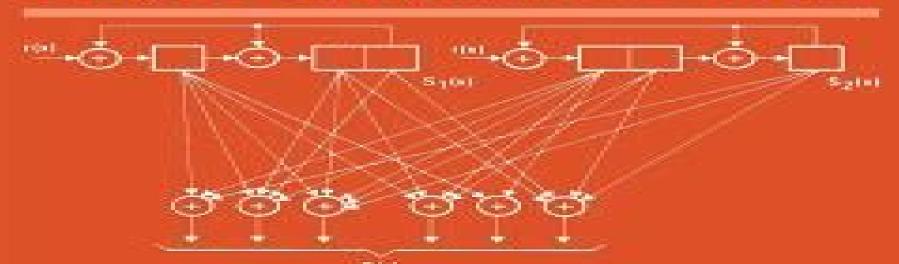


# Error-Correction Coding for Digital Communications

George C. Clark, Jr., and J. Bibb Cain



**S** Ashworth

Error-correction coding for digital communications George Cyril Clark, J. Bibb Cain, 1988 **Error-correction** Coding for Digital Communications George C. Clark, J. B. Cain, 1982 *Error- Correction Coding for Digital Communications* Error-Correction Coding for Digital Communications George C. Clark Jr., J. Bibb George C. Clark, J. Bibb Cain, 1981 Cain, 2013-06-29 Error correction coding is being used on an almost routine basis in most new communication systems Not only is coding equipment being used to increase the energy efficiency of communication links but coding ideas are also providing innovative solutions to many related communication problems Among these are the elimination of intersymbol interference caused by filtering and multipath and the improved demodulation of certain frequency modulated signals by taking advantage of the natural coding provided by a continuous phase Although several books and nu merous articles have been written on coding theory there are still noticeable deficiencies First the practical aspects of translating a specific decoding algorithm into actual hardware have been largely ignored. The information that is available is sketchy and is widely dispersed Second the information required to evaluate a particular technique under situations that are en countered in practice is available for the most part only in private company reports This book is aimed at correcting both of these problems It is written for the design engineer who must build the coding and decoding equipment and for the communication system engineer who must incorporate this equipment into a system It is also suitable as a senior level or first year graduate text for an introductory one semester course in coding theory. The book USes a minimum of mathematics and entirely avoids **Error-Correction Coding for Digital** the classical theorem proof approach that is often seen in coding texts Communications George C. Clark Jr., J. Bibb Cain, 2013-05-27 Error correction coding is being used on an almost routine basis in most new communication systems Not only is coding equipment being used to increase the energy efficiency of communication links but coding ideas are also providing innovative solutions to many related communication problems Among these are the elimination of intersymbol interference caused by filtering and multipath and the improved demodulation of certain frequency modulated signals by taking advantage of the natural coding provided by a continuous phase Although several books and nu merous articles have been written on coding theory there are still noticeable deficiencies First the practical aspects of translating a specific decoding algorithm into actual hardware have been largely ignored The information that is available is sketchy and is widely dispersed Second the information required to evaluate a particular technique under situations that are en countered in practice is available for the most part only in private company reports This book is aimed at correcting both of these problems It is written for the design engineer who must build the coding and decoding equipment and for the communication system engineer who must incorporate this equipment into a system It is also suitable as a senior level or first year graduate text for an introductory one semester course in coding theory The book USes a minimum of mathematics and entirely avoids the classical theorem proof approach that is often seen in

coding texts **Error Correction Coding** Todd K. Moon, 2005-06-06 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 **Digital Communications: Pearson New International Edition** uPDF eBook Bernard Skylar, 2015-11-09 For courses in Digital Communications Exceptionally accessible this book presents the often difficult concepts of digital communications in an easy to understand manner without diluting the mathematical precision Using a student friendly approach it develops the important techniques in the context of a unified structure in block diagram form providing organization and structure to a field that has and continues to grow rapidly and ensuring that students gain an awareness of the big picture even while delving into the details the most up to date modulation coding and signal processing techniques that have become the basic tools of our modern era It traces signals and key processing steps from the information source through the transmitter channel receiver and ultimately to the information sink The full text downloaded to your computer With eBooks you can search for key concepts words and phrases make highlights and notes as you study share your notes with friends eBooks are downloaded to your computer and accessible either offline through the Bookshelf available as a free download available online and also via the iPad and Android apps Upon purchase you ll gain instant access to this eBook Time limit The eBooks products do not have an expiry date You will continue to access your digital ebook products whilst you have your Bookshelf installed Digital Communications Marcelo Sampaio de

