Noise Theory Of Linear And Nonlinear Circuits

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Noise theory of linear and nonlinear circuits Springer Science & Business Media
Understanding the nature of random signals and noise is critically important for detecting signals and for reducing and minimizing the effects of noise in applications such as communications and control systems. Outlining a variety of techniques and explaining when and how to use them, Random Signals and Noise: A Mathematical Introduction focuses on applications and practical problem solving rather than probability theory. A Firm Foundation Before launching into the particulars of random signals and noise, the author outlines the elements of probability that are used throughout the book and includes an appendix on the relevant aspects of linear algebra. He offers a careful treatment of Lagrange multipliers and the Fourier transform, as well as the basics of stochastic processes, estimation, matched filtering, the Wiener-Khinchin theorem and its applications, the Schottky and Nyquist formulas, and physical sources of noise. Practical Tools for Modern Problems Along with these traditional topics, the book includes a chapter devoted to spread spectrum techniques. It also demonstrates the use of MATLAB® for solving complicated problems in a short amount of time while still building a sound knowledge of the underlying principles. A self-contained primer for solving real problems, Random Signals and Noise presents a complete set of tools and offers guidance on their effective application.

Noise Sustained Patterns World Scientific
The book presents a collection of articles on novel approaches to problems of current interest in vibration control by academicians, researchers, and practicing engineers from all over the world. The book is divided into eight chapters and encompasses multidisciplinary areas within the scope of noise and vibration engineering, such as structural dynamics, structural mechanics, finite element modeling, vibration control, and material vibration. Noise and Vibration Control - From Theory to Practice is a useful reference material for all engineering fraternities, including undergraduate and postgraduate students, academicians, researchers, and practicing engineers.

A Possible Explanation for the Present Difference Between Linear Noise Theory and Experimental Data for Supersonic Helical Tip Speed Propellers John Wiley & Sons
Turbulence takes place in most flow situations whethertheyoccur naturally or in technological systems. Therefore, considerable effort is being expended in an attempt to understand the phenomenon of turbulence. The recent discovery ofcoherent structure in turbulent shear flows and the modem developments in computer capabilities have revolutionized research work in turbulence. There is a strong evidence that the coherent structure in turbulent shear flows is reminiscent of nonlinear stability waves. As such, the interest in nonlinear stability waves has increased not only for the understandingofthe latterstages of the laminar-turbulent transition process, but also for understanding the coherent structures in turbulent flows. Also. the advances in computers have made direct numerical simulation possible at Low-Reynolds numbers and large-eddy simulation possible at high Reynolds numbers. This made first-principles prediction of turbulence-generated noise feasible. Therefore, this book aims at presenting a graduate-level introductory study of turbulence while accounting for such recent views of concern to researchers. This book is an outgrowth oflecture notes on the subject offered to graduate students in

engineering. The book should be of interest to research engineers and graduatestudents in science and engineering. The theoretical basis presented is sufficient not only for studying the specialized literature on turbulence but also for theoretical investigations on the subject.

Principles and Applications of Random Noise Theory MIT Press

This monograph deals with approximation and noise cancellation of dyn- ical systems which include linear and nonlinear input/output relationships. It also deal with approximation and noise cancellation of two dimensional arrays. It will be of special interest to researchers, engineers and graduate students who have specialized in ?ltering theory and system theory and d- ital images. This monograph is composed of two parts. Part I and Part II will deal with approximation and noise cancellation of dynamical systems or digital images respectively. From noiseless or noisy data, reduction will be made. A method which reduces model information or noise was proposed in the reference vol. 376 in LNCIS [Hasegawa, 2008]. Using this method will allow model description to be treated as noise reduction or model reduction without having to bother, for example, with solving many partial di?er- tial equations. This monograph will propose a new and easy method which produces the same results as the method treated in the reference. As proof of its advantageous e?ect, this monograph provides a new law in the sense of numerical experiments. The new and easy method is executed using the algebraic calculations without solving partial di?erential equations. For our purpose,manyactualexamplesofmodelinformationandnoisereductionwill also be provided. Using the analysis of state space approach, the model reduction problem may have become a major theme of technology after 1966 for emphasizing e?ciency in the ?elds of control, economy, numerical analysis, and others.

