

Chapter 1 : Sergio Benedetto - ACoRN Member Details

Digital Transmission Theory S. Benedetto, E. Biglieri, V. Castellani, Prentice Hall , pages, , BRAND NEW, A Communications and Transmission, Scientific and Engineering Book Exchange.

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: 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. Digital Transmission Systems, Third Edition, is a comprehensive overview of the theory and practices of digital transmission systems used in digital communication. This new edition has been completely updated to include the latest technologies and newest techniques in the transmission of digitized information as well as coverage of digital transmission design, implementation and testing. Provides a step-by-step description of the basics of precoding and signal shaping. This introduction to digital data transmission, modulation, and error-correction coding, together with the underlying communication and information theory is an all-inclusive text suitable for all those connected with Mechanical Engineering or Computer Science. Equal emphasis is given to underlying mathematical theory and engineering practice. Not meant to be an encyclopedic treatise, the book offers strong, accessible pedagogy. This Second Edition presents enhanced explanations of key ideas as well as additional examples and problems. It also provides greatly expanded coverage of wireless communication, which has seen exponential growth since the release of the first edition. A pedagogical approach aimed at the 5th year EE student A balance of theory with engineering and design Integration of important topics such as synchronization, radio channels, and wireless communication, which are left out of competing books, or lost in more lengthy formats. Dayan Adionel Guimaraes Language: Nevertheless, these principles can serve as the fundamentals that will help the reader to understand more advanced topics and the associated technology. In this book, each topic is addressed in two different and complementary ways: The theoretical approach encompasses common subjects covering principles of digital transmission, like notions of probability and stochastic processes, signals and systems, baseband and passband signaling, signal-space representation, spread spectrum, multi-carrier and ultra wideband transmission, carrier and symbol-timing recovery, information theory and error-correcting codes. The presentation of the theory is made easier with the help of illustrations. A total of simulation files supplied in the accompanying CD support the simulation-oriented approach.

Chapter 2 : Digital Transmission Theory : Sergio Benedetto :

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Filterbank transceivers optimizing information rate in block transmissions over dispersive channels by Anna Scaglione, Sergio Barbarossa, Georgios B. Optimal finite impulse response FIR transmit and receive filterbanks are derived for block-based data transmissions over frequency-selective additive Gaussian noise AGN channels by maximizing mutual information subject to a fixed transmitpower constraint. Both FIR and pole-zero channels are cons Both FIR and pole-zero channels are considered. The inherent flexibility of the proposed transceivers is exploited to derive, as special cases, zero-forcing ZF and minimum mean-square error receive filterbanks. The transmit filterbank converts transmission over a frequency-selective fading channel, affected by additive colored noise, into a set of independent flat fading subchannels with uncorrelated noise samples. Two loading algorithms are also developed to distribute transmit power and number of bits across the usable subchannels, while adhering to an upper bound on the bit error rate BER. The potential of the proposed transceivers is illustrated and compared to discrete multitone DMT with simulated examples. McEliece California Institute of Technology , " In this article, we apply transfer function bounding techniques to obtain upper bounds on the bit-error rate for maximum-likelihood decoding of turbo codes constructed with random permutations. These techniques are applied to two turbo codes with constraint length 3 and later extended to other code These techniques are applied to two turbo codes with constraint length 3 and later extended to other codes. The performance predicted by these bounds is compared with simulation results. More refined bounds are needed for accurate performance measures at lower signal-to-noise ratios. Show Context Citation Context This behavior mimics that of similar bounds applied to totally random codes, which turbo codes resemble. Technol , " Abstractâ€”A novel approach to analytically evaluate the bit error probability in optically preamplified direct-detection systems is presented, which can take into account the effects of pulse shaping, chirping, filtering at the transmitter and the receiver, both pre- and postdetection, chromatic dis The method is computationally very fast in that the saddle point integration method for solving the resulting line integral of a particular moment generating function is adopted. A closed-form approximation for the bit error probability is also provided, which is within 0.

