Ali Reza Ahmadi

Curriculum Vita

Education:

Ph.D.   Doctor of Philosophy in Mechanical Engineering - GPA : 4.0/4.0 - Graduated with honors
             University of Kansas, Lawrence KS. **May. 2003**

  Dissertation: *Investigation of Galerkin and Least Squares Finite Element Processes in Higher Order Spaces*
     Advisor: K.S. Susanna

D.E.   Doctor of Engineering in Civil Engineering - GPA : 3.7/4.0
             University of Kansas, Lawrence KS. **May 1988**

  Dissertation: *A Correlation Study of X-29 Aircraft and Associated Analytical Developments*
     Advisor: K.K. Gupta (NASA – DFRC)

M.S.   Master of Science in Civil Engineering - GPA : 3.1/4.0
             University of California Irvine, Irvine Ca. **May 1982**

  Project: *Nonlinear Dynamic Analysis of Shear Buildings*

B.S.   Bachelor of Science in Civil Engineering - GPA : 3.8/4.0
             U.S. International University, SanDiego Ca. **May 1980**

Professional Organizations:
        Iranian Mathematical Society (1995)
        Honor Society of Phi Kappa Phi (2002)

Areas of Specialization and Interest:
        Computational Mechanics & Computational Mathematics
        Numerical methods
        Finite Element Methods & Finite Element Modeling
        Computational Photonics
        Linear/Nonlinear Solid Mechanics, Micro-plates
        Linear/Nonlinear Dynamics and Vibrations
        Magneto-Hydro-Dynamics
        Scientific Software Development

Professional Experience:
March 1981 - May 1990
     Research Engineer at Harvey Mudd College and Eloret Institute funded through NASA under supervision of Dr. K.K. Gupta at NASA-DFRC, Edwards California.

          The main body of this work was the development of STARS (*STructures, Aerodynamics, and Related Systems*) general-purpose computer package.
  In Particular:
          Development and implementation of spinning shell finite elements.
          Development of Finite Dynamic Elements. (***Pub. p1, c1***)

Modification and implementation of a Block Lanczos program to solve the linearized and quadratic eigenvalue problems. (*