



Array Signal Processing

Prabhakar S. Naidu



Array Signal Processing:

Array Signal Processing Don H. Johnson, Dan E. Dudgeon, 1993 This is the first book on the market to bring together material on array signal processing in a coherent fashion with uniform notation and convention of models KEY TOPICS Using extensive examples and problems it presents not only the theories of propagating waves and conventional array processing algorithms but also the underlying ideas of adaptive array processing and multi array tracking algorithms This manual will be valuable to engineers who wish to practice and advance their careers in the array signal processing field *Array Signal Processing* S. Unnikrishna Pillai, 2012-12-06 This book is intended as an introduction to array signal processing where the principal objectives are to make use of the available multiple sensor information in an efficient manner to detect and possibly estimate the signals and their parameters present in the scene The advantages of using an array in place of a single receiver have extended its applicability into many fields including radar sonar communications astronomy seismology and ultrasonics The primary emphasis here is to focus on the detection problem and the estimation problem from a signal processing viewpoint Most of the contents are derived from readily available sources in the literature although a certain amount of original material has been included This book can be used both as a graduate textbook and as a reference book for engineers and researchers The material presented here can be readily understood by readers having a background in basic probability theory and stochastic processes A preliminary course in detection and estimation theory though not essential may make the reading easy In fact this book can be used in a one semester course following probability theory and stochastic processes Sensor Array Signal Processing Prabhakar S. Naidu, 2000-07-06 Sensors arrays are used in diverse applications across a broad range of disciplines Regardless of the application however the tools of sensor array signal processing remain the same Furthermore whether your interest is in acoustic seismic mechanical or electromagnetic wavefields they all have a common mathematical framework Mastering this *Microphone Array Signal Processing* Jacob Benesty, Jingdong Chen, Yiteng Huang, 2008-03-11 In the past few years we have written and edited several books in the area of acoustic and speech signal processing The reason behind this endeavor is that there were almost no books available in the literature when we first started while there was and still is a real need to publish manuscripts summarizing the most useful ideas concepts results and state of the art algorithms in this important area of research According to all the feedback we have received so far we can say that we were right in doing this Recently several other researchers have followed us in this journey and have published interesting books with their own visions and perspectives The idea of writing a book on Microphone Array Signal Processing comes from discussions we have had with many colleagues and friends As a consequence of these discussions we came up with the conclusion that again there is an urgent need for a monograph that carefully explains the theory and implementation of microphone arrays While there are many manuscripts on antenna arrays from a narrowband perspective narrowband signals and narrowband processing the literature is quite scarce when it comes to sensor

arrays explained from a truly broadband perspective Many algorithms for speech applications were simply borrowed from narrowband antenna rays However a direct application of narrowband ideas to broadband speech processing may not be necessarily appropriate and can lead to many misunderstandings

Sensor Array Signal Processing, Second Edition
Prabhakar S. Naidu, 2009-06-08 Since publication of the first edition of Sensor Array Signal Processing in 2000 the field it heralded has come of age Sensor arrays helped usher in the age of wireless communication by meeting the increasing capacity requirements of ever growing wireless networks but that is only one example of the number of uses served by this valuable technology across any number of fields Extensively updated and expanded Sensor Array Signal Processing Second Edition covers a wide range of interrelated topics in array processing to provide an introduction to the field that one will not find in the literature The book introduces new developments in the use of sensors in wireless networks and the use of distributed sensors for localization It unravels layers of complexity to explore underlying basic principles of array signal processing focusing on the common threads that exist in wavefield analysis rather than on particular applications Following an introduction to the basic equations governing different wavefields the text provides updated coverage on current topics of interest It analyzes various types of sensor configurations focusing on those most useful for understanding array systems in practice uniform linear and circular arrays Fully updated with over 150 new pages this new edition Includes new chapters emphasizing the use of sensor arrays in wireless communication and localization Adds new exercises and examples to the end of each chapter Provides information on emerging topics covering distributed sensor array multi component sensors space time processing azimuth elevation estimation wideband adaptive beamformation and frequency invariant beamformation An invaluable tool for self study this book provides those working in or interested in medical imaging astronomy radar communications sonar seismology or any field that studies propagating wavefields with a highly accessible guide It describes each concept in precise mathematical language complete with numerical examples detailed illustrations and practice exercises at the end of each chapter to reinforce concepts As with the first edition this volume also meets the needs of professors wishing to adopt the book for graduate level courses in telecommunications and electrical engineering

Array Signal Processing Simon S. Haykin, James H. Justice, 1985 *Academic Press Library in Signal Processing* Mats Viberg, Abdelhak Zoubir, 2013-08-31 This third volume edited and authored by world leading experts gives a review of the principles methods and techniques of important and emerging research topics and technologies in array and statistical signal processing With this reference source you will Quickly grasp a new area of research Understand the underlying principles of a topic and its application 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 array and statistical signal processing Presents core principles and shows their application 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 Edited by leading people in the field who through their reputation have been able to commission experts to write on a particular topic