Bounded Noises in Physics, Biology, and Engineering World Scientific

Noise theory is continuing to gain momentum as a leading topic. Developments in the field are proving increasingly important to the electronics engineer or researcher specialising in communications and microwave engineering. This text provides a comprehensive overview of noise theory in linear and nonlinear circuits and serves as a practical guide for engineers designing circuits where noise is a significant factor. Features include: A practical approach to the design of noise circuits Graphical representations of noise quantities Definition of all noise quantities for both active and passive circuits Formulae for the conversion of different sets of noise parameters Equations derived for the overall noise parameters of embedded noisy networks Determination of Volterra transfer functions of nonlinear multi-port networks containing multi-dimensional nonlinearities Analysis of noise theory in nonlinear networks based on the multi-port Volterra-series approach Presenting material currently only available in the primary literature, this book serves as an invaluable reference source for advanced students, academics and researchers in the fields of electronics and microwave engineering. The comprehensive coverage will also appeal to communications and microwave engineers in industry.

Noise and Its Effect on Communication Institution of Engineering & Technology

From the reviews: "Haus' book provides numerous insights on topics of wide importance, and contains much material not available elsewhere in book form. [...] an indispensable resource for those working in quantum optics or electronics." Optics & Photonics News

Noise Theory of Linear and Nonlinear Circuits Springer Science & Business Media

Overcome the effects of noise to push the level of circuit performance with this practical reference. Thoroughly explaining the theory of noise in high-frequency circuits, the book focuses on the real-world problems noise creates. It provides you with a full understanding of methods for analyzing and minimizing noise in linear and nonlinear circuits. The book pays special attention to phase noise in oscillators, offering you a comprehensive and accessible treatment of this critical topic. Additionally, this authoritative volume examines noise in low-noise amplifiers, mixers, and frequency multipliers.

Random Signals and Noise Springer Science & Business Media

Ch. 1. Introduction. 1.1. Stability theory revisited. 1.2. Instabilities and nonlinear events in everyday life. 1.3 Postscript -- ch. 2. Essentials. 2.1. Probabilistic and information theoretic measures. 2.2. Matrix manipulations. 2.3. Delay-differential equations. 2.4. The fluctuation-dissipation theorem. 2.5. The Fokker-Planck equation. 2.6. Numerical techniques for the simulation of stochastic equations. 2.7. Experimental aspects of generating noise. 2.8. Complex integration -- ch. 3. Noise induced temporal phenomena. 3.1. Escape from metastable states. 3.2. Stochastic resonance in bistable systems. 3.3. Postscript -- ch. 4. Adding spatial dimensions. 4.1. Spatiotemporal stochastic resonance. 4.2. Doubly stochastic resonance. 4.3. Spatial patterns. 4.4. Postscript -- ch. 5. Stochastic transport phenomena. 5.1. Noise-sustained structures in convectively unstable media. 5.2. Noise sustained front transmission. 5.3. Theory. 5.4. Noise enhanced wave propagation. 5.5. Stochastic ratchets and Brownian motors. 5.6. Postscript -- ch. 6. Sundry topics. 6.1. Minority game. 6.2. Traffic dynamics. 6.3. Dithering. 6.4. Noise in neural networks -- ch. 7. Afterthoughts

The Theory of Optimum Noise Immunity CRC Press

This text defines a variety of non-Gaussian processes, develops methods for generating realizations of non-Gaussian models, and provides methods for finding probabilistic characteristics of the output of linear filters with non-Gaussian inputs.

Material Noise Springer Science & Business Media

An argument that theoretical works can signify through their materiality—their “noise,” or such nonsemantic elements as typography—as well as their semantic content. In Material Noise, Anne Royston argues that theoretical works signify through their materiality—such nonsemantic elements as typography or color—as well as their semantic content. Examining works by Jacques Derrida, Avital Ronell, Georges Bataille, and other well-known theorists, Royston considers their materiality and design—which she terms “noise”—as integral to their meaning. In other words, she reads these theoretical works as complex assemblages, just as she would read an artist's book in all its idiosyncratic tangibility. Royston explores the formlessness and heterogeneity of the Encyclopedia Da Costa, which published works by Bataille, André Breton, and others; the use of layout and white space in Derrida's Glas; the typographic illegibility—“static and interference”—in Ronell's The Telephone Book; and the enticing surfaces of Mark C. Taylor's Hiding, its digital counterpart The Réal: Las Vegas, NV, and Shelley Jackson's Skin. Royston then extends her analysis to other genres, examining two recent artists' books that express explicit theoretical concerns: Johanna Drucker's Stochastic Poetics and Susan Howe's Tom Tit Tot. Throughout, Royston develops the concept of artistic arguments, which employ signification that exceeds the semantics of a printed text and are not reducible to a series of linear logical propositions. Artistic arguments foreground their materiality and reflect on the media that create them. Moreover, Royston argues, each artistic argument anticipates some aspect of digital thinking, speaking directly to such contemporary concerns as hypertext, communication theory, networks, and digital distribution.

