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Modal Array Signal Processing: Principles and Applications of Acoustic Wavefield Decomposition-Heinz Teutsch 2007-01-10 This book deals with the problem of detecting and localizing multiple simultaneously active wideband acoustic sources by applying the notion of wavefield decomposition using circular and spherical microphone arrays. A rigorous derivation of modal array signal processing algorithms for unambiguous source detection and localization, as well as performance evaluations by means of measurements using an actual real-time capable implementation, are discussed.

Proceedings of the EAA Joint Symposium on Auralization and Ambisonics 2014-Weinzierl, Stefan 2014 In consideration of the remarkable intensity of research in the field of Virtual Acoustics, including different areas such as sound field analysis and synthesis, spatial audio technologies, and room acoustical modeling and auralization, it seemed

about time to organize a second international symposium following the model of the first EAA Auralization Symposium initiated in 2009 by the acoustics group of the former Helsinki University of Technology (now Aalto University). Additionally, research communities which are focused on different approaches to sound field synthesis such as Ambisonics or Wave Field Synthesis have, in the meantime, moved closer together by using increasingly consistent theoretical frameworks. Finally, the quality of virtual acoustic environments is often considered as a result of all processing stages mentioned above, increasing the need for discussions on consistent strategies for evaluation. Thus, it seemed appropriate to integrate two of the most relevant communities, i.e. to combine the 2nd International Auralization Symposium with the 5th International Symposium on Ambisonics and Spherical Acoustics. The Symposia on Ambisonics, initiated in 2009 by the Institute of Electronic Music and Acoustics of the University of Music and Performing Arts in Graz, were traditionally dedicated to problems of spherical sound field analysis and re-synthesis, strategies for the exchange of ambisonics-encoded audio material, and - more than other conferences in this area - the artistic application of spatial audio systems. This publication contains the official conference proceedings. It includes 29

manuscripts which have passed a 3-stage peer-review with a board of about 70 international reviewers involved in the process. Each contribution has already been published individually with a unique DOI on the DepositOnce digital repository of TU Berlin. Some conference contributions have been recommended for resubmission to Acta Acustica united with Acustica, to possibly appear in a Special Issue on Virtual Acoustics in late 2014. These are not published in this collection.

Techniques for Noise Robustness in Automatic Speech Recognition-

Tuomas Virtanen 2012-11-28 Automatic speech recognition (ASR) systems are finding increasing use in everyday life. Many of the commonplace environments where the systems are used are noisy, for example users calling up a voice search system from a busy cafeteria or a street. This can result in degraded speech recordings and adversely affect the performance of speech recognition systems. As the use of ASR systems increases, knowledge of the state-of-the-art in techniques to deal with such problems becomes critical to system and application engineers and researchers who work with or on ASR technologies. This book presents a comprehensive survey of the state-of-the-art in techniques used to improve the robustness of speech recognition systems to these degrading external influences. Key features: Reviews all the main noise robust ASR approaches, including signal separation, voice activity detection, robust feature extraction, model compensation and adaptation, missing data techniques and recognition of reverberant speech. Acts as a timely exposition of the topic in light of more widespread use in the future of ASR technology in challenging environments. Addresses robustness issues and signal degradation which are both key requirements for practitioners of ASR. Includes contributions from top ASR researchers from leading research units in the field

Audio Source Separation and Speech Enhancement-

Emmanuel Vincent 2018-07-24 Learn the technology behind hearing aids, Siri, and Echo Audio source separation and speech enhancement aim to extract one or more source signals of interest from an audio recording involving several sound sources. These technologies are among the most studied in audio signal processing today and bear a critical role in the success of hearing aids, hands-free phones, voice command and other noise-robust audio analysis

systems, and music post-production software. Research on this topic has followed three convergent paths, starting with sensor array processing, computational auditory scene analysis, and machine learning based approaches such as independent component analysis, respectively. This book is the first one to provide a comprehensive overview by presenting the common foundations and the differences between these techniques in a unified setting. Key features: Consolidated perspective on audio source separation and speech enhancement. Both historical perspective and latest advances in the field, e.g. deep neural networks. Diverse disciplines: array processing, machine learning, and statistical signal processing. Covers the most important techniques for both single-channel and multichannel processing. This book provides both introductory and advanced material suitable for people with basic knowledge of signal processing and machine learning. Thanks to its comprehensiveness, it will help students select a promising research track, researchers leverage the acquired cross-domain knowledge to design improved techniques, and engineers and developers choose the right technology for their target application scenario. It will also be useful for practitioners from other fields (e.g., acoustics, multimedia, phonetics, and musicology) willing to exploit audio source separation or speech enhancement as pre-processing tools for their own needs.