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practical knowledge on modern communication systems to help students transition smoothly into the workplace and beyond This book presents the most relevant concepts and technologies of today's communication systems and presents them in a concise and intuitive manner It covers advanced topics such as Orthogonal Frequency Division Multiplexing OFDM and Multiple Input Multiple Output MIMO Technology which are enabling technologies for modern communication systems such as WiFi including the latest enhancements and LTE Advanced Following a brief introduction to the field Digital Communication for Practicing Engineers immerses readers in the theories and technologies that engineers deal with It starts off with Shannon Theorem and Information Theory before moving on to basic modules of a communication system including modulation statistical detection channel coding synchronization and equalization The next part of the book discusses advanced topics such as OFDM and MIMO and introduces several emerging technologies in the context of 5G cellular system radio interface The book closes by outlining several current research areas in digital communications In addition this text Breaks down the subject into self contained lectures which can be read individually or as a whole Focuses on the pros and cons of widely used techniques while providing references for detailed mathematical analysis Follows the current technology trends including advanced topics such as OFDM and MIMO Touches on content this is not usually contained in textbooks such as cyclo stationary symbol timing recovery adaptive self interference canceler and Tomlinson Harashima precoder Includes many illustrations homework problems and examples Digital Communication for Practicing Engineers is an ideal guide for graduate students and professionals in digital communication looking to understand work with and adapt to the current and future technology Mobile Communications Handbook Jerry D. Gibson, 2017-12-19 With 26 entirely new and 5 extensively revised chapters out of the total of 39 the Mobile Communications Handbook Third Edition presents an in depth and up to date overview of the full range of wireless and mobile technologies that we rely on every day This includes but is not limited to everything from digital cellular mobile radio and evolving personal communication systems to wireless data and wireless networks Illustrating the extraordinary evolution of wireless communications and networks in the last 15 years this book is divided into five sections Basic Principles provides the essential underpinnings for the wide ranging mobile communication technologies currently in use throughout the world Wireless Standards contains technical details of the standards we use every day as well as insights into their development Source Compression and Quality Assessment covers the compression techniques used to represent voice and video for transmission over mobile communications systems as well as how the delivered voice and video quality are assessed Wireless Networks examines the wide range of current and developing wireless networks and wireless methodologies Emerging Applications explores newly developed areas of vehicular communications and 60 GHz wireless communications Written by experts from industry and academia this book provides a succinct overview of each topic quickly bringing the reader up to date but with sufficient detail and references to enable deeper investigations Providing much more than a just the facts presentation contributors use their experience in the

field to provide insights into how each topic has emerged and to point toward forthcoming developments in mobile communications Introduction to CDMA Wireless Communications Mosa Ali Abu-Rgheff, 2007-09-10 The book gives an in depth study of the principles of the spread spectrum techniques and their applications in mobile communications It starts with solid foundations in the digital communications that are essential to unequivocal understanding of the CDMA technology and guides the reader through the fundamentals and characteristics of cellular CDMA communications Features include A very clear and thorough description of the principles and applications of spread spectrum techniques in multi user mobile communications Matlab based worked examples exercises and practical sessions to clearly explain the theoretical concepts An easy to read explanation of the air interface standards used in IS 95 A B cdma2000 and 3G WCDMA Clear presentations of the high speed downlink and uplink packet access HSDPA HSUPA techniques used in 3G WCDMA The book is a very suitable introduction to the principles of CDMA communications for senior undergraduate and graduate students as well researchers and engineers in industry who are looking to develop their expertise A very clear and thorough description of the principles and applications of spread spectrum techniques in multi user mobile communications Matlab based worked examples exercises and practical sessions to clearly explain the theoretical concepts An easy to read explanation of the air interface standards used in IS 95 A B cdma2000 and 3G WCDMA Clear presentations of the high speed downlink and uplink packet access HSDPA HSUPA techniques used in 3G WCDMA **Introduction to Digital Communication Systems** Krzysztof Wesolowski, 2009-07-31 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 Source and Channel Coding John B. Anderson, Seshadri Mohan, 2012-12-06 oW should coded communication be approached Is it about prob H ability theorems and bounds or about algorithms and structures The traditional course in information theory and coding teaches these together in one course in which the Shannon theory a probabilistic the ory of information dominates The theory's predictions and bounds to performance are valuable to the coding engineer but coding today is mostly about structures and algorithms and their size speed and error performance While coding has a theoretical basis it has a practical side as well an engineering side in which costs and benefits matter It is safe to say that most of the recent advances in information theory and coding are in the engineering of coding These thoughts motivate the present text book A coded communication book based on methods and algorithms with information theory in a necessary but supporting role There has been much recent progress in coding both in the theory and the practice and these pages report many new advances Chapter 2 cov ers traditional source coding but also the coding ofreal one dimensional sources like speech and new techniques like vector quantization Chapter 4 is a unified treatment of trellis codes beginning with binary convolutional codes and passing to the new trellis modulation codes Codes and turbo codes Claude Berrou, 2011-01-27 This book is devoted to one of the essential functions of modern telecommunications systems channel coding or error correction coding Its main topic is iteratively decoded algebraic codes convolutional codes and concatenated codes Wireless Video Communications Lajos Hanzo, Peter Cherriman, Jurgen Streit, 2001-03-12 Bridging the gap between the video compression and communication communities this unique volume provides an all encompassing treatment of wireless video communications compression channel coding and wireless transmission as a joint subject WIRELESS VIDEO COMMUNICATIONS begins with relatively simple compression and information theoretical principles continues through state of the art and future concepts and concludes with implementation ready system solutions This book s deductive presentation and broad scope make it essential for anyone interested in wireless communications It systematically converts the lessons of Shannon's information theory into design principles applicable to practical wireless systems It provides in a comprehensive manner implementation ready overall system design and performance studies giving cognizance to the contradictory design requirements of video quality bit rate delay complexity error resilience and other related system design aspects Topics covered include information theoretical foundations block based and convolutional channel coding very low bit rate video codecs and multimode videophone transceivers high resolution video coding using both proprietary and standard schemes CDMA OFDM systems third generation and beyond adaptive video systems WIRELESS VIDEO COMMUNICATIONS is a valuable reference for postgraduate researchers system engineers industrialists managers and visual communications practitioners Practical Digital Wireless Signals Earl McCune, 2010-02-04 Do you need to know what signal type to select for a wireless application Quickly develop a useful expertise in digital modulation with this practical guide based on the author's experience of over thirty years in industrial design You will understand the physical

meaning behind the mathematics of wireless signals and learn the intricacies and tradeoffs in signal selection and design Six modulation families and twelve modulation types are covered in depth together with a quantitative ranking of relative cost incurred to implement any of twelve modulation types Extensive discussions of the Shannon Limit Nyquist filtering efficiency measures and signal to noise measures are provided radio wave propagation and antennas multiple access techniques and signal coding principles are all covered and spread spectrum and wireless system operation requirements are presented

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