satellite Communication Systems

Error Correction Codes for Non-Volatile Memories

Open Problems in Mathematical Systems and Control Theory

Codes, Systems, and Graphical Models

A Book of Readings

Hashing in Computer Science

Nowadays it is hard to find an electronic device which does not use codes: for example, we listen to music via heavily encoded audio CD's and we watch movies via encoded DVD's. There is at least one area where the use of encoding/decoding is not so developed, yet: Flash non-volatile memories. Flash memory high-density, low power, cost effectiveness, and scalable design make it an ideal choice to fuel the explosion of multimedia products, like USB keys, MP3 players, digital cameras and solid-state disk. In ECC for Non-Volatile Memories the authors expose the basics of coding theory needed to understand the application to memories, as well as the relevant design topics, with reference to both NOR and NAND Flash architectures. A collection of software routines is also included for better understanding. The authors form a research group (now at Qimonda) which is the typical example of a fruitful collaboration between mathematicians and engineers.

This book constitutes the refereed proceedings of the Fourth International Conference on High Performance Embedded Architectures and Compilers, HiPEAC 2009, held in Paphos, Cyprus, in January 2009. The 27 revised full papers presented together with 2 invited keynote paper were carefully reviewed and selected from 97 submissions. The papers are organized in topical sections on dynamic translation and optimisation, low level scheduling, parallelism and resource control, communication, mapping for CMPs, power, cache issues as well as parallel embedded applications.

Rapid advances in electronic and optical technology have enabled the implementation of powerful error-control codes, which are now used in almost the entire range of information systems with close to optimal performance. These codes and decoding methods are required for the detection and correction of the errors and erasures which inevitably occur in digital information during transmission, storage and processing because of noise, interference and other imperfections. Error-control coding is a complex, novel and unfamiliar area, not yet widely understood and appreciated. This book sets out to provide a clear description of the essentials of the subject, with comprehensive and up-to-date coverage of the most useful codes and their decoding algorithms. A practical engineering and information technology emphasis, as well as relevant background material and fundamental theoretical aspects, provides an in-depth guide to the essentials of Error-Control Coding. Provides extensive and detailed coverage of Block, Cyclic, BCH, Reed-Solomon, Convolutional, Turbo, and Low Density Parity Check (LDPC) codes, together with relevant aspects of Information Theory EXIT chart performance analysis for iteratively decoded error-control techniques Heavily illustrated with tables, diagrams, graphs, worked examples, and exercises Invaluable companion website features slides of figures, algorithm software, updates and solutions to problems Offering a complete overview of Error Control Coding, this book is an indispensable resource for students, engineers and researchers in the areas of telecommunications engineering, communication networks, electronic engineering, computer science, information systems and technology, digital signal processing and applied mathematics.

This book gathers the proceedings of the Fourth International Conference on Computational Science and Technology 2017 (ICCST2017), held in Kuala Lumpur, Malaysia, on 29 – 30 November 2017. These proceedings offer practitioners and researchers the opportunity to present exciting advances in computational techniques and solutions in this area. They also identify emerging issues, help to shape future research directions, and will enable industrial users to apply cutting-edge, large-scale and high-performance computational methods.

Audio Signal Processing and Coding

First International Conference, FGIT 2009, Jeju Island, Korea, December 10-12,2009, Proceedings

Fifty Years of Slicing and Dicing

Combinatorial Methods and Models

Introduction to Wireless and Mobile Systems

Inside the Circuitry from the Oldest to the Emerging Non-Volatile Memories

Power Line Communications (PLC) is a promising emerging technology, which has attracted much attention due to the wide availability of power distribution lines. This book provides a thorough introduction to the use of power lines for communication purposes, ranging from channel characterization, communications on the physical layer and electromagnetic interference, through to protocols, networks, standards and up to systems and implementations. With contributions from many of the most prominent international PLC experts from academia and industry, Power Line Communications brings together a wealth of information on PLC specific topics that provide the reader with a broad coverage of the major developments within the field. Acts as a single source reference guide to PLC collating information that is widely dispersed in current literature, such as in research papers and standards. Covers both the state of the art, and ongoing research topics. Considers future developments and deployments of PLC

