İlker Bayram

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Dept. of Electronics and Telecommunications Eng.
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Education

- PhD, Electrical Engineering   2005 - 2009
  Polytechnic Institute of New York University, Brooklyn, NY, USA

- MSc, Electrical and Electronics Engineering   2002 - 2004
  Middle East Technical University (METU), Ankara, Turkey

- BSc, Electrical and Electronics Engineering   1998 - 2002
  Middle East Technical University (METU), Ankara, Turkey

Employment

- Associate Professor   2015 -
  Dept. of Electronics and Telecommunications Eng.,
  Istanbul Technical University, Istanbul, Turkey

- Assistant Professor   2010 - 2015
  Dept. of Electronics and Telecommunications Eng.,
  Istanbul Technical University, Istanbul, Turkey

- Post-doctoral Researcher   2009 - 2010
  Biomedical Imaging Group,
  École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

- Research/Teaching Assistant   2005 - 2009
  Dept. of Electrical and Computer Engineering,
  Polytechnic Institute of New York University, Brooklyn, NY, USA

- Research Assistant   2004 - 2005
  Dept. of Electrical and Electronics Eng.,
  Bilkent University, Ankara, Turkey

- Researcher   2002 - 2004
  Control and Guidance Laboratory, TUBITAK-SAGE, Ankara, Turkey

Research Interests

Time-frequency analysis, wavelets, filter banks, applications of convex and non-convex optimization in audio/image processsing (specifically sparsity-aware formulations), (microphone) array signal processing

Publications

International Refereed Journals

- İ. Bayram, "Solution of a Bivariate ℓ_1 Regularized Problem", IEEE Signal Proc. Letters, 23(5):653-657, May 2016.

- I. W. Selesnick and İ. Bayram, "Enhanced Sparsity by Non-Separable Regularization", IEEE Trans. Signal Processing, 64(9): 2298-2313, May 2016.

○ İ. Bayram, "On the Convergence of the Iterative Shrinkage/Thresholding Algorithm With a Weakly Convex Penalty", IEEE Trans. Signal Processing, 64(6):1597-1608, March 2016.

○ İ. Bayram, "A Multichannel Audio Denoising Formulation Based on Spectral Sparsity", IEEE/ACM Trans. Audio, Speech and Language Processing, 23(12):2272-2285, December 2015.

○ İ. Bayram, "Proximal Mappings Involving Almost Structured Matrices", IEEE Signal Proc. Letters, 22(12):2264-2268, December 2015.

○ İ. Bayram, "Penalty Functions Derived From Monotone Mappings", IEEE Signal Proc. Letters, 22(3):265-269, March 2015.

○ I. W. Selesnick, A. Parekh and İ. Bayram, "Convex 1-D Total Variation Denoising with Non-convex Regularization", IEEE Signal Proc. Letters, 22(2):141-144, February, 2015.

○ I. W. Selesnick and İ. Bayram, "Sparse Signal Estimation by Maximally Sparse Convex Optimization", IEEE Trans. Signal Processing, 62(5):1078-1092, March, 2014.

○ İ. Bayram and Ö. D. Akyıldız, "Primal-Dual Algorithms for Audio Decomposition Using Mixed Norms", Signal, Image and Video Processing, 8(1):95-110, January 2014.

○ İ. Bayram and M. Kamaşak, "A Simple Prior for Audio Signals", IEEE Trans. Audio, Speech and Language Processing, 21(6):1190-1200, June 2013.

○ İ. Bayram, "An Analytic Wavelet Transform with a Flexible Time-Frequency Covering", IEEE Trans. Signal Processing, 61(5): 1131-1142, March 2013.

○ İ. Bayram and M. Kamaşak, "Directional Total Variation", IEEE Signal Processing Letters, 19(12):781-784, December 2012.

○ İ. Bayram and I. W. Selesnick, "A Dual-Tree Rational Dilation Wavelet Transform", IEEE Trans. Signal Processing, 59(12): 6251-6256, December 2011.

○ F. I. Karahanoğlu, İ. Bayram and D. Van De Ville, "A Signal Processing Approach to Generalized 1-D Total Variation", IEEE Trans. Signal Processing, 59(11): 5265-5274, November 2011.

○ İ. Bayram and I. W. Selesnick, "A Subband Adaptive Iterative Shrinkage/Thresholding Algorithm", IEEE Trans. Signal Processing, 58(3): 1131-1143, March 2010.

○ İ. Bayram and I. W. Selesnick, "Frequency-Domain Design of Overcomplete Rational-Dilation Wavelet Transforms", IEEE Trans. Signal Processing, 57(8):2957-2972, August 2009.

○ İ. Bayram and I. W. Selesnick, "On the Frame Bounds of Iterated Filter Banks", Applied and Compututational Harmonic Analysis, 27:255-262, 2009.

○ İ. Bayram and I. W. Selesnick, "Orthonormal FBs with Rational Sampling Factors and Oversampled DFT-Modulated FBs: A Connection and Filter Design", IEEE Trans. Signal Processing, 57(7):2515-2526, July 2009.

○ İ. Bayram and I. W. Selesnick, "Overcomplete Discrete Wavelet Transforms with Rational Dilation Factors", IEEE Trans. Signal Processing, 57(1):131-145, January 2009.

○ İ. Bayram and I. W. Selesnick, "On the Dual-Tree Complex Wavelet Packet and M-Band Transforms", IEEE Trans. Signal Processing, 56(6):2298-2310, June 2008.

