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Department of Electrical and Electronics Engineering
Middle East Technical University (METU)

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RESEARCH INTERESTS

Statistical Signal Processing: Detection and Estimation Theory, Bayesian Methods, Spectrum Estimation, Radar Signal Processing
Time-Frequency Analysis: Wigner Distribution, Fractional Fourier Transform, Non-stationary Signal Analysis.
Other: Signal Processing Theory, Efficient Implementations for Filtering, Fractional Delay, Frequency Estimation Applications.

EDUCATION

Doctorate of Philosophy, Georgia Institute of Technology, USA — *May 2004*
Electrical and Computer Engineering
Thesis: Minimum Distortion Data Hiding For Compressed Images
Advisor: Prof. Nikil S. Jayant

Master of Science, Bilkent University, Turkey — *July 1998*
Electrical and Electronics Engineering
Thesis: Discrete Fractional Fourier Transform
Advisor: Prof. Haldun M. Ozaktas

Bachelor of Science, Middle East Technical University (METU), Turkey — *June 1996*
Electrical and Electronics Engineering

PROFESSIONAL EXPERIENCE

Professor — *September 2015 - Present*
Middle East Technical University — *Ankara, Turkey*

Associate Professor — *May 2010 - September 2015*
Middle East Technical University — *Ankara, Turkey*

Assistant Professor — *September 2004 - May 2010*
Middle East Technical University — *Ankara, Turkey*

Research Assistant — *May 1999 - January 2004*
Georgia Institute of Technology — *Atlanta GA,USA*

Teaching Assistant — *September 1996 - July 1998*
Bilkent University — *Ankara, Turkey*

TEACHING EXPERIENCE

Undergraduate Courses: Circuit Theory (EE 201, EE 202), Introduction to Probability (EE 230), Signals and Systems (EE 301, EE 306), Digital Electronics (EE 312)

Graduate Courses: Introduction to Statistical Signal Processing (EE 503), Adaptive Filtering (EE 504), Random Processes (EE 531), Spectrum Estimation (EE 603)

JOURNAL PUBLICATIONS

[1] **C. Candan** "Chebyshev Center Computation on Probability Simplex with α-divergence Measure," *IEEE Signal Processing Lett.*, vol. 27, p. 1515-1519, 2020.

[2] C. U. Ungan, **C. Candan**, T. Ciloglu, "A Space-Time Coded Mills Cross MIMO Architecture to Improve DOA Estimation and Its Performance Evaluation by Field Experiments," *IEEE Trans. Aerospace and Electronic Systems*, vol.56, no.3, p. 1807-1818, June 2020.

[3] Ö. Çayır, **C. Candan**, "Transmit beamformer design with a PAPR constraint to trade-off between beampattern shape and power efficiency," *Elsevier Digital Signal Processing*, vol.99, article. 102674, April 2020.

[4] **C. Candan**, "Making linear prediction perform like maximum likelihood in Gaussian autoregressive model parameter estimation," *Elsevier Signal Processing*, vol.166, article. 107256, Jan. 2020.

[5] Ö. Çayır, **C. Candan**, "Performance Improvement of Time-Balance Radar Schedulers Through Decision Policies," *IEEE Trans. Aerospace and Electronic Systems*, vol.54, no.4, p. 1679-1691, Aug. 2018.

[6] O. Coşkun, **C. Candan**, "Design of Maisel sidelobe blankers with a guarantee on the gap to optimality," *IET Radar, Sonar & Navigation*, vol. 10, no.9, p. 1619-1626, Dec. 2016.

[7] M. Ispir, **C. Candan**, "On the design of staggered moving target indicator filters," *IET Radar, Sonar & Navigation*, vol. 10, no.1, p. 205-215, Jan. 2016.

[8] **C. Candan**, "Fine resolution frequency estimation from three DFT samples: Case of windowed data," *Elsevier Signal Processing*, vol. 114, p. 245-250, Sept. 2015.

[9] **C. Candan**, S. Koç, "Direction finding accuracy of sequential lobing under target amplitude fluctuations," *IET Radar, Sonar & Navigation*, vol. 9, no.1, p. 92-103, Jan. 2015.

[10] U. Orguner, **C. Candan**, "A Fine-Resolution Frequency Estimator Using an Arbitrary Number of DFT Coefficients," *Elsevier Signal Processing*, vol. 105, p. 17-21, Dec. 2014.

[11] **C. Candan**, H. Inan "A unified framework for derivation and implementation of SavitzkyGolay filters," *Elsevier Signal Processing*, vol. 104, p. 203-211, Nov. 2014.

[12] **C. Candan** "Analysis and Further Improvement of Fine Resolution Frequency Estimation Method From Three DFT Samples," *IEEE Signal Processing Lett.*, vol. 20, no.9, p.913-916, Sept. 2013.

