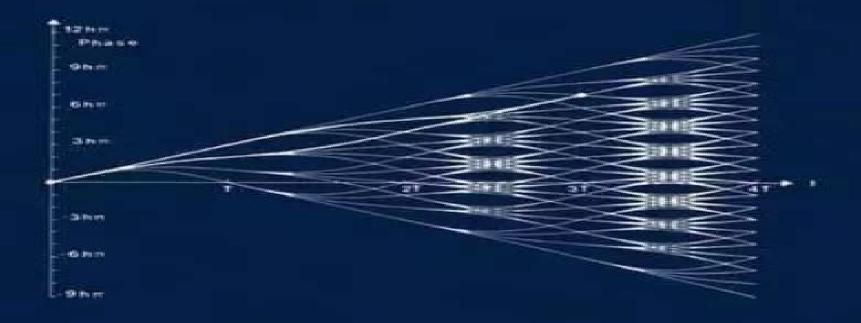
SOURCE AND CHANNEL CODING

An Algorithmic Approach



John B. Anderson Seshadri Mohan

Source And Channel Coding An Algorithmic Approach

Peter Jung

Source And Channel Coding An Algorithmic Approach:

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 Channel Coding: Theory, Algorithms, and Applications ,2014-07-29 This book gives a review of the principles methods and techniques of important and emerging research topics and technologies in Channel Coding including theory algorithms and applications Edited by leading people in the field who through their reputation have been able to commission experts to write on a particular topic With this reference source you will Quickly grasp a new area of research Understand the underlying principles of a topic and its applications Ascertain how a topic relates to other areas and learn of the research issues yet to be resolved Quick tutorial reviews of important and emerging topics of research in Channel Coding Presents core principles in Channel Coding theory and shows their applications Reference content on core principles technologies algorithms and applications Comprehensive references to journal articles and other literature on which to build further more specific and detailed knowledge Digest of papers. IEEE Computer Society International Conference // Computer Society. Institute of Electrical and Electronics **Engineers** : **33** ,1988 <u>Information Theory and Network Coding</u> Raymond W. Yeung, 2008-08-28 This book is an evolution from my book A First Course in Information Theory published in 2002 when network coding was still at its infancy The last few years have witnessed the rapid development of network coding into a research eld of its own in information science With its root in infor tion theory network coding has not only brought about a paradigm shift in network communications at large but also had signi cant in uence on such speci c research elds as coding theory networking switching wireless c munications distributed datastorage cryptography and optimization theory. While new applications of network coding keep emerging the fundamental sults that lay the foundation of the subject are more or less mature. One of the main goals of this book therefore is to present these results in a unifying and coherent manner While the previous book focused only on information theory for

discrete random variables the current book contains two new chapters on information theory for continuous random variables namely the chapter on di erential entropy and the chapter on continuous valued channels With these topics included the book becomes more comprehensive and is more suitable to be used as a textbook for a course in an electrical engineering department Signal Processing VI J. Vandewalle, R. Boite, M. Moonen, A. Oosterlinck, 2012-12-02 This was the sixth in the sequence of the international conferences promoted and organized by the European Association for Signal Processing The conference has established itself as one of the world's largest and most important meetings on the subject The 444 papers in three volumes are organized under 7 themes containing the following topics 1 Theory of Signals and Systems a Detection b Estimation c Filtering d Spectral estimation e Adaptive systems f Modeling g Digital transforms h Digital filtering 2 Image Processing and Multidimensional Signal Processing a Coding b Enhancement c Restoration d Medical image processing 3 Speech Processing a Coding b Synthesis c Recognition and understanding d Enhancement 4 Implementations a Hardware b Software c VLSI d Novel Architectures e Array processing 5 Knowledge Engineering and Signal Processing a Expert systems b Pattern recognition c Signal interpretation d Image understanding 6 Neural Networks for Signal Processing a Theory b Speech c Vision d Implementations 7 Applications a Radar b Sonar c Communications d Geophysics e Digital audio f Biomedics g Sensing h Robotics i Astrophysics j Mechanics k other The diversity of topics in this 3 volume set as well as the extraordinary tempo at which Signal Processing has progressed attest to the permanent vitality of this area of research and development Workers in signal processing will find in these papers the latest advances and results as well as indications on future research and analysis in this rapidly developing field Principles of Digital Transmission Sergio Benedetto, Ezio Biglieri, 1999-07-31 Principles of Digital Transmission is designed for advanced undergraduate and graduate level students and professions in telecommunications Teachers and learners can mix and match chapters to create four distinct courses 1 a one term basic course in digital communications 2 a one term course in advanced digital communications 3 a one term course in information theory and coding 4 a two term course sequence in digital communications and coding The book provides rigorous mathematical tools for the analysis and design of digital transmission systems The authors emphasize methodology in their aim to teach the reader how to do it rather than how it is done They apply the fundamental tools of the discipline onto a number of systems such as wireless data transmission systems