Springer Handbook of Speech Processing-

Jacob Benesty 2007-11-22 This handbook plays a fundamental role in sustainable progress in speech research and development. With an accessible format and with accompanying DVD-Rom, it targets three categories of readers: graduate students, professors and active researchers in academia, and engineers in industry who need to understand or implement some specific algorithms for their speech-related products. It is a superb source of application-oriented, authoritative and comprehensive information about these technologies, this work combines the established knowledge derived from research in such fast evolving disciplines as Signal Processing and Communications, Acoustics, Computer Science and Linguistics.

Ambisonics- 2014-01-01 This open access book provides a concise explanation of the fundamentals and background of the surround sound recording and playback technology Ambisonics. It equips readers with the

psychoacoustical, signal processing, acoustical, and mathematical knowledge needed to understand the inner workings of modern processing utilities, special equipment for recording, manipulation, and reproduction in the higher-order Ambisonic format. The book comes with various practical examples based on free software tools and open scientific data for reproducible research. The book's introductory section offers a perspective on Ambisonics spanning from the origins of coincident recordings in the 1930s to the Ambisonic concepts of the 1970s, as well as classical ways of applying Ambisonics in first-order coincident sound scene recording and reproduction that have been practiced since the 1980s. As, from time to time, the underlying mathematics become quite involved, but should be comprehensive without sacrificing readability, the book includes an extensive mathematical appendix. The book offers readers a deeper understanding of Ambisonic technologies, and will especially benefit scientists, audio-system and audio-recording engineers. In the advanced sections of the book, fundamentals and modern techniques as higher-order Ambisonic decoding, 3D audio effects, and higher-order recording are explained. Those techniques are shown to be suitable to supply audience areas ranging from studio-sized to hundreds of listeners, or headphone-based playback, regardless whether it is live, interactive, or studio-produced 3D audio material.

Parametric Time-Frequency Domain Spatial Audio-Ville Pulkki 2017-10-04 A comprehensive guide that addresses the theory and practice of spatial audio This book provides readers with the principles and best practices in spatial audio signal processing. It describes how sound fields and their perceptual attributes are captured and analyzed within the time-frequency domain, how essential representation parameters are coded, and how such signals are efficiently reproduced for practical applications. The book is split into four parts starting with an overview of the fundamentals. It then goes on to explain the reproduction of spatial sound before offering an examination of signal-dependent spatial filtering. The book finishes with coverage of both current and future applications and the direction that spatial audio research is heading in. Parametric Time-frequency Domain Spatial Audio focuses on applications in entertainment audio, including music, home cinema, and gaming—covering the capturing and reproduction of spatial sound as well as its generation, transduction, representation,

transmission, and perception. This book will teach readers the tools needed for such processing, and provides an overview to existing research. It also shows recent up-to-date projects and commercial applications built on top of the systems. Provides an in-depth presentation of the principles, past developments, state-of-the-art methods, and future research directions of spatial audio technologies Includes contributions from leading researchers in the field Offers MATLAB codes with selected chapters An advanced book aimed at readers who are capable of digesting mathematical expressions about digital signal processing and sound field analysis, Parametric Time-frequency Domain Spatial Audio is best suited for researchers in academia and in the audio industry.

Springer Handbook of Systematic Musicology-Rolf Bader 2018-03-21 This unique reference book offers a holistic description of the multifaceted field of systematic musicology, which is the study of music, its production and perception, and its cultural, historical and philosophical background. The seven sections reflect the main topics in this interdisciplinary subject. The first two parts discuss musical acoustics and signal processing, comprehensively describing the mathematical and physical fundamentals of musical sound generation and propagation. The complex interplay of physiology and psychology involved in sound and music perception is covered in the following sections, with a particular focus on psychoacoustics and the recently evolved research on embodied music cognition. In addition, a huge variety of technical applications for professional training, music composition and consumer electronics are presented. A section on music ethnology completes this comprehensive handbook. Music theory and philosophy of music are imbedded throughout. Carefully edited and written by internationally respected experts, it is an invaluable reference resource for professionals and graduate students alike.

