Optimum Array Processing: Part IV of Detection, Estimation, and Modulation Theory
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Appendix B

Array Processing Literature

Due to the wide variety of applications of array processing, the literature is spread across a number of different journals and conferences. In this section, we list some of the journals and books where array processing research is reported. In Section B.1, we list the relevant journals. In Section B.2, we list some books dealing with array processing. In Section B.3, we list some books that treat time-domain problems, which are similar to the array processing problems, for uniform linear arrays.

B.1 Journals

The following journals discuss current research in array processing from various viewpoints.

A. Institute of Electrical and Electronic Engineers

We have listed transactions that contain articles on array processing. The order is a rough indication of the number of articles published. The first three entries are the primary sources.

(i) *Signal Processing*

(ii) *Antennas and Propagation*

(iii) *Aerospace and Electronic Systems*

(iv) *Ocean Engineering*

(v) *Information Theory*

(vi) *Circuits and Systems*

(vii) *Vehicular Technology*

(viii) *Communications*

(ix) *Geoscience Electronics*

(x) *Automatic Control*

(xi) *Systems, Man, and Cybernetics*

The *Proceeding of the IEEE* also has special issues dealing with Antennas (e.g., [MM92]).

B. IEE (British)

C. Journal of the Acoustical Society of America (JASA)

D. Geophysics

E. Geophysical Prospecting

F. Signal Processing (European)

B.2 Books

Two representative lists of books that deal with various aspects of array processing can be constructed. The first group emphasizes a deterministic approach and develops what we will refer to a "classical array theory". This group includes:

(i) J. D. Kraus, *Antennas* [Kra88]

(ii) C. A. Balanis, *Antenna Theory Analysis and Design* [Bal82]

(iii) R. S. Elliott, *Antenna Theory and Design* [Ell81]

(iv) T. A. Milligan, *Modern Antenna Design* [Mil85]

(v) Y. T. Lo and S. W. Lee, *Antenna Handbook*: 1. *Fundamentals and Mathematical Techniques* [LL93a]; 2. *Antenna Theory* [LL93b]; 3. *Applications* [LL93c]; 4. *Related Topics* [LL93d]

(vi) W. L Stutzman and G. A. Thiele, *Antenna Theory and Design* [ST81]

(vii) B. D. Steinberg, *Principles of Aperture and Array System Design* [Ste76]

(viii) R. J. Mailloux, *Phased Array Antenna Handbook* [Mai94]

(ix) W. L. Weeks, *Antenna Engineering* [Wee68]

(x) K. Fujimoto and J. R. James, *Mobile Antenna Systems Handbook* [FJ94]

(xi) H. Mott, *Antennas for Radar and Communications* [Mot92]

(xii) R. C. Hansen, *Microwave Scanning Antennas* [Han85]

(xiii) R. C. Hansen, *Phased Array Antennas* [Han98]

The second group emphasizes a statistical approach to "optimum array processing". This list includes:

(i) P. A. Monzingo and T. W. Miller, *Introduction to Adaptive Arrays* [MM80]

(ii) J. E. Hudson, *Adaptive Array Principles* [Hud81]

(iii) S. Haykin (Ed.), *Adaptive Signal Processing* [Hay85]

(iv) D. E. Dudgeon and R. M. Mesereau, *Multidimensional Signal Processing* [DM84]

(v) E. Brookner, *Practical Phased Array Antenna Systems* [Bro91]

(vi) S. Haykin (Ed.), *Advances in Spectrum Analysis and Array Processing*, Vol. I [Hay91a] Vol. II [Hay91b], Vol. III [Hay95]

(vii) D. H. Johnson and D. E. Dudgeon, *Array Signal Processing, Concepts and Techniques* [JD93]

(viii) R. T. Compton, Jr., *Adaptive Antennas, Concepts and Performance* [Com88]

(ix) S. U. Pillai, *Array Signal Processing* [Pil89]

(x) B. D. Steinberg, *Principles of Aperture and Array System Design* [Ste76]

(xi) S. Haykin and A. Steinhardt, *Adaptive Radar Detection and Estimation* [HS92]