○ B. Dumitrescu, İ. Bayram and I. W. Selesnick, "Optimization of Symmetric Self-Hilbertian Filters for the Dual-Tree Complex Wavelet Transform", IEEE Signal Proc. Letters, 15 : 146-149, 2008.

International Conference/Workshop

○ İ. Bayram, "Employing Phase Information for Audio Denoising", In Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2014.

○ İ. Bayram, P.-Y. Chen and I. W. Selesnick, "Fused Lasso with a Non-Convex Sparsity Inducing Penalty", In Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2014.

- İ. Bayram, "Combining Multiple Observations of Audio Signals", In Proc. SPIE Conf. on Wavelets and Sparsity XV, 2013.

- İ. Bayram, "p-Norm Minimization Over Intersections of Convex Sets", In Proc. Eurepoean Signal Processing Conference (EUSIPCO), 2012.

- İ. Bayram and M. Kamaşak, "A Directional Total Variation", In Proc. Eurepoean Signal Processing Conference (EUSIPCO), 2012.

- Ö. D. Akyıldız and İ. Bayram, "An Analysis Prior Based Decomposition Method for Audio Signals", In Proc. European Signal Processing Conference (EUSIPCO), 2012.

- İ. Bayram, "Mixed Norms with Overlapping Groups as Signal Priors", In Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), 2011.

- İ. Bayram, M. Guerquin-Kern, R. Terrés-Cristofani and M. Unser, "Accelerated Wavelet-Regularized Deconvolution for 3-D Fluorescence Microscopy", In Proc. IEEE International Conference on Image Processing (ICIP), 2010.

- I. W. Selesnick and İ. Bayram, "Oscillatory and Transient Signal Decomposition Using Overcomplete Rational-Dilation Wavelet Transforms", In Proc. SPIE Conf. on Wavelets XIII, 2009.

- İ. Bayram and I. W. Selesnick, "Decomposing EEG Signals into Rhythmic and Transient Components", CIE-GNYC Student Workshop, Oct. 4, 2008.

- İ. Bayram and I. W. Selesnick, "Design of Orthonormal and Overcomplete Wavelet Transforms Based on Rational Sampling Factors", In Proc. SPIE Conf. on Wavelet Applications in Industrial Processing V, volume 6763, Sept 11-12, 2007.

- İ. Bayram and I. W. Selesnick, "A Simple Construction for the M-Band Dual-Tree Complex Wavelet Transform", In Proc. IEEE 12th DSP Workshop, 2006.

National Conference/Workshop

- İ. Bayram and A. Koçanaoğulları, "A Minimization Formulation for Source Separation with a Microphone Array", In Proc. Signal Proc. and Communications Applications Conf. (SIU), 2015.

- A. Koçanaoğulları and İ. Bayram, "A Dereverberation Formulation Based on Sparsity", In Proc. Signal Proc. and Communications Applications Conf. (SIU), 2015.

- İ. Bayram, "Signal Alignment: A Method Based on Non-Convex Optimization", In Proc. Signal Proc. and Communications Applications Conf. (SIU), 2014.

- İ. Bayram, "Pitch Shifting Using a Flexible Wavelet Family", In Proc. Signal Proc. and Communications Applications Conf. (SIU), 2012.

- Ö. D. Akyıldız and İ. Bayram, "Signal Decomposition via Mixed Norm Regularization", In Proc. Signal Proc. and Communications Applications Conf. (SIU), 2012.

- İ. Bayram and M. E. Kamaşak, "Directional Total Variation Minimization", In Proc. Signal Proc. and Communications Applications Conf. (SIU), 2012.

- İ. Bayram, "On Convex Combinations of Norms for Group Sparsity", In Proc. Signal Proc. and Communications Applications Conf. (SIU), 2011.

- İ. Bayram and I. W. Selesnick, "Denoising with the Analysis Prior", Symposium on Telecommunications Technologies and Applications (HABTEKUS), Yıldız Technical University, Istanbul, 2009.

Projects

- *Formulations Based on Sparsity for Microphone Arrays*. TÜBİTAK Project (1001), PI, 03.2014 − 03.2016.

- *Signal Processing Using the Rational Dilation Wavelet Transform*. TÜBİTAK Career Grant (3501), PI, 03.2011 − 03.2013.

Courses Taught

Undergraduate (ITU)

- MAT205E – Theory of Complex Functions (Fall 2014)

- MAT281E – Linear Algebra and Applications (Fall 2010, 2011, 2012, 2013, 2015)

- TEL311E – Digital Signal Processing (Fall 2010)

- MAT271E – Probability and Statistics (Spring 2011, 2012, 2013, 2014, 2015, 2016)

- EHB252E – Signals and Systems (Spring 2012, 2013)

- EHB372E – Digital Signal Processing Design and Applications (Spring 2015)

Graduate (ITU)

- TEL502E – Detection and Estimation Theory (Spring 2014, 2015, 2016)

- BYM510E – Mathematical Methods in Tomography (Spring 2014)

- TEL519E – Image Processing (Fall 2010, 2011)

- BYM510E – Biological Signals Processing (Spring 2011, 2012, 2015)

- TEL603E – Adv. Topics in Telecom. (Introduction to Convex Analysis) (Fall 2012, 2015)

Award

- Alexander Hessel Award for the Best PhD Dissertation in Electrical and Computer Engineering, Polytechnic Institute of NYU, June 2009.