Chapter 3 : Data transmission - Wikipedia

*Digital Transmission Theory [Sergio Benedetto, Exio Biglieri, Valentino Castellani] on calendrierdelascience.com *FREE* shipping on qualifying offers. Aiming to fill the gap between theory and practice of data communications, this text provides an overview of modern digital communication theory with an emphasis on practical engineering applications.*

Layer 6, the presentation layer: Source coding digitization and data compression , and information theory. Cryptography may occur at any layer Applications and history[edit] Data mainly but not exclusively informational has been sent via non-electronic e. Analog signal data has been sent electronically since the advent of the telephone. However, the first data electromagnetic transmission applications in modern time were telegraphy and teletypewriters , which are both digital signals. The fundamental theoretical work in data transmission and information theory by Harry Nyquist , Ralph Hartley , Claude Shannon and others during the early 20th century, was done with these applications in mind. Data transmission is utilized in computer networking equipment such as modems , local area networks LAN adapters , repeaters , repeater hubs , microwave links , wireless network access points , etc. In telephone networks, digital communication is utilized for transferring many phone calls over the same copper cable or fiber cable by means of Pulse code modulation PCM , i. Telephone exchanges have become digital and software controlled, facilitating many value added services. For example, the first AXE telephone exchange was presented in The current tendency is to replace traditional telecommunication services by packet mode communication such as IP telephony and IPTV. Transmitting analog signals digitally allows for greater signal processing capability. The ability to process a communications signal means that errors caused by random processes can be detected and corrected. Digital signals can also be sampled instead of continuously monitored. The multiplexing of multiple digital signals is much simpler to the multiplexing of analog signals. Because of all these advantages, and because recent advances in wideband communication channels and solid-state electronics have allowed scientists to fully realize these advantages, digital communications has grown quickly. Digital communications is quickly edging out analog communication because of the vast demand to transmit computer data and the ability of digital communications to do so. The digital revolution has also resulted in many digital telecommunication applications where the principles of data transmission are applied. Examples are second-generation and later cellular telephony , video conferencing , digital TV , digital radio , telemetry , etc. Data transmission, digital transmission or digital communications is the physical transfer of data a digital bit stream or a digitized analog signal[1] over a point-to-point or point-to-multipoint communication channel. Examples of such channels are copper wires, optical fibers, wireless communication channels, storage media and computer buses. The data are represented as an electromagnetic signal, such as an electrical voltage, radiowave, microwave, or infrared signal. While analog transmission is the transfer of a continuously varying analog signal over an analog channel, digital communications is the transfer of discrete messages over a digital or an analog channel. The messages are either represented by a sequence of pulses by means of a line code baseband transmission , or by a limited set of continuously varying wave forms passband transmission , using a digital modulation method. The passband modulation and corresponding demodulation also known as detection is carried out by modem equipment. According to the most common definition of digital signal, both baseband and passband signals representing bit-streams are considered as digital transmission, while an alternative definition only considers the baseband signal as digital, and passband transmission of digital data as a form of digital-to-analog conversion. Data transmitted may be digital messages originating from a data source, for example a computer or a keyboard. It may also be an analog signal such as a phone call or a video signal, digitized into a bit-stream for example using pulse-code modulation PCM or more advanced source coding analog-to-digital conversion and data compression schemes. This source coding and decoding is carried out by codec equipment. Serial and parallel transmission[edit] In telecommunications, serial transmission is the sequential transmission of signal elements of a group representing a character or other entity of data. Digital serial transmissions are bits sent over a single wire, frequency or optical path sequentially. Because it requires less signal processing and less

chances for error than parallel transmission, the transfer rate of each individual path may be faster. This can be used over longer distances as a check digit or parity bit can be sent along it easily. In telecommunications, parallel transmission is the simultaneous transmission of the signal elements of a character or other entity of data. In digital communications, parallel transmission is the simultaneous transmission of related signal elements over two or more separate paths. Multiple electrical wires are used which can transmit multiple bits simultaneously, which allows for higher data transfer rates than can be achieved with serial transmission. This method is used internally within the computer, for example the internal buses, and sometimes externally for such things as printers, The major issue with this is "skewing" because the wires in parallel data transmission have slightly different properties not intentionally so some bits may arrive before others, which may corrupt the message. A parity bit can help to reduce this. However, electrical wire parallel data transmission is therefore less reliable for long distances because corrupt transmissions are far more likely. Types of communication channels Network topologies [edit].

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Chapter 6 : Edwin Howard Armstrong Achievement Award - Sergio Benedetto | IEEE Communications Soc

Imperfect data transmission between local sensors and a fusion center is considered and modeled as a Rayleigh fading channel. The conventional maximum likelihood estimation (MLE) usually involves high computational complexity.

Chapter 7 : Continuing Education Institute Instructor Profile - Sergio Benedetto

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Junghsi Lee, V. John Mathews, On the extended RLS adaptive bilinear filters, Proceedings of the IEEE international conference on Acoustics, speech, and signal processing: digital speech processing, April , , Minneapolis, Minnesota, USA.