Innovation Approach To Random Fields, An: Application Of White Noise Theory Wiley-IEEE Press

A systematic treatment of linear n-terminal-pair networks with internal noise. One result of this study is that it provides a way of characterizing amplifier noise performance on the basis of signal-to-noise ratio using a single number.

Noise in Linear and Nonlinear Circuits John Wiley & Sons

This classic text is an excellent resource and time-saver for engineers who need to tackle troublesome nonlinear components that remain in use despite recent advances in microwave technology. NONLINEAR MICROWAVE CIRCUITS offers detailed, technically substantial coverage of key methods for the analysis, design, and optimization of nonlinear microwave circuits. Using minimal mathematics, it integrates in-depth, "readable" coverage of the underlying theories that guide these methods. This book is replete with valuable "how to" information on a wide range of topics.

An Introduction to the Theory of Random Signals and Noise Springer Science & Business Media

This monograph deals with approximation and noise cancellation of dynamical systems which include linear and nonlinear input/output relations. It will be of special interest to researchers, engineers and graduate students who have specialized in ?ltering theory and system theory. From noisy or noiseless data, reductionwillbemade.Anewmethodwhichreducesnoiseormodelsinformation will be proposed. Using this method will allow model description to be treated as noise reduction or model reduction. As proof of the e?cacy, this monograph provides new results and their extensions which can also be applied to nonlinear dynamical systems. To present the e?ectiveness of our method, many actual examples of noise and model information reduction will also be provided. Using the analysis of state space approach, the model reduction problem may have become a major theme of technology after 1966 for emphasizing e?ciency in the ?elds of control, economy, numerical analysis, and others. Noise reduction problems in the analysis of noisy dynamical systems may havebecomeamajorthemeoftechnologyafter1974foremphasizinge?ciencyin control.However,thesubjectsoftheseresearcheshavebeenmainlyconcentrated in linear systems. In common model reduction of linear systems in use today, a singular value decompositionofaHankelmatrixisusedto?ndareducedordermodel.However, the existence of the conditions of the reduced order model are derived without evaluationoftheresultantmodel.Inthecommontypicalnoisereductionoflinear systems in use today, the order and parameters of the systems are determined by minimizing information criterion. Approximate and noisy realization problems for input/output relations can be roughly stated as follows: A. The approximate realization problem. For any input/output map, ?nd one mathematical model such that it is similar totheinput/outputmapandhasalowerdimensionthanthegivenminimalstate spaceofadynamicalsystemwhichhasthesamebehaviortotheinput/outputmap. B. The noisy realization problem.

Circuit Theory of Linear Noisy Networks Springer Science & Business Media

Since the parameters in dynamical systems of biological interest are inherently positive and bounded, bounded noises are a natural way to model the realistic stochastic fluctuations of a biological system that are caused by its interaction with the external world. Bounded Noises in Physics, Biology, and Engineering is the first contributed volume devoted to the modeling of bounded noises in theoretical and applied statistical mechanics, quantitative biology, and mathematical physics. It gives an overview of the current state-of-the-art and is intended to stimulate further research. The volume is organized in four parts. The first part presents the main kinds of bounded noises and their applications in theoretical physics. The theory of bounded stochastic processes is intimately linked to its applications to mathematical and statistical physics, and it would be difficult and unnatural to separate the theory from its physical applications. The second is devoted to framing bounded noises in the theory of random dynamical systems and random bifurcations, while the third is devoted to applications of bounded stochastic processes in biology, one of the major areas of potential applications of this subject. The final part concerns the application of bounded stochastic processes in mechanical and structural engineering, the area where the renewed interest for non-Gaussian bounded noises started. Pure mathematicians working on stochastic calculus will find here a rich source of problems that are challenging from the point of view of contemporary nonlinear analysis. Bounded Noises in Physics, Biology, and Engineering is intended for scientists working on stochastic processes with an interest in both fundamental issues and applications. It will appeal to a broad range of applied mathematicians, mathematical biologists, physicists, engineers, and researchers in other fields interested in complexity theory. It is accessible to anyone with a working knowledge of stochastic modeling, from advanced undergraduates to senior researchers.

