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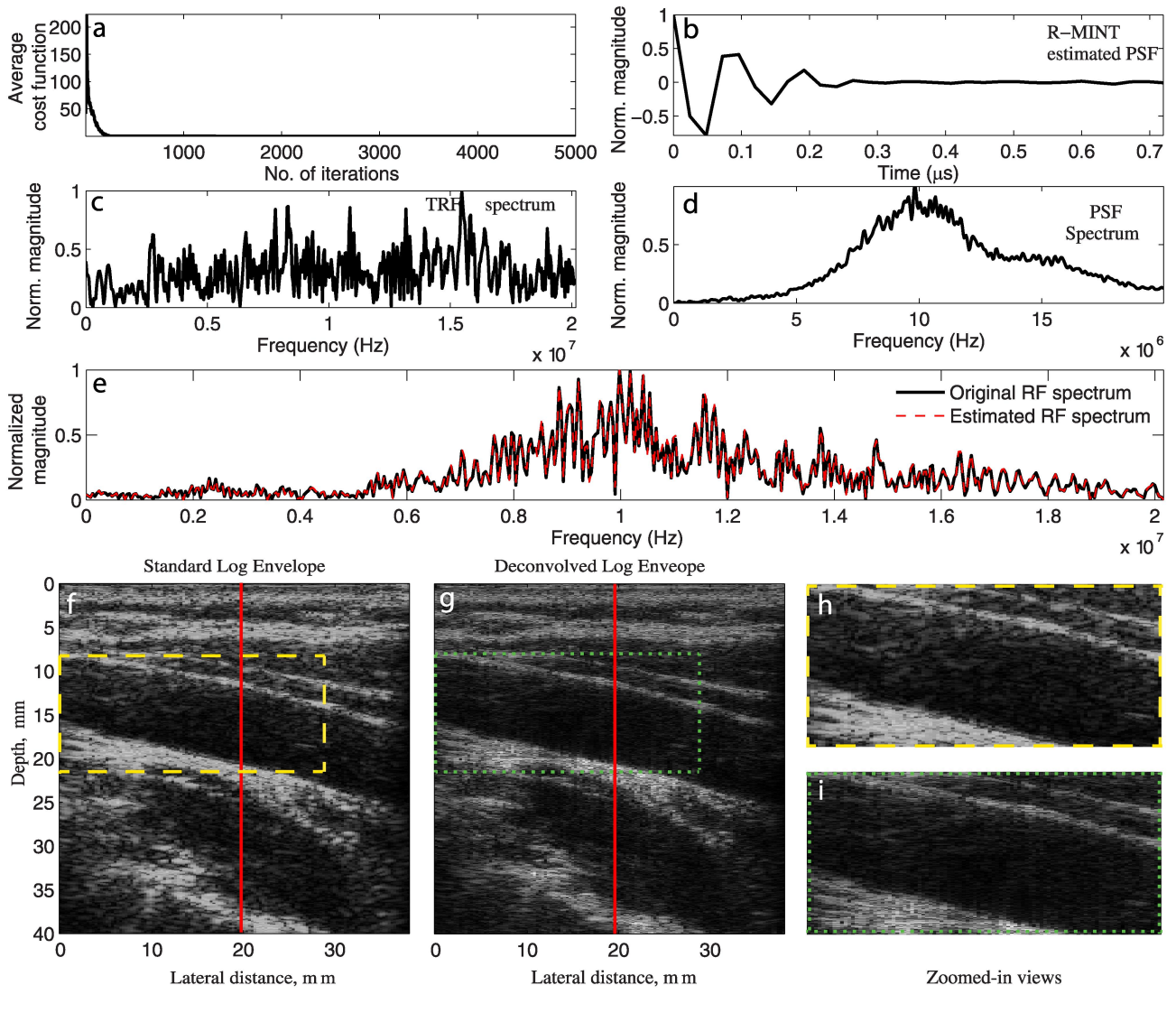

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Guidelines for Authors 1046

PAPERS

Medical Ultrasonics

Evaluating the Improvement in Shear Wave Speed Image Quality Using Multidimensional Directional Filters in the Presence of Reflection Artifacts ..... *S. L. Lipman, N. C. Rouze, M. L. Palmeri, and K. R. Nightingale* 1049

Effects of Temperature on the Histotripsy Intrinsic Threshold for Cavitation ..... *E. Vlaisavljevich, Z. Xu, A. D. Maxwell, L. Mancia, X. Zhang, K.-W. Lin, A. P. Duryea, J. R. Sukovich, T. L. Hall, E. Johnsen, and C. A. Cain* 1064

Direct Digital Demultiplexing of Analog TDM Signals for Cable Reduction in Ultrasound Imaging Catheters ..... *T. M. Carpenter, M. W. Rashid, M. Ghovanloo, D. M. J. Cowell, S. Freear, and F. L. Degertekin* 1078

