Contents

Plenary Talks

The Gibbs Phenomenon in Sampling and Interpolation, A. J. Jerri 1
An extension of Papoulis’ sampling theorem for non-bandlimited functions, M. Unser 10
Wavelets, Sampling, and Noise Reduction, J. J. Benedetto 455

Applications I: Tomography, Nonuniform Sampling

Efficient Sampling in Doppler Imaging, L. Desbat and C. Mennessier 16
Spiral MRI Scan-Time Reduction by Undersampling and Iterative Gaussian Filtering, F. T. A. W. Wajer, R. de Beer, M. Fuderer, A. F. Mehlkopf and D. van Ormondt 22
What about the FT of the comb signal?, M. D. Ortigueira 28
MRI: k-Space Resampling for Intrascan Rotation Compensation, M. Bourgeois, Y. Crémillieux, C. Delon-Martin, M. Roth, A. Briguet and D. Graveron-Demilly 34
Lossy Image compression by A High Performance Non Uniform Morphological Sampling Scheme, S. Saryazdi, V. Haese-Coat and J. Ronsin 37
Irregular Image Sub-sampling and Reconstruction by interpolation, H. Le Floch and C. Labit 43
Image decomposition: an end-to-end theory, R. Alter-Gartenberg and S. K. Park 49

Applications II: Digital Filtering, Filter Banks

A Laplacian pyramid with rational scale factor for multisensor image data fusion, B. Aiazzi, L. Alparone, S. Baronti, V. Capellini, R. Carlà and L. Mortelli 55
General Dual-Rate Systems as Multirate Building Blocks, T. Chen, L. Qiu and E. Bai ........................................... 61
Non-uniform Subband Splitting based on IIR Filter Banks, F. Argenti and E. Del Re ........................................... 67
Complex FIR filter design using nonuniform frequency sampling, A. Yardim, G. D. Cain and M. A. Mughal ............... 73
Efficient Multirate Filters for Sigma-Delta Converters, L. L. Presti 79
Sample Restoration Based on Nonlinear Fast Kalman Filtering, S. Nasser Eldin, M. Najin and H. Abdel Nour .......... 97
Influence of Sampling on Regularization and Alias Suppression in Inversion of Integral Transforms by Digital Filters, V. Shtrauss 91

Applications III: Array Processing, Geophysics, Telecommunications, Other
Weight- and Layout-Optimized Sparse Arrays, S. Holm, B. Elgetun and G. Dahl ........................................... 97
Discrete Sampling Transform of the Signals Masked in the Noise, K. Kruminsh and O. Zaytsev ............................ 103
A Frequency Domain Approach to the Recovery of Geophysical Potentials, M. Rauth and T. Strohmer ................. 109
Mixed Fourier-Radon reconstruction of irregularly and sparsely sampled seismic data, M. A. Schonewille and A. J. W. Duijndam 115
Spectral Analysis of Laser Doppler Anemometry Velocity Measurements in Turbulent Flows, R. Banning and W. L. de Koning . 121
Sampling Effects in High-Speed A/D Converters, D. Bellan, A. Brandolini and A. Gandelli ....................................... 127
An Implementation-Oriented Scheme of Sampling and Reconstructing Continuous-Time Signals, M. Kamada and O. Sasaki . 133
An ADPCM-like system based on non uniform signal transmission, S. Mirsaidi, G. Fleury and J. Oksman .................. 139
Spurious Signals Reduction in Coarse quantization by Jittered Sampling, D. Gold and H. Ur ................................. 145
Accuracy of the RMS Value Measurement of Repetitive Waveforms by Means of Asynchronous, Non Uniformly Spaced Sampling Technique, B. Jackiewicz ........................................... 151
Missing Samples, Interpolation, Reconstruction

Iterative Reconstruction of Lost Samples Using Updating of Autocorrelation Matrix, M. Greitans .............................................. 155

Burst Correction for missing samples, F. Marvasti, M. Echhart and M. Hasan ................................................................. 161

Detection and correction of missing samples, P. J. S. G. Ferreira and J. M. N. Vieira ............................................................. 169

Computational Issues of Interpolation via Wavelet Basis Fitting,
C. Ford and D. M. Etter .............................................................. 175

Reliability of Signal Reconstruction From Finite Sets of Samples,
A. Tarczynski and G. D. Cain ....................................................... 181


Autoregression and irregular sampling: Estimation and filtering,
R. J. Martin and S. J. Godsill .................................................... 193

Sampling and Statistical Signal Processing


Cumulants of a multidimensional process observed at rationally related resolutions, A. N. Delopoulos and M. Rangoussi ........ 205

On Transformations of Stochastic Signals by the Up-and-Down and Dichotomic Methods, O. Zaytsev .................................. 211

On Identifiability, Aliasing and the Optimal Sampling Strategy for Polynomial Phase Signals, J. Angeby ......................... 217

Reducing Quantization Error using Prediction/Non-uniform Transmission, S. Mirsaidi, G. Fleury and J. Oksman ............... 223