Advanced Mobile Communications Peter Jung, 2024-05-06 This book is an extensively elaborated treatise on physical layer concepts of advanced mobile communications Setting out from the author s own experience of university teaching for over three decades the book covers the most fundamental aspects of physical layer transceivers for mobile communications ranging from approximation schemes such as sampling the Fourier series and the Fourier transformation over multi antenna techniques including aspects of curvilinear coordinate systems tensor calculus determinant computation rules array antennas spatial sampling details on probability theory and information theory optimum detection with soft outputs and spatial

multiplexing to orthogonal frequency division multiplexing A First Course in Information Theory Raymond W. Yeung, 2012-12-06 A First Course in Information Theory is an up to date introduction to information theory In addition to the classical topics discussed it provides the first comprehensive treatment of the theory of I Measure network coding theory Shannon and non Shannon type information inequalities and a relation between entropy and group theory ITIP a software package for proving information inequalities is also included With a large number of examples illustrations and original problems this book is excellent as a textbook or reference book for a senior or graduate level course on the subject as well as a reference for researchers in related fields Wireless Infrared Communications John R. Barry, 2012-12-06 The demand for wireless access to network services is growing in virtually all communications and computing applications Once accustomed to unteathered operation users resent being tied to a desk or a fixed location but will endure it when there is some substantial benefit such as higher resolution or bandwidth Recent technolog ical advances however such as the scaling of VLSI the development of low power circuit design techniques and architectures increasing battery energy capacity and advanced displays are rapidly improving the capabilities of wireless devices Many of the technological advances contributing to this revolution pertain to the wireless medium itself. There are two viable media radio and optical In radio spread spectrum techniques allow different users and services to coexist in the same bandwidth and new microwave frequencies with plentiful bandwidth become viable as the speed of the supporting low cost electronics increases Radio has the advantage of being available ubiquitously indoors and outdoors with the possibility of a seam less system infrastructure that allows users to move between the two There are unan swered but likely to be benign biological effects of microwave radiation at higher power densities Optical communications is enhanced by advances in photonic devices such as semiconductor lasers and detectors Optical is primarily an indoor technology where it need not compete with sunlight and offers advantages such as the immediate availability of a broad bandwidth without the need for regulatory approval **Ioint Source-Channel Decoding** Pierre Duhamel, Michel Kieffer, 2009-11-26 Treats joint source and channel decoding in an integrated way Gives a clear description of the problems in the field together with the mathematical tools for their solution Contains many detailed examples useful for practical applications of the theory to video broadcasting over mobile and wireless networks Traditionally cross layer and joint source channel coding were seen as incompatible with classically structured networks but recent advances in theory changed this situation Joint source channel decoding is now seen as a viable alternative to separate decoding of source and channel codes if the protocol layers are taken into account A joint source protocol channel approach is thus addressed in this book all levels of the protocol stack are considered showing how the information in each layer influences the others This book provides the tools to show how cross layer and joint source channel coding and decoding are now compatible with present day mobile and wireless networks with a particular application to the key area of video transmission to mobiles Typical applications are broadcasting or point to point delivery of multimedia contents which are

very timely in the context of the current development of mobile services such as audio MPEG4 AAC or video H263 H264 transmission using recent wireless transmission standards DVH H DVB SH WiMAX LTE This cross disciplinary book is ideal for graduate students researchers and more generally professionals working either in signal processing for communications or in networking applications interested in reliable multimedia transmission. This book is also of interest to people involved in cross layer optimization of mobile networks Its content may provide them with other points of view on their optimization problem enlarging the set of tools which they could use Pierre Duhamel is director of research at CNRS LSS and has previously held research positions at Thomson CSF CNET and ENST where he was head of the Signal and Image Processing Department He has served as chairman of the DSP committee and associate Editor of the IEEE Transactions on Signal Processing and Signal Processing Letters as well as acting as a co-chair at MMSP and ICASSP conferences He was awarded the Grand Prix France Telecom by the French Science Academy in 2000 He is co author of more than 80 papers in international journals 250 conference proceedings and 28 patents Michel Kieffer is an assistant professor in signal processing for communications at the Universit Paris Sud and a researcher at the Laboratoire des Signaux et Syst mes Gif sur Yvette France His research interests are in joint source channel coding and decoding techniques for the reliable transmission of multimedia contents He serves as associate editor of Signal Processing Elsevier He is co author of more than 90 contributions to journals conference proceedings and book chapters Treats joint source and channel decoding in an integrated way Gives a clear description of the problems in the field together with the mathematical tools for their solution Contains many detailed examples useful for practical applications of the theory to video broadcasting over mobile and wireless networks

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