

ASHKAN ASHRAFI

CONTACT INFORMATION

Department of Electrical & Computer Engineering
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PERSONAL DATA

- Married, Permanent Resident of the United State.

RESEARCH INTERESTS

- My research interests include digital signal processing systems and their VLSI implementations such as direct digital frequency synthesizers, digital filters, orthogonal signal generation for wireless and ultra-wide band communications, statistical signal processing and multi-tapper spectral estimation. I am also conducting research on variable-structure control systems such as continuous and discrete-time sliding mode control.

EDUCATION

- **The University of Alabama in Huntsville** *Huntsville, AL*
Ph.D. in Electrical Engineering *May 2006*
Dissertation: "A Quasi-Linear Interpolation Method to Develop a Direct Digital Frequency Synthesizer with VLSI Implementation." Advisor: Professor Reza Adhami
- **The University of Alabama in Huntsville** *Huntsville, AL*
M.S. in Electrical Engineering *May 2004*
Thesis: "Mapping From Phase to Sine Amplitude in Direct Digital Frequency Synthesizers Utilizing Chebyshev Polynomial Interpolation". Advisor: Professor Reza Adhami
- **K.N.Toosi University of Technology** *Tehran, Iran*
M.Sc. in Electrical Engineering. *June 1995*
Thesis: "Design and Construction of Precision Capacitive Sensors". Advisor: Professor Hossein Golnabi
- **K.N. Toosi University of Technology** *Tehran, Iran*
B.Sc. in Electrical Engineering. *January 1992*
Graduated as the best (#1) student (in a class of ~150).

PROFESSIONAL EXPERIENCE

- **ECE Department, San Diego State University** *San Diego, CA*
Assistant Professor *August 2007 – Present*
- **The University of Alabama in Huntsville** *Huntsville, AL*

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|---|--|--|
| | <i>Visiting Assistant Professor</i> | <i>August 2006 – May 2007</i> |
| ➤ | The University of Alabama in Huntsville
<i>Graduate Teaching Assistant</i> | <i>Huntsville, AL</i>
<i>August 2001 – May 2006</i> |
| ➤ | Azad University, Tehran Central Branch
<i>Faculty Member and Vice Chairman</i> | <i>Tehran, Iran</i>
<i>September 1997 – August 2001</i> |
| ➤ | Niroo Research Institute (NRI)
<i>Senior Design Engineer (Part Time)</i> | <i>Tehran, Iran</i>
<i>December 2000 – August 2001</i> |
| ➤ | Modje Niroo Co.
<i>Senior Design Engineer and Project Manager</i> | <i>Tehran, Iran</i>
<i>September 1999 – August 2001</i> |
| ➤ | Matn Niroo Co.
<i>Design Engineer</i> | <i>Tehran, Iran</i>
<i>July 1995 – September 1997</i> |
| ➤ | Institute of Water and Energy, Sharif University of Technology
<i>Research Associate (Part Time)</i> | <i>Tehran, Iran</i>
<i>March 1992 – July 1995</i> |

HONORS AND DISTINCTIONS

- The 2005 Iliana Martin Chittur Outstanding Graduate Student Award, University of Alabama in Huntsville.
- College of Engineering 2005 National Engineer's Week, Outstanding Graduate Student Award, Department of ECE, University of Alabama in Huntsville.
- Listed in Marquis Who's Who in America (60th Edition 2006, and 61st Edition 2007).
- Listed in Marquis Who's Who in Science and Engineering (9th Edition 2007)
- Listed in Marquis Who's Who of Emerging Leaders (1st Edition Dec. 2006)
- School of Graduate Studies Dean's List, Academic Year 2002-04, University of Alabama in Huntsville.
- The 1995 Best (#1) Graduate Student Award, Department of Electrical Engineering, K.N.T. University of Technology.
- The 1992 Best (#1) Undergraduate Student Award, Department of Electrical Engineering, K.N.T. University of Technology.
- Member of Phi-Kappa-Phi. Honor Society.
- Member of Eta-Kappa-Nu. Honor Society.

TEACHING AND ADVISING EXPERIENCE

- **ECE Department, San Diego State University** *August 2007 – Present*
 - Undergraduate classes taught:
 - * *EE-330L (Engineering Electronics Laboratory), Fall 2009*
 - * *EE-410 (Signals and Systems), Fall 2007, Spring 2008, Fall 2009*
 - * *EE-556 (Digital Signal Processing), Fall 2007, Spring & Fall 2008, Spring & Fall 2009*
 - Graduate courses taught:
 - * *EE-658 (Advanced Digital Signal Processing), Spring 2009*
 - Research Supervision:
 - * *M.S. Graduates:*
 1. Sudheep Thota, Graduated in 2008 (He is currently with Qualcomm Co., San Diego CA)
Thesis: "A Novel Pre-Truncated Fixed-Width Digital Squarer"

2. Vishal R. Jain, Graduated in 2009 (He is currently the Assistant Director (Technical), Jaisu Shipping Company Pvt. Ltd., India)
Thesis: "Zinc-Based Orthogonal Signals for Ultra-Wide Band Pulse Generation"