(xii) T. J. Shepherd S. Haykin, and J. Litva (Eds.), *Radar Array Processing* [SH92]

(xiii) P. Stoica and R. Moses, *Introduction to Spectral Analysis* [SM97]

(xiv) L. J. Ziomek, *Fundamentals of Acoustic Field Theory and Space-Time Signal Processing* [Zio95]

(xv) J. C. Hassab, *Underwater Signal and Data Processing* [Has89]

(xvi) R. J. Mailloux, *Phased Array Antenna Handbook* [Mai94]

(xvii) N. Kalouptsidis and S. Theodoridis (Eds.), *Adaptive System Identification and Signal Processing Algorithms* [KT93]

(xviii) F. A. Grunbaum, M. Bernfeld, and R. E. Blahut (Eds.), *Radar and Sonar, Part I* [GBB91]

(xix) F. A. Grunbaum, M. Bernfeld, and R. E. Blahut(Eds.), *Radar and Sonar, Part II* [GBB92]

(xx) S. Haykin (Ed.), *Topics in Applied Physics*, Vol. 34: Nonlinear Methods of Spectral Analysis [Hay83]

(xxi) J. C. Liberti, Jr. and T. S. Rappaport, *Smart Antennas for Wireless Communications: IS-95 and Third Generation CDMA Applications* [LR99]

(xxii) R. Klemm, *Space-time Adaptive Processing* [Kle98]

(xxiii) T. S. Rappaport (Ed.), *Smart Antennas: Adaptive Arrays, Algorithms, and Wireless Position Location* [Rap98]

(xxiv) S. Y. Kung, H. J. Whitehouse, and T. Kailath (Eds.), *VLSI and Modern Signal Processing* [KWK85]

B.3 Duality

In Chapter 2, we find that array processing for a uniformly spaced linear array with elements spaced at $\lambda/2$ is identical to frequency-domain processing using a FIR filter. Therefore, a significant number of results carry over directly to the array processing area.

Representative books that contain results that are useful in array processing include:

(i) S. M. Kay, *Modern Spectral Estimation, Theory and Application* [Kay88]

(ii) S. L. Marple, Jr., *Digital Spectral Analysis with Applications* [Mar87]

(iii) A. V. Oppenheim and R. W. Schafer, *Discrete-Time Signal Processing* [OS89]

(iv) S. Haykin, *Adaptive Filter Theory*, [Hay96]

(v) B Porat, *Digital Processing of Random Signals* [Por94]

(vi) J. G. Proakis et al., *Advanced Digital Signal Processing* [PRLN92]

(vii) D. G. Childers, *Modern Spectrum Analysis* [Chi78]

(viii) S. B. Kesler (Ed.), *Modern Spectrum Analysis*, vol. II [Kes86]

(ix) B. Widrow and S. D. Stearns, *Adaptive Signal Processing* [WS85]

(x) L. L. Scharf, *Statistical Signal Processing: Detection, Estimation, and Time Series Analysis* [Sch91]

(xi) M. Bellanger, *Digital Processing of Signals*, [Bel84]

(xii) G. C. Carter (Ed.), *Coherence and Time Delay Estimation* [Car93]

(xiii) A. V. Oppenheim (Ed.), *Applications of Digital Signal Processing* [Opp78]

(xiv) S. U. Pillai and T. I. Shim, *Spectrum Estimation and System Identification* [PS93]

(xv) Multidimensional Signal Processing Committee (Eds.), *Selected Papers in Multidimensional Digital Signal Processing* [MSP86]

(xvi) L. R. Rabiner and B. Gold, *Theory and Application of Digital Signal Processing* [RG75]

(xvii) M. B. Priestley, *Spectral Analysis and Time Series*, Vols. 1 and 2 [Pri81]

(xviii) S. T. Alexander, *Adaptive Signal Processing* [Alex86]

(xix) J. R. Treichler, C. R. Johnson, Jr., and M. G. Larimore, *Theory and Design of Adaptive Filters* [TJL87]

(xx) J. M. Mendel, *Lessons in Estimation Theory for Signal Processing, Communications, and Control* [Men95]

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