Psychoacoustic Music Sound Field Synthesis-Tim Ziemer 2019-08-06 This book provides a broad overview of spaciousness in music theory, from mixing and performance practice, to room acoustics, psychoacoustics and audio engineering, and presents the derivation, implementation and experimental validation of a novel type of spatial audio system. Discussing the physics of musical instruments and the nature of auditory perception,

the book enables readers to precisely localize synthesized musical instruments while experiencing their timbral variance and spatial breadth. Offering interdisciplinary insights for novice music enthusiasts and experts in the field of spatial audio, this book is suitable for anyone interested in the study of music and musicology and the application of spatial audio mixing, or those seeking an overview of the state of the art in applied psychoacoustics for spatial audio.

Principles of Space-Time Adaptive Processing, 3rd Edition-Richard Klemm 2006 This third edition of "Principles of Space-Time Adaptive Processing" provides a detailed introduction to the fundamentals of space-time adaptive processing, with emphasis on clutter suppression in airborne or space based phased array radar, covering specifically the principles of airborne or space based MTI radar for detection of slow moving targets for use in the fields of earth observation, surveillance and reconnaissance, with special attention paid to clutter rejection techniques. The book includes topics such as signal processing, clutter models, array processing, bandwidth effects, non-linear antenna arrays, anti-jamming techniques, adaptive monopulse, bistatic radar configurations, SAR and ISAR, and sonar. After the success of the first and second editions, this third edition has been extensively updated and extended to reflect the numerous advances in the field. A completely new chapter has been added on the impact of the radar range equation, which is of particular importance for radar system designers.

The Journal of the Acoustical Society of America-Acoustical Society of America 2006

Journal of the Audio Engineering Society-Audio Engineering Society 2008 "Directory of members" published as pt. 2 of Apr. 1954- issue

Mathematical Reviews- 2007

Robust Adaptive Beamforming-Jian Li 2005-10-10 The latest research and developments in robust adaptive beamforming. Recent work has made great strides toward devising robust adaptive beamformers that vastly improve signal strength against background noise and directional interference. This dynamic technology has diverse applications, including radar, sonar, acoustics, astronomy, seismology, communications, and medical imaging. There are also exciting emerging applications such as smart antennas for wireless communications, handheld ultrasound imaging systems, and directional hearing aids. Robust Adaptive Beamforming compiles the theories and work of leading researchers investigating various approaches in one comprehensive volume. Unlike previous efforts, these pioneering studies are based on theories that use an uncertainty set of the array steering vector. The researchers define their theories, explain their methodologies, and present their conclusions. Methods presented include: * Coupling the standard Capon beamformers with a spherical or ellipsoidal uncertainty set of the array steering vector * Diagonal loading for finite sample size beamforming * Mean-squared error beamforming for signal estimation * Constant modulus beamforming * Robust wideband beamforming using a steered adaptive beamformer to adapt the weight vector within a generalized sidelobe canceller formulation Robust Adaptive Beamforming provides a truly up-to-date resource and reference for engineers, researchers, and graduate students in this promising, rapidly expanding field.

Advanced Signal Processing Handbook-Stergios Stergiopoulos 2000-12-21 Advances in digital signal processing algorithms and computer technology have combined to produce real-time systems with capabilities far beyond those of just a few years ago. Nonlinear, adaptive methods for signal processing have emerged to provide better array gain performance, however, they lack the robustness of conventional algorithms. The challenge

Advances in Natural Multimodal Dialogue Systems-Jan van Kuppevelt 2005-12-06 References 74 Part II Annotation and Analysis of Multimodal Data: Speech and Gesture 4 FORM 79 Craig H. Martell 1. Introduction 79 2.