Introduction to Random Signals and Noise Springer Science & Business Media

Based on the author’s own research, this book rigorously and systematically develops the theory of Gaussian white noise measures on Hilbert spaces to provide a comprehensive account of nonlinear filtering theory. Covers Markov processes, cylinder and quasi-cylinder probabilities and conditional expectation as well as predictio0n and smoothing and the varied processes used in filtering. Especially useful for electronic engineers and mathematical statisticians for explaining the systematic use of finely additive white noise theory leading to a more simplified and direct presentation.

The Generation and Radiation of Supersonic Jet Noise: Theory of turbulence generated jet noise, noise radiation from upstream sources, and combustion noise BoD – Books on Demand

This book contains a unified treatment of a class of problems of signal detection theory. This is the detection of signals in addi tive noise which is not required to have Gaussian probability den sity functions in its statistical description. For the most part the material developed here can be classified as belonging to the gen eral body of results of parametric theory. Thus the probability density functions of the observations are assumed to be known, at least to within a finite number of unknown parameters in a known functional form. Of course the focus is on noise which is not Gaussian; results for Gaussian noise in the problems treated here become special cases. The contents also form a bridge between the classical results of signal detection in Gaussian noise and those of nonparametric and robust signal detection, which are not con sidered in this book. Three canonical problems of signal detection in additive noise are covered here. These allow between them formulation of a range of specific detection problems arising in applications such as radar and sonar, binary signaling, and pattern recognition and classification. The simplest to state and perhaps the most widely studied of all is the problem of detecting a completely known deterministic signal in noise. Also considered here is the detection random non-deterministic signal in noise. Both of these situa of a tions may arise for observation processes of the low-pass type and also for processes of the band-pass type.

Classical, Semi-classical and Quantum Noise World Scientific
This study uses a linear analysis to predict the S/N of a backward-wave oscillator, considered as a local oscillator. Local oscillator RF power is calculated using an approximate expression for efficiency. Noise power is found by calculating skirt gain and noise figure for each side band. The analysis assumes that skirt gain can be calculated from linear theory for the start-oscillation condition. Losses are neglected. Where necessary, equations developed by other authors for small values of the impedance parameter, C, are modified to allow large-C calculations. All the basic equations and their modifications are reviewed in the appendices. This study shows that linear theory predicts that the impedance parameter may be adjusted to achieve an optimum S/N. The value of C obtained is in the neighborhood of 0.003 and is lower than the value of C usually found in commercial backward-wave oscillators. The results indicate that an order of magnitude improvement in R may be expected. (Author).

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• The Pimp Game Instructional Guide : click here

Applied Non-Gaussian Processes Springer Science & Business Media
Random signals and noise are present in many engineering systems and networks. Signal processing techniques allow engineers to distinguish between useful signals in audio, video or communication equipment, and interference, which disturbs the desired signal. With a strong mathematical grounding, this text provides a clear introduction to the fundamentals of stochastic processes and their practical applications to random signals and noise. With worked examples, problems, and detailed appendices, Introduction to Random Signals and Noise gives the reader the knowledge to design optimum systems for effectively coping with unwanted signals. Key features: Considers a wide range of signals and noise, including analogue, discrete-time and bandpass signals in both time and frequency domains. Analyses the basics of digital signal detection using matched filtering, signal space representation and correlation receiver. Examines optimal filtering methods and their consequences. Presents a detailed discussion of the topic of Poisson processes and shot noise. An excellent resource for professional engineers developing communication systems, semiconductor devices, and audio and video equipment, this book is also ideal for senior undergraduate and graduate students in Electronic and Electrical Engineering.
Noise and Vibration Control Mit Press
Covers encoding and binary digits, entropy, language and meaning, efficient encoding and the noisy channel, and explores ways in which information theory relates to physics, cybernetics, psychology, and art. 1980 edition.
Phase Noise in Signal Sources World Scientific
The Second Edition is an updated revision to the authors highly successful and widely used introduction to the principles and application of the statistical theory of signal detection. This book emphasizes those theories that have been found to be particularly useful in practice including principles applied to detection problems encountered in digital communications, radar, and sonar. Detection processing based upon the fast Fourier transform