- **University of Alabama in Huntsville** *August 2001 – May 2007*
 - Undergraduate classes taught:
 - * *EE-382, Analytical Methods for Continuous Time Systems, Spring 2007*
 - * *EE-383, Analytical Methods for Multivariable and Discrete Time Systems, Spring 2005, Summer 2005, Spring 2006, Summer 2006, Fall 2006*
 - * *EE-414, Analog and Digital Filter Design, Fall 2005*
 - * *EE-384, Digital Signal Processing Lab, Spring 2002-Fall 2004*

- **Azad University, Tehran Central Branch** *August 2001 – May 2007*
 - Undergraduate classes taught
 - * *Electronic Circuits III, Spring & Fall 1999, Spring & Fall 2000, Spring 2001*
 - * *Electronic Circuits II, Spring 1998, Fall 1998*
 - * *Electronic Circuits I, Fall 1997*
 - * *Electronic Circuits I Lab. Fall 1997-Spring 2001*
 - * *Electronic Circuits II Lab. Fall 1997-Spring 2001*
 - * *Electronic Circuits III Lab. Fall 1997-Spring 2001*

PUBLICATIONS

➤ **Peer Reviewed Journal Papers:**

- J11. **Ashkan Ashrafi**, Reza Adhami and Aleksandar Milenković, "Direct Digital Frequency Synthesizers Based on the Quasi-Linear Interpolation Method", *IEEE Trans. on Circuits and Systems Part-I, Regular Papers*, (To appear).
- J10. **Ashkan Ashrafi** and Reza Adhami, "Theoretical Upperbound of the Spurious Free Dynamic Range in Direct Digital Frequency Synthesizers Realized by Polynomial Interpolation Methods", *IEEE Trans. on Circuits and Systems Part-I, Regular Papers*, Vol. 54, No. 10, pp. 2252-2261, Oct. 2007.
- J9. Peter Meenen, **Ashkan Ashrafi**, and Reza Adhami, "The Utilization of a Taylor Series-Based Transformation in Fingerprint Verification," *Pattern Recognition Letters*, Vol. 27, No.14, pp. 1606-1618, October 2006.
- J8. **Ashkan Ashrafi** and Reza Adhami, "Comments on 'A 13-Bits Resolution ROM-Less Direct Digital Frequency Synthesizer Based on a Trigonometric Quadruple Angle Formula'," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, Vol.13, No.9, pp. 1096-1098, Sept. 2005.
- J7. **Ashkan Ashrafi** and Peter M. Gibson "Eigenvalues of Hadamard powers of large symmetric Pascal matrices", *Linear Algebra and its Applications*, Vol. 405, pp. 60-66, August 2005.
- J6. **Ashkan Ashrafi** and Peter M. Gibson "An involutory Pascal matrix", *Linear Algebra and its Applications*, Vol 387, pp. 277-286, August 2004.
- J5. **Ashkan Ashrafi**, Reza Adhami, Laurie Joiner and Parisa Kaveh, "Arbitrary Waveform DDFS Utilizing Chebyshev Polynomials Interpolation", *IEEE Transactions on Circuits and Systems Part-I, Regular Papers*, Vol 51, No.8, pp. 1468-1476, August 2004.
- J4. **Ashkan Ashrafi** and Hossein Golnabi, "A High Precision Method for Measuring Very Small Capacitance Changes", *Rev. of Sci. Instrum.*, Vol. 70 (8), pp. 3483-87, August 1999.
- J3. H. Golnabi and **A. Ashrafi**, "Phase Shift Generation and Monitoring by a Simple Circuit", *Rev. of Sci. Instrum.*, Vol. 76 (5), pp. 2017-2019, 1996.
- J2. H. Golnabi and **A. Ashrafi**, "Producing 180° out of Phase Signals from an Input Sinusoidal Waveform", *IEEE Transactions on Instrum. and Meas.*, Vol. 45, No.1, pp. 312-314, Feb. 1996.
- J1. H. Golnabi and **A. Ashrafi**, "Theoretical Studies of Electrical Characteristics of the Nitrogen Laser", *Journal of Engineering, IR Iran*, Vol.7, No.3, pp. 143-153, August 1994.