Structure of FORM 80 3. Annotation Graphs 85 4. Annotation Example 86 5. Preliminary Inter-Annotator Agreement Results 88 6. Conclusion: Applications to HLT and HCI? 90 Appendix: Other Tools, Schemes and Methods of Gesture Analysis 91 References 95 5 97 On the Relationships among Speech, Gestures, and Object Manipulation in Virtual Environments: Initial Evidence Andrea Corradini and Philip R. Cohen 1. Introduction 97 2. Study 99 3. Data Analysis 101 4. Results 103 5. Discussion 106 6. Related Work 106 7. Future Work 108 8. Conclusions 108 Appendix: Questionnaire MYST III - EXILE 110 References 111 6 113 Analysing Multimodal Communication Patrick G. T. Healey, Marcus Colman and Mike Thirlwell 1. Introduction 113 2. Breakdown and Repair 117 3. Analysing Communicative Co-ordination 125 4. Discussion 126 References 127 7 131 Do Oral Messages Help Visual Search? Noëlle Carbonell and Suzanne Kieffer 1. Context and Motivation 131 2. Methodology and Experimental Set-Up 134 3. Results: Presentation and Discussion 141 4. Conclusion 153 References 154 Contents vii 8 159 Geometric and Statistical Approaches to Audiovisual Segmentation Trevor Darrell, John W. Fisher III, Kevin W. Wilson, and Michael R. Siracusa 1. Introduction 159 2. Related Work 160 3. Multimodal Multisensor Domain 162 4. Results 166 5. Single Multimodal Sensor Domain 167 6.

Compressed Sensing and its Applications-Holger Boche 2015-07-04 Since publication of the initial papers in 2006, compressed sensing has captured the imagination of the international signal processing community, and the mathematical foundations are nowadays quite well understood. Parallel to the progress in mathematics, the potential applications of compressed sensing have been explored by many international groups of, in particular, engineers and applied mathematicians, achieving very promising advances in various areas such as communication theory, imaging sciences, optics, radar technology, sensor networks, or tomography. Since many applications have reached a mature state, the research center MATHEON in Berlin focusing on "Mathematics for Key Technologies", invited leading researchers on applications of compressed sensing from mathematics, computer science, and engineering to the "MATHEON Workshop 2013: Compressed Sensing and its Applications" in December 2013. It was the first workshop specifically focusing on the applications of compressed sensing. This book features contributions by the plenary and invited

speakers of this workshop. To make this book accessible for those unfamiliar with compressed sensing, the book will not only contain chapters on various applications of compressed sensing written by plenary and invited speakers, but will also provide a general introduction into compressed sensing. The book is aimed at both graduate students and researchers in the areas of applied mathematics, computer science, and engineering as well as other applied scientists interested in the potential and applications of the novel methodology of compressed sensing. For those readers who are not already familiar with compressed sensing, an introduction to the basics of this theory will be included.

Microphone Arrays-Michael Brandstein 2013-04-17 This is the first book to provide a single complete reference on microphone arrays. Top researchers in this field contributed articles documenting the current state of the art in microphone array research, development and technological application.

Signal Processing for Intelligent Sensor Systems with MATLAB-David C. Swanson 2011-07-21 Signal Processing for Intelligent Sensors with MATLAB, Second Edition once again presents the key topics and salient information required for sensor design and application. Organized to make it accessible to engineers in school as well as those practicing in the field, this reference explores a broad array of subjects and is divided into sections:

Principles of Optics for Engineers-William S. C. Chang 2015-05-28 Uniting classical and modern photonics approaches by presenting optical analyses as solutions of Maxwell's equations, this unique book enables students and practising engineers to fully understand the similarities and differences between the different methods. The book begins with a thorough discussion of plane wave analysis, which provides a clear understanding of optics without considering boundary condition or device configuration. It then goes on to cover diffraction analysis of many applications, including a rigorous analysis of TEM waves using Maxwell's equations with boundaries.

Laser cavity modes and Gaussian beams are presented, modal analysis is covered, and approximation methods are discussed (including the perturbation technique, coupled mode analysis, and super mode analysis). With theory linked to practical examples throughout, it provides a clear understanding of the interplay between plane wave, diffraction and modal analysis, and how the different techniques can be applied to various areas including imaging, signal processing, and optoelectronic devices.