[13] **C. Candan** "An Upper Bound on the Capacity Loss Due to Imprecise Channel State Information for General Memoryless Fading Channels," *IEEE Communications Letters*, vol.17, no.7, p.1348-1351, July 2013.

[14] **C. Candan**, U. Orguner, "The moment function for the ratio of correlated generalized gamma variables," *Statistics & Probability Letters*, vol. 83, issue 10, p. 2353-2356, Oct. 2013.

[15] **C. Candan** "Capacity of Zero-Outage Scheme Under Imprecise Channel State Information," *IEEE Communications Letters*, vol. 17, issue 1, p. 127-130, Jan. 2013.

[16] **C. Candan** "A Low Complexity Two-Stage Target Detection Scheme for Resource Limited Radar Systems," *IEEE Trans. Aerospace and Electronics Systems*, vol. 49, Issue 1, p. 594-601, Jan. 2013.

[17] **C. Candan**, Y.B. Erol, "Conjugate directions based order recursive implementation of post-Doppler adaptive target detectors," *IET Radar, Sonar and Navigation*, vol.6, no.7, p. 577-586, August 2012.

[18] B. Gurakan, **C. Candan**, T. Ciloglu, "CFAR processing with switching exponential smoothers for nonhomogeneous environments," *Elsevier Digital Signal Processing*, vol. 22, No.3, p.407-416, May 2012.

[19] **C. Candan**, "An Accurate and Efficient Two-Stage Channel Estimation Method Utilizing Training Sequences with Closed Form Expressions," *IEEE Transactions on Communications*, vol. 59, No. 12, p.3259-3264, Dec. 2011.

[20] **C. Candan**, "Digital Wideband Integrators with Matching Phase and Arbitrarily Accurate Magnitude Response," *IEEE Trans. Circuits and Systems II*, vol. 58, No. 9, p. 610-614, Sept. 2011.

[21] **C. Candan**, "A Method For Fine Resolution Frequency Estimation From Three DFT Samples," *IEEE Signal Processing Letters*, vol. 18, No.6, p. 351-354, June 2011.

[22] A. Coskun, **C. Candan**, "Transmit Precoding for Flat Fading MIMO Multiuser Systems with Maximum Ratio Combining Receivers," *IEEE Trans. Vehicular Technology*, Volume 60, Issue 2, p. 710-716, 2011.

[23] Y. Soydan, **C. Candan**, "A Feedback Quantization Scheme Leveraging Fairness and Throughput for Heterogeneous Multi-User Diversity Systems," *IEEE Trans. Vehicular Technology*, Volume 59, Issue 5, p. 2610-2614, 2010.

[24] **C. Candan**, A.O. Yilmaz, "Efficient Methods of Clutter Suppression for Coexisting Land and Weather Clutter Systems," *IEEE Trans. Aerospace and Electronics Systems*, Volume 45, Issue 4, p. 1641-1650, 2009.

[25] A. Koc, H.M. Ozaktas, **C. Candan**, M.A. Kutay, "Digital Computation of Linear Canonical Transforms," *IEEE Transactions on Signal Processing*, vol.56, no.6, p. 2383-2394, June 2008.

[26] **C. Candan**, "On Higher Order Approximations for Hermite - Gaussian Functions And Discrete Fractional Fourier Transforms", *IEEE Signal Processing Letters*, Volume 14, Issue 10, p. 699 - 702, October 2007.

[27] **C. Candan**, "An Efficient Filtering Structure For Lagrange Interpolation," *IEEE Signal Processing Letters*, vol. 14, No.1, p. 17-19, Jan. 2007.

[28] **C. Candan**, "Derivation of Length Extension Formulas For Complementary Sets of Sequences Using Orthogonal Filterbanks," *Electronics Letters*, Volume 42, Issue 24, p. 1427-1428, 2006.

[29] **C. Candan**, H.M. Ozaktas, "Sampling and series expansion theorems for fractional Fourier and other transforms," *Elsevier Signal Processing*, vol. 83, p. 2455-2457, 2003.

[30] L. Barker, **C. Candan**, T. Hakioglu, M.A. Kutay and H.M. Ozaktas, "The harmonic oscillator, Harper's equation, and the discrete fractional Fourier transform," *Journal of Physics A: Mathematical*, Vol:33, p. 2209-2222, March 2000.

[31] **C. Candan**, M. A. Kutay and H. M.Ozaktas, "The discrete fractional Fourier Transform," *IEEE Trans. On Signal Processing*, Vol:48, p. 1329-1337, May 2000.