This Book Is Specially Designed To Improve The Problem Solving Ability And The Imaginative Power Of Students Over The Subjects Of Information Technology, Network And Internet. The Conventional Text And Reference Books Ignore That Fact Young Minds Need To Be Properly Trained And Nurtured To Achieve Excellency. In The Book Lots Of Research Issues Are Discussed Pertaining The Current Issues Of Networking. The Book Covers General Topics Of Information Technology Including The Future Trends Of Computing And Networking, Networks In General Staring With Protocol To Wireless Networking, Internet Technology In Details Including Next Generation Internet.The Evolution Of Networking, Economics Benefits, Transitional Phases, Evolution Of Generations Of Computers And Communications, Pcn, Packet Switching To Atm Cell Switching, Lan, Man, Wan, Ethernet And Its Future Generations, Internetworking, Gateways, Bridges, Isdn, Xdsl And Applications Are Discussed. Tcp/Ip, Udp, Icmp, Arp, Rarp, Ipv6, Firewall Are Dealt With Problems And Exercises. The Future Network Will Face Three Major Challenges Of High Data Rate, Reliable Transport And Secured Transport. Two Exclusives Chapters Deal With Reliable Transport (Basically Error Control) And Secured Transport. The Details Analysis Of Bec Techniques Including Those Of Basic Arqs And Several New And Modified Approaches Are Extensively Discussed. Many Research Direction Are Examined.The Conventional Security Techniques Namely Coding Schemes, Key Transport Protocol, Key Distribution Protocols, One Time Key Pad, Des, Aes And Md Etc. Are Thoroughly Discussed In The Book. The Future Research Areas Of Secured Techniques Are Explored With Possible Solution. A Chapter On Successor Of Ir Now Believed As Knowledge Technology Has Been Referred To. In Fact In Every Chapter, Some Research Issues Are Mentioned With Judicious Selection And Approaches.The Book Is Aimed To Benefit Be/Btech And Mtech Students Of Computer Science & Engineering, Electronics & Communication Engineering, Information Technology And Electrical Engineering.

PREFACE The increasing demand on high data rate and quality of service in wireless communication has to cope with limited bandwidth and energy resources. More than 50 years ago, Shannon has paved the way to optimal usage of bandwidth and energy resources by bounding the spectral efficiency vs. signal to noise ratio trade-off. However, as any information theorist, Shannon told us what is the best we can do but not how to do it [1]. In this view, turbo codes are like a dream come true: they allow approaching the theoretical Shannon capacity limit very closely. However, for the designer who wants to implement these codes, at first sight they appear to be a nightmare. We came a huge step closer in striving the theoretical limit, but see the historical axiom repeated on a different scale: we know we can achieve excellent performance with turbo codes, but not how to realize this in real devices.

The fourth volume of Rudolf Ahlswede’s lectures on Information Theory is focused on Combinatorics. Ahlswede was originally motivated to study combinatorial aspects of Information Theory via zero-error codes: in this case the structure of the coding problems usually drastically changes from probabilistic to combinatorial. The best example is Shannon’s zero error capacity, where independent sets in graphs have to be examined. The extension to multiple access channels leads to the Zarankiewicz problem. A code can be regarded combinatorially as a hypergraph; and many coding theorems can be obtained by appropriate colourings or coverings of the underlying hypergraphs. Several such colouring and covering techniques and their applications are introduced in this book. Furthermore, codes produced by permutations and one of Ahlswede’s favourite research fields -- extremal problems in Combinatorics -- are presented. Whereas the first part of the book concentrates on combinatorial methods in order to analyse classical codes as prefix codes or codes in the Hamming metric, the second is devoted to combinatorial models in Information Theory. Here the code concept already relies on a rather combinatorial structure, as in several concrete models of multiple access channels or more refined distortions. An analytical tool coming into play, especially during the analysis of perfect codes, is the use of orthogonal polynomials. Classical information processing concerns the main tasks of gaining knowledge and the storage, transmission and hiding of data. The first task is the prime goal of Statistics. For transmission and hiding data, Shannon developed an impressive mathematical theory called Information Theory, which he based on probabilistic models. The theory largely involves the concept of codes with small error probabilities in spite of noise in the transmission, which is modeled by channels. The lectures presented in this work are suitable for graduate students in Mathematics, and also for those working in Theoretical Computer Science, Physics, and Electrical Engineering with a background in basic Mathematics. The lectures can be used as the basis for courses or to supplement courses in many ways. Ph.D. students will also find research problems, often with conjectures, that offer potential subjects for a thesis. More advanced researchers may find questions which form the basis of entire research programs.