Signal Processing for Intelligent Sensor Systems with MATLAB, Second Edition-David C. Swanson 2012 Building on the unique features that made the first edition a bestseller, this second edition includes additional solved problems and web access to the large collection of MATLAB™ scripts that are highlighted throughout the text. The book offers expanded coverage of audio engineering, transducers, and sensor networking technology. It also includes new chapters on digital audio processing, as well as acoustics and vibrations transducers. The text addresses the use of meta-data architectures using XML and agent-based automated data mining and control. The numerous algorithms presented can be applied locally or network-based to solve complex detection problems.

Optoelectronic Signal Processing for Phased-array Antennas IV-Brian M. Hendrickson 1994

Chaotic, Fractal, and Nonlinear Signal Processing-Richard Alan Katz 1996 Annotation The conference, organized by the Office of Naval Research, Naval Undersea Warfare Center, focused on methods leading toward the solution of practical problems in engineering and the physical sciences, and to that end entertained a few papers on advanced linear techniques despite the title. The areas covered are mathematical frontiers, the predictability and control of chaos, detection and classification, advance applied signal processing methods, stochastic resonance, machine diagnostics, turbulence, geophysics, medicine, and new methods for modeling nonlinear systems. Among the 58 topics are measures of complexity in signal analysis, channel

equalization for communication with chaotic signals, the evolution of frequency content in fluid flow noise,, and an oscillatory neural network unit model. No subject index. Annotation c. by Book News, Inc., Portland, Or.

Engineering Noise Control-David A. Bies 2017-12-21 The practice of engineering noise control demands a solid understanding of the fundamentals of acoustics, the practical application of current noise control technology and the underlying theoretical concepts. This fully revised and updated fourth edition provides a comprehensive explanation of these key areas clearly, yet without oversimplification. Written by experts in their field, the practical focus echoes advances in the discipline, reflected in the fourth edition's new material, including: completely updated coverage of sound transmission loss, mufflers and exhaust stack directivity a new chapter on practical numerical acoustics thorough explanation of the latest instruments for measurements and analysis. Essential reading for advanced students or those already well versed in the art and science of noise control, this distinctive text can be used to solve real world problems encountered by noise and vibration consultants as well as engineers and occupational hygienists.

Computational Ocean Acoustics-Finn B. Jensen 2000-03-23 "Many practical suggestions and tips; the examples are meaningful and the illustrations are effective....Destined to become a classic reference that any serious practitioner of ocean acoustics cannot afford to ignore." Revue de livre Authored by four internationally renowned scientists, this volume covers 20 years of progress in computational ocean acoustics and presents the latest numerical techniques used in solving the wave equation in heterogeneous fluid-solid media. The authors detail various computational schemes and illustrate many of the fundamental propagation features via 2-D color displays.

Government Reports Announcements & Index- 1995-04

STAR- 1991-04

Focusing Filters for Wideband Array Processing-Sivanand Simanapalli
1991

Direction of Arrival Estimation and Localization of Multi-Speech

Sources-Nilanjan Dey 2017-12-23 This book presents research and applications on arrival estimation and localization in speech processing to ensure that the broad vision of the direction of arrival estimation (DOAE) / localization of speech sources is well-established. The book first provides a brief overview of the most classical direction of arrival estimation and localization techniques. It then introduces the concept and model of acoustics sources and then highlights the most contemporary studies on this pervasive problem. In addition, the authors explore employing the optimization algorithms to improve the DOAE techniques. The book then highlights the concept and principles of the multi-DOAE approaches. Using a microphone array, the book introduces the localization and tracking problem of multiple speech/acoustic sources. It includes several applications and real-life speech sources localization based on the DOAE approaches. The book reports the challenges facing the DOAE techniques in speech-sources localization. The book pertains to researchers, designers, and engineers in speech processing fields.