➤ **Peer Reviewed Conference Papers:**

- C14. Ujjal Bhowmik, **A. Ashrafi**, and Reza Adhami “A Fingerprint Verification Algorithm Using the Smallest Minimum Sum of Closest Euclidean Distance”, *Proc. of the 19th International Conference on Electronics, Communications and Computers, CONIELECOMP 2009*, pp. 90-95, May 2009.
- C13. **A. Ashrafi**, and Sudheep Thota, “A Novel Pre-Truncated Fixed-Width Digital Squarer”, *Proc. of the IEEE 2008 Midwest Symposium on Circuits and Systems MWSCAS-2008*, pp. 959-961, August 2008.
- C12. **A. Ashrafi**, A. Milenkovic and R. Adhami, “A 1GHz Direct Digital Frequency Synthesizer Based on the Quasi-Linear Interpolation Method”, *Proc. of the IEEE International Symposium on Circuits and Systems ISCAS-2007*, May 2007.
- C11. **A. Ashrafi** and R. Adhami, “An Optimized Direct Digital Frequency Synthesizer Based on Even Fourth Order Polynomial Interpolation,” *Proc. of the IEEE 38th Southeastern Symposium on System Theory*, pp. 109-113, March 2006.
- C10. **A. Ashrafi** and R. Adhami, “A Direct Digital Frequency Synthesizer Utilizing Quasi-Linear Interpolation Method,” *Proc. of the IEEE 37th Southeastern Symposium on System Theory*, pp. 144-148, March 2005.
- C9. P. Kaveh, **A. Ashrafi** and Y. Shtessel, “Robust Sliding Mode Harmonic Oscillator Suitable for Low Frequencies,” *Proc. of the IEEE 37th Southeastern Symposium on System Theory*, pp. 249-252, March 2005.
- C8. P. Kaveh, **A. Ashrafi**, Y. Shtessel, “Integral and Second Order Sliding Mode Control of Harmonic Oscillator”, *Proc. of the 44th IEEE Conference on Decision and Control and European Control Conference (CDC-ECC’05)*, pp. 3941 – 3946, December 2005.
- C7. P. Kaveh, **A. Ashrafi** and Y. Shtessel, “Robust Harmonic Oscillator Control via Integral and High Order Sliding Modes”, *Proc. of the 8th International Workshop on Variable Structure Systems (VSS’04)*.
- C6. **Ashkan Ashrafi**, Zexin Pan, Reza Adhami and B. Earl Wells, “A Novel ROM-less DDFS Based on Chebyshev Polynomial Interpolation”, *Proc. of IEEE 36th Southeastern Symposium on System Theory*, pp. 393-397, March 2004.
- C5. **Ashkan Ashrafi**, Reza Adhami and Paul Cox, “A Simple Wide-Band Frequency Independent Quadrature Phase Shifter”, *Proc. of IEEE 34th Southeastern Symposium on System Theory*, March 2002.
- C4. Hossein Golnabi, **A. Ashrafi** and Habib. Golnabi, "Fiber Optic Sensing of Displacement and Pressure", *Proceedings of the 6th International Conference on Flexible Automation and Intelligent Manufacturing (FAIM'96)*, Begell House, New York, pp. 149-158, 1996.
- C3. H. Golnabi and **A. Ashrafi**, "Design and Construction of a Reliable Fiber Optic Sensor", *Proc. of the 5th International Conference on Flexible Automation and Intelligent Manufacturing (FAIM'95)*, Begell House, New York, pp. 910-917, 1995.
- C2. H. Golnabi and **A. Ashrafi**, "Theoretical and Experimental Investigation of a Computer-Controlled Angle Tuning System", *Proc. of the 4th International Conference on Flexible Automation and Integrated Manufacturing (FAIM'94)*, Begell House, New York, pp. 834-843, 1994.
- C1. H. Golnabi and **A. Ashrafi**, "The Role of Sensor Systems in Automated Manufacturing", *Proc. of the 4th International Conference on Flexible Automation and Integrated Manufacturing (FAIM'94)*, Begell House, New York, pp. 646-654, 1994.

➤ **Patent applications:**

- P2. **Ashkan Ashrafi** and Reza Adhami, “Direct Digital Frequency Synthesizer with Phase Selectable Interpolator” *United States Patent Application 20080298527*.
- P1. **Ashkan Ashrafi**, “Haar-Based Orthogonal Signals with Rectangular Power Spectral Density”, *Provisional application submitted USPO*.

PROFESSIONAL ACTIVITIES/SERVICES

- **Senior Member IEEE.**
- **Served as a Reviewer for Journals/Publishers:**

- * IEEE Transactions on Circuits and Systems Part-I, Regular Papers.
- * IEEE Transactions on Automatic Control.
- * IEEE Transactions on Industrial Electronics.
- * IEEE Transactions on Ultrasonic Ferroelectric and Frequency Control.
- * IEEE Transactions on Information Technology in BioMedicine.
- * IEEE Signal Processing Letters.
- * IEEE International Symposium on Circuits and Systems (ISCAS2009).
- * Journal of Control Science and Engineering.
- * Electronics and Telecommunications Research Institute (ETRI) Journal.
- * Microelectronics Journal (Elsevier).
- * Optics and Lasers in Engineering (Elsevier).
- * Iranian Journal of Electrical and Computer Engineering.
- * Oxford University Press.
- * Cengage Learning Pub.
- * John Wiley and Sons.

GRANTS

- “Study of an Orthogonal Function Set with Rectangular Power Spectral Density”,
 Funding Agency: San Diego State University Grant Program
 Role: PI
 Status: Funded, \$8092 from
 Duration: Jan. 2008 to June 2009