Radar Array Processing Simon Haykin, John Litva, Terence J. Shepherd, 2013-03-08 Radar Array Processing presents modern techniques and methods for processing radar signals received by an array of antenna elements With the recent rapid growth of the technology of hardware for digital signal processing it is now possible to apply this to radar signals and thus to enlist the full power of sophisticated computational algorithms Topics covered in detail here include super resolution methods of array signal processing as applied to radar adaptive beam forming for radar and radar imaging This book will be of interest to researchers and students in the radar community and also in related fields such as sonar seismology acoustics and radio astronomy

Array Signal Processing Algorithms for Beamforming and Direction Finding Lei Wang, 2009

Microphone Arrays Michael Brandstein, Darren Ward, 2013-04-17 The study and implementation of microphone arrays originated over 20 years ago Thanks to the research and experimental developments pursued to the present day the field has matured to the point that array based technology now has immediate applicability to a number of current systems and a vast potential for the improvement of existing products and the creation of future devices In putting this book together our goal was to provide for the first time a single complete reference on microphone arrays We invited the top researchers in the field to contribute articles addressing their specific topics of study The reception we received from our colleagues was quite enthusiastic and very encouraging There was the general consensus that a work of this kind was well overdue The results provided in this collection cover the current state of the art in microphone array research development and technological application This text is organized into four sections which roughly follow the major areas of microphone array research today Parts I and II are primarily theoretical in nature and emphasize the use of microphone arrays for speech enhancement and source localization respectively Part III presents a number of specific applications of array based technology Part IV addresses some open questions and explores the future of the field

Sensor Array Signal Processing Prabhakar S. Naidu, 2000-07-06 Sensors arrays are used in diverse applications across a broad range of disciplines Regardless of the application however the tools of sensor array signal processing remain the same Furthermore whether your interest is in acoustic seismic mechanical or electromagnetic wavefields they all have a common mathematical framework Mastering this framework and those tools lays a strong foundation for more specialized study and research Sensor Array Signal Processing helps build that foundation It unravels the underlying principles of the subject without reference to any particular application Instead the author focuses on the common threads that exist in wavefield analysis After introducing the basic equations governing different wavefields the treatment includes topics from simple beamformation spatial filtering and high resolution DOA estimation to imaging and reflector mapping It studies different types of sensor configurations but focuses on the uniform linear and circular arrays the most useful configurations for understanding array systems in practice Unique in its approach depth and quantitative focus Sensor Array Signal Processing

offers the ideal starting point and an outstanding reference for those working or interested in medical imaging astronomy radar communications sonar seismology any field that studies propagating wavefields Its clear exposition numerical examples exercises and wide applicability impart a broad picture of array signal processing unmatched by any other text on the market

Array Signal Processing Based on Traditional and Sparse Arrays Ahsan Jafri,2019

Modal Array Signal Processing: Principles and Applications of Acoustic Wavefield Decomposition Heinz Teutsch,2007-05-10 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

Sensor Array Signal Processing Hamid Krim,Mats Viberg,Center for Intelligent Control Systems (U.S.),Massachusetts Institute of Technology. Laboratory for Information and Decision Systems,1995

Array Signal Processing (Array Signal Processing: Concepts and Techniques 1st Edition) ,2025-10-07

Array Signal Processing and Space-time Two-dimensional Signal Processing 2023

Array Processing Jacob Benesty,Israel Cohen,Jingdong Chen,2019-02-28 The focus of this book is on array processing and beamforming with Kronecker products It considers a large family of sensor arrays that allow the steering vector to be decomposed as a Kronecker product of two steering vectors of smaller virtual arrays Instead of directly designing a global beamformer for the original array once the steering vector has been decomposed smaller virtual beamformers are designed and separately optimized for each virtual array This means the matrices that need to be inverted are smaller which increases the robustness of the beamformers and reduces the size of the observations The book explains how to perform beamforming with Kronecker product filters using an unconventional approach It shows how the Kronecker product formulation can be used to derive fixed adaptive and differential beamformers with remarkable flexibility Furthermore it demonstrates how fixed and adaptive beamformers can be intelligently combined optimally exploiting the advantages of both The problem of spatiotemporal signal enhancement is also addressed and readers will learn how to perform Kronecker product filtering in this context

Narrowband Array Signal Processing Using Higher-order Statistics Norman Yuen,1995

Array Signal Processing in GNSS Receiver ,2007

Efficient One-, Two-, and Multidimensional High Resolution Array Signal Processing Martin Haardt,1997-01-01

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Array Signal Processing Introduction

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