Machine Audition: Principles, Algorithms and Systems-Wang, Wenwu
2010-07-31 Machine audition is the study of algorithms and systems for the automatic analysis and understanding of sound by machine. It has recently attracted increasing interest within several research communities, such as signal processing, machine learning, auditory modeling, perception and cognition, psychology, pattern recognition, and artificial intelligence. However, the developments made so far are fragmented within these disciplines, lacking connections and incurring potentially overlapping research activities in this subject area. Machine Audition: Principles, Algorithms and Systems contains advances in algorithmic developments, theoretical frameworks, and experimental research findings. This book is

useful for professionals who want an improved understanding about how to design algorithms for performing automatic analysis of audio signals, construct a computing system for understanding sound, and learn how to build advanced human-computer interactive systems.

The Shock and Vibration Digest- 1998

International Aerospace Abstracts- 1999

Structural Health Monitoring with Piezoelectric Wafer Active Sensors-Victor Giurgiutiu 2014-06-20 Structural Health Monitoring with Piezoelectric Wafer Active Sensors, Second Edition provides an authoritative theoretical and experimental guide to this fast-paced, interdisciplinary area with exciting applications across a range of industries. The book begins with a detailed yet digestible consolidation of the fundamental theory relating to structural health monitoring (SHM). Coverage of fracture and failure basics, relevant piezoelectric material properties, vibration modes in different structures, and different wave types provide all the background needed to understand SHM and apply it to real-world structural challenges. Moving from theory to experimental practice, the book then provides the most comprehensive coverage available on using piezoelectric wafer active sensors (PWAS) to detect and quantify damage in structures. Updates to this edition include circular and straight-crested Lamb waves from first principle, and the interaction between PWAS and Lamb waves in 1-D and 2-D geometries. Effective shear stress is described, and tuning expressions between PWAS and Lamb waves has been extended to cover axisymmetric geometries with a complete Hankel-transform-based derivation. New chapters have been added including hands-on SHM case studies of PWAS stress, strain, vibration, and wave sensing applications, along with new sections covering essential aspects of vibration and wave propagation in axisymmetric geometries. Comprehensive coverage of underlying theory such as piezoelectricity, vibration, and wave propagation alongside experimental techniques Includes step-by-step guidance on the use of piezoelectric wafer active sensors (PWAS) to detect and quantify

damage in structures, including clear information on how to interpret sensor signal patterns Updates to this edition include a new chapter on composites and new sections on advances in vibration and wave theory, bringing this established reference in line with the cutting edge in this emerging area

Applied Mechanics Reviews- 1996

Training and Development Organizations Directory-Paul Wasserman
1983

Naval Research Reviews- 1983

Highly Innovative Space Telescope Concepts-Howard A. MacEwen 2002

Parametric Time-Frequency Domain Spatial Audio-Ville Pulkki
2017-12-26 A comprehensive guide that addresses the theory and practice of spatial audio This book provides readers with the principles and best practices in spatial audio signal processing. It describes how sound fields and their perceptual attributes are captured and analyzed within the time-frequency domain, how essential representation parameters are coded, and how such signals are efficiently reproduced for practical applications. The book is split into four parts starting with an overview of the fundamentals. It then goes on to explain the reproduction of spatial sound before offering an examination of signal-dependent spatial filtering. The book finishes with coverage of both current and future applications and the direction that

spatial audio research is heading in. Parametric Time-frequency Domain Spatial Audio focuses on applications in entertainment audio, including music, home cinema, and gaming—covering the capturing and reproduction of spatial sound as well as its generation, transduction, representation, transmission, and perception. This book will teach readers the tools needed for such processing, and provides an overview to existing research. It also shows recent up-to-date projects and commercial applications built on top of the systems. Provides an in-depth presentation of the principles, past developments, state-of-the-art methods, and future research directions of spatial audio technologies Includes contributions from leading researchers in the field Offers MATLAB codes with selected chapters An advanced book aimed at readers who are capable of digesting mathematical expressions about digital signal processing and sound field analysis, Parametric Time-frequency Domain Spatial Audio is best suited for researchers in academia and in the audio industry.

Selected Papers on Photonic Control Systems for Phased Array Antennas-Nebeel A. Riza 1997 Topics in this volume include: antenna beamforming using optical processor; novel optical techniques for phased-array processing; and optically-controlled phased array radar receiver using SLM switched real time delays.

1988 International Symposium on Flow-Induced Vibration and Noise: Flow-induced vibration and noise in cylinder arrays-M. P. Paidoussis
1988