Alias-free Cross-Bispectral Analysis of Continuous-Time Vector Processes Under Random Sampling, Keh-Shin Lii .......... 233

Spectral Estimation of Poisson-Distributed Time-Series of Arrivals,
M. Iribarren and U. Heute ....................................................... 471
Wavelets, Frames, and Sampling

Orthogonal and Biorthogonal Scaling Functions with good Translation Invariance Characteristic, A. J. Bastys .......... 239

A New Class of Identity Systems, D. Isar and A. Isar .......... 245

Time-Frequency Irregular Sampling and Frames for Discrete-Time Signals, S. Wada, H. Yagi and H. Inaba .......... 249

Sampling Theorems in Generalized Shannon Systems, H. O. Kim and J. H. Park .................. 255

Sampling of Bandlimited Functions in Higher Dimensions and Applications to Deconvolution, D. Walnut .......... 441

Sampling and nonlinear approximation of band limited signals in mean oscillation spaces, R. H. Torres .......... 267

Wavelet Subspaces for Sampling and Extrapolation, J. E. Gilbert, J. A. Hogan and J. D. Lakey .......... 273

Sampling Techniques for Multichannel Deconvolution, S. D. Casey .......... 279

Special Session: Gabor Analysis, Irregular Sampling

Regular and Irregular Sampling in Gabor Analysis,

H. G. Feichtinger .................. 465

Finite and Infinite-Dimensional Models of Non-Uniform Sampling,

K. Gröchenig .................. 285

Sampling and interpolation for bandlimited $L^p$-functions, K. M. Flornes .................. 291


Metalectic Frames and Sampling Theory, J. D. Lakey .......... 261

Special Session: New Trends in Sampling Theory

Mellin transform methods and the exponential sampling theorem of signal analysis, P. L. Butzer and S. Jansche .......... 303

New Orthonormal Sets and Bases of the Space of Bandlimited Functions, A. I. Zayed .......... 305

Sampling and Multiwavelets, G. G. Walter and Luchuan Cai .......... 313

Sampling and Interpolation for Functions with Multi-Band Spectrum: the Mean-Periodic Continuation Method, V. E. Kat-
snelson .............................................................. 457
Nyquist Rates and the Linear Prediction of Band-Limited Signals Based on Signal and Derivative Samples, D. H. Mugler, W. Splettstößer and Y. Wu ............................................. 321
Sampling, Gaussian Quadrature, and Poisson Summation Formula, G. Schmeisser .................................................. 327
A Sampling Theorem for Discrete Transforms, M. H. Annaby ...... 339
Filter Banks as Sampling Structures: Relationships and New Re-
sults, Cormac Herley ............................................ 343

Special Session: Digital Alias-Free Signal Processing
Digital Alias-free Signal Processing and a Test-bed for this technol-
ogy, I. Bilinskis and G. Cain ........................................ 349
Signal Digitizing and Recording in the DASP-Lab System, Y. Artyukh, I. Bilinskis, M. Greitans and V. Vedin ...................... 357
Evaluation of Pseudorandom Sampling Processes, Y. Artyukh, A. Ribakov and V. Vedin .............................................. 361
Vector Spectral Analyzer based on the DASP-Lab System, I. Bilin-
skis, A. Mikelsons and G. Mucenieks ............................ 365
Virtual Power Analyzer of the DASP-Lab system, I. Mednieks, A. Mikelsons and G. Mucenieks ....................................... 371
Virtual Oscilloscope of the DASP-Lab System, Y. Artyukh, I. Med-
ieks and V. Vedin .................................................... 375
Modulation Domain Analyzer of the DASP-Lab System, Y. Artyukh, A. Ribakov and V. Vedin ......................................... 379

Issues in Sampling Theory
Finite Sampling associated with second order difference problems, A. G. Garcia and M. A. Hernández-Medina ....................... 385
Nonstandard Methods in Sampling Theory, R. F. Hoskins and J. Sousa Pinto ................................................................. 391
Subordination in generalized sampling series by Rogosinski-type sam-
pling series, A. Kivinukk and G. Tamberg ............................. 397
Relation of Systematic and Measurement Errors of the Signal Synthesized from the Nonorthogonal Bessel’s Function Spectrum, E. Hermanis ....................................................... 403

Functional fitting and its connections with sampling theory, R. J. Martin ................................................................. 407

A Sampling Theorem for Bandlimited $L^p$-functions, J. J. Voss . . 413

The Behaviour of the Finite Shannon Sampling Series, H. Boche and H. Schreiber .......................................................... 419

On the Application of an Optimal Spline Sampling Theorem to Parametric Modeling of Nonstationary Signals, T. Oliveira e Silva ................................................................. 425

Irregular sampling based on the fractional Fourier transform, B. Bittner ................................................................. 431

Sampling with binned data, M. Pawlak and U. Statdmüller . . . 437

Errors in Sampling Series with Measured Sampled Values, P. L. Butzer and Junjiang Lei ......................................................... 447

Sampling theorems from the iteration of low order differential operators, J. R. Higgins ......................................................... 463