Phase and Amplitude Modulation Methods for Nonlinear Ultrasound Imaging With CMUTs ..... *S. Satir and F. L. Degertekin* 1086

Optimization-Based Speckle Tracking Algorithm for Left Ventricle Strain Estimation: A Feasibility Study ..... *H. Khamis, S. Shimoni, A. Hagendorff, N. Smirin, Z. Friedman, and D. Adam* 1093

Tissue Attenuation Estimation by Mean Frequency Downshift and Bandwidth Limitation ..... *Z. Klimonda, M. Postema, A. Nowicki, and J. Litniewski* 1107

Blind Deconvolution of Ultrasound Images Using l_1-Norm-Constrained Block-Based Damped Variable Step-Size Multichannel LMS Algorithm ..... *M. K. Hasan, M. S. E. Rabbi, and S. Y. Lee* 1116

Efficiency of U.S. Tissue Perfusion Estimators ..... *M. Kim, C. K. Abbey, and M. F. Insana* 1131

Transducers and Transducer Materials

An Air-Coupled Multiple Moving Membrane Micromachined Ultrasonic Transducer With Inverse Biasing Functionality ..... *A. Emadi and D. A. Buchanan* 1140

Optimization of the Bias Magnetic Field of Shear Wave EMATs ..... *J. Isla and F. Cegla* 1148

Improving the Performance of a 1-D Ultrasound Transducer Array by Subdicing ..... *J. Janjic, M. Shabanimotlagh, G. van Soest, A. F. W. van der Steen, N. de Jong, and M. D. Verweij* 1161

Sensors, NDE, and Industrial Applications

Digital Signal Processing Methods for Ultrasonic Echoes ..... *K. M. Sinding, C. S. Drapaca, and B. R. Tittmann* 1172

Full-Duplex Airborne Ultrasonic Data Communication Using a Pilot-Aided QAM-OFDM Modulation Scheme ..... *W. Jiang and W. M. D. Wright* 1177

Ferroelectrics

Enhanced Actuation Performance and Reduced Heat Generation in Shear-Bending Mode Actuator at High Temperature ..... *J. Chen, G. Liu, J. Cheng, and S. Dong* 1186

Shear-Mode-Based Cantilever Driving Low-Frequency Piezoelectric Energy Harvester Using $0.67Pb(Mg_{1/3}Nb_{2/3})O_3$-$0.33PbTiO_3$ ..... *Z. Zeng, B. Ren, L. Gai, X. Zhao, H. Luo, and D. Wang* 1192

(Continued on Page 1045)

DOI http://dx.doi.org/10.1109/TUFFC.2016.2593318

(Continued from Page 1044)

Frequency Control

High-Stability Comparison of Atomic Fountains Using Two Different Cryogenic Oscillators ..... *M. Abgrall, J. Guéna, M. Lours, G. Santarelli, M. E. Tobar, S. Bize, S. Grop, B. Dubois, Ch. Fluhr, and V. Giordano* 1198

Numerical Verification of an Analytical Model for Phase Noise in MEMS Oscillators ..... *D. K. Agrawal, F. Bizzarri, A. Brambilla, and A. A. Seshia* 1204

REVIEW PAPERS

Frequency Control

Oscillator Phase Noise: A 50-Year Review ..... *D. B. Leeson* 1208

Ultrasound Image Resolution Improvement Through PSF Effect Elimination

The conventional ultrasound images suffer from low resolution due to the convolution effect of the point spread function (PSF) on the backscattered radio frequency (RF) data. The l_1-bMCLMS algorithm can remove the convolution effect of the PSF and estimate the tissue reflectivity function (TRF) from the measured RF data, and thereby improve resolution of the clinical ultrasound images. The improved performance of l_1-bMCLMS algorithm in terms of resolution gain and normalized misalignment parameter of the TRF may find promising applications in clinical ultrasound imaging. The cover figure shows a) the convergence of the l_1-bMCLMS cost function, b) the estimated PSF by the l_1-bMCLMS algorithm, spectrum of the c) estimated TRF, d) estimated PSF, and e) estimated RF superimposed with the original RF, and at last demonstrates the resolution improvement presenting the f) conventional and g) deconvolved l_1-bMCLMS images with their h-i) zoomed-in views.

Images are courtesy of Md. Kamrul Hasan, Md. Shifat-E-Rabbi, and Soo Yeol Lee. The authors are with the Department of Electrical and Electronic Engineering, Bangladesh University of Engineering and Technology, Dhaka 1000, Bangladesh, and the Department of Biomedical Engineering, Kyung Hee University, Yongin 446-701, South Korea.

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