[32] M.A. Kutay, M.F. Erden, H.M. Ozaktas, O.Arikan, O. Guleryuz and **C. Candan**, "Space-bandwidth efficient realizations of linear systems," *Optics Letters*, 23: 1069-1071, 1998.

CONFERENCE PUBLICATIONS

[1] E. Mehmetcik, **C. Candan**, "Prediction and representation of array performance under sensor failure," UDT 2019.

[2] G. Gurer, S. Koc, **C. Candan**, U. Orguner, "Slow Moving Target Detection for Airborne Radar Systems by Dynamic Programming on SAR Images ," IEEE Radar Conference 2019.

[3] D. Dinler, **C. Candan**, S. Koc, "A study on the performance of a complementary auxiliary antenna pattern for Maisel sidelobe blanker," IEEE Radar Conference 2018.

[4] G. Güvensen, **C. Candan**, "On the impact of fast-time and slow-time preprocessing operations on adaptive target detectors," IEEE Radar Conference 2018.

[5] M.O. Padar, A.E. Ertan, **C. Candan**, "Classification of human motion using radar micro-Doppler signatures with hidden Markov models," IEEE Radar Conference 2016.

[6] G. Güvensen, **C. Candan**, S. Koç, U. Orguner, "On Generalized Eigenvector Space For Target Detection in Reduced Dimensions," IEEE Radar Conference 2015.

[7] O.T. Alemdaroglu, **C. Candan**, S. Koç, "The radar application of micro Doppler features from human motions," IEEE Radar Conference 2015.

[8] **C. Candan**, A.O. Yilmaz, E.S. Ata "Effect of Carrier Frequency Estimation Error On Clutter Filtering For Magnetron Based Coherent Systems," ERAD 2014.

[9] O. Coşkun, **C. Candan**, "On the Optimality of Maisel Sidelobe Blanking Structure," IEEE Radar Conference 2014.

[10] M. Ispir, **C. Candan**, "Least Square and Min-Max Design of MTI Filters With Nonuniform Interpulse Periods," IEEE Radar Conference 2013.

[11] **C. Candan**, S. Koc, "Beamspace Approach for Detection of the Number of Coherent Sources," IEEE Radar Conference 2012.

[12] **C. Candan**, "On The Design of Mismatched Filters With An Adjustable Matched Filtering Loss," IEEE Radar Conference 2010.

[13] **C. Candan**, "On the Optimality of Detectors Defined Over The Ambiguity Plane," IEEE Radar Conference 2009.

[14] **C. Candan**, A.O. Yilmaz, "Efficient Methods of Doppler Processing for Coexisting Land and Weather Clutter," IEEE Radar Conference 2008.

[15] **C. Candan**, "On the Implementation of Optimal Receivers for LFM Signals Using Fractional Fourier Transform" IEEE Radar Conference 2008.

[16] **C. Candan**, "A Transcoding Robust Data Hiding Method for Image Communication Applications," IEEE ICIP 2005.

[17] **C. Candan**, N. Jayant, "A Minimal Distortion Data Hiding Method for Compressed Images," IEEE MMSP (Multimedia Signal Proc. Workshop) 2002.

[18] **C. Candan**, "A Multiple Description Coding Scheme based on the Chinese Remainder Theorem," IEEE ICASSP 2002.

[19] **C. Candan**, N. Jayant, "A new interpretation of data hiding capacity", IEEE ICASSP 2001.

[20] **C. Candan**, M.A. Kutay and H.M. Ozaktas, "The discrete fractional Fourier transform," IEEE ICASSP 1999.

OTHER PUBLICATIONS

- **Book Chapter:** H.M. Ozaktas, M.A. Kutay, **C. Candan**, "Chapter 14: Fractional Fourier Transform" in Transforms and Applications Handbook 3rd Edition, Edited by: Alexander D. Poularikas, 2010.
- **IEEE SPM Column: C. Candan**, "Properly Handling Complex Differentiation in Optimization and Approximation Problems," *IEEE Signal Processing Magazine*, Lecture Notes Column, vol. 36, Issue 2, p. 117-124, March 2019.

- **IEEE SPM Column: C. Candan**, "On the Eigenstructure of DFT Matrices," *IEEE Signal Processing Magazine*, DSP Education Column, vol. 28, Issue 2, p. 105-108, March 2011.

AWARDS

- 2015 TÜBİTAK Teşvik Ödülü (TUBITAK Incentive Award)

PROFESSIONAL INVOLVEMENT

- Senior Member of IEEE
- Reviewer of Journals
  - IEEE Transactions of Signal Processing
  - IEEE Signal Processing Letters
  - IEEE Transactions on Vehicular Communications
  - IEEE Transactions of Aerospace and Electronic Systems
  - IEEE Transactions on Circuits and Systems II
  - Elsevier Signal Processing

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