Mobile Multimedia Broadcasting Standards

Mathematical Modelling

4th ICCST 2017, Kuala Lumpur, Malaysia, 29-30 November, 2017

Fifth International ITG Conference on Source and Channel Coding (SCC)

Rudolf Ahlswede’s Lectures on Information Theory 4

Technology and Practice

Mathematics of Computing -- Miscellaneous.

This book constitutes the proceedings of the 16th IFIP International Conference on Distributed Applications and Interoperable Systems, DAIS 2016, held in Heraklion, Crete, Greece, in June 2016. The 13 papers presented together with 3 short papers in this volume were carefully reviewed and selected from 34 submissions. They represent a comprehensive survey of the state of the art in the area of distributed applications and interoperable systems. Cloud computing and services received a large emphasis this year.

Digital Signal Processing for Communication Systems examines the plans for the future and the progress that has already been made, in the field of DSP and its applications to communication systems. The book pursues the progression from communication and information theory through to the implementation, evaluation and performance enhancement of digital communication systems using DSP technology. Digital Signal Processing for Communication Systems looks at various types of coding and modulation techniques, describing different applications of Turbo-Codes, BCH codes and general block codes, pulse modulations, and combined modulation and coding in order to improve the overall system performance. The b

measurements performed for channel characterisation, pursues the use of DSP for design of effective channel simulators, and discusses equalization and detection of various signal formats for different channels. A number of system design issues are presented where digital signal processing is involved, reporting on the successful implementation of digital signal processing technology, and including the problems involved with implementation of some DSP algorithms. Digital Signal Processing for Communication Systems serves as an excellent resource for professionals and researchers who deal with digital signal processing for communication systems, and may serve as a text for advanced courses on the subject. Papers presented at the National Conference on Mobile Computing, held at Hyderabad during 11-12 December 2001.

High Performance Embedded Architectures and Compilers

Free Space Laser Communication with Ambient Light Compensation

Information Hiding: Steganography and Watermarking

Information Technology Network and Internet

Introduction to Digital Communication Systems

Classroom Notes in Applied Mathematics

Using a simple yet rigorous approach, Algebraic and Stochastic Coding Theory makes the subject of coding theory easy to understand for readers with a thorough knowledge of digital arithmetic, Boolean and modern algebra, and probability theory. It explains the underlying principles of coding theory and offers a clear, detailed description of each code. More advanced readers will appreciate its coverage of recent developments in coding theory and stochastic processes. After a brief review of coding history and Boolean algebra, the book introduces linear codes, including Hamming and Golay codes. It then examines codes based on the Galois field theory as well as their application in BCH and especially the Reed–Solomon codes that have been used for error correction of data transmissions in space missions. The major outlook in coding theory seems to be geared toward stochastic processes, and this book takes a bold step in this direction. As research focuses on error correction and recovery of erasures, the book discusses belief propagation and distributions. It examines the low-density parity-check and erasure codes that have opened up new approaches to improve wide-area network data transmission. It also describes modern codes, such as the Luby transform and Raptor codes, that are enabling new directions in high-speed transmission of very large data to multiple users. This robust, self-contained text fully explains coding problems, illustrating them with more than 200 examples. Combining theory and computational techniques, it will appeal not only to students but also to industry professionals, researchers, and academics in areas such as coding theory and signal and image processing.

This collection of contributions is offered to Jack van Lint on the occasion of his sixtieth birthday and appears simultaneously in the series Topics in Discrete Mathematics and as a special double volume of Discrete Mathematics (Volumes 106/107). It is hoped that the papers selected, all written by experts in their own fields, represent the many interesting areas that together constitute the discipline of Discrete Mathematics. It is in this sphere that van Lint has become the acknowledged master and this expansive volume serves to demonstrate the enormous significance he has had on the development of Discrete Mathematics during the last 30 years.

Precoding Techniques for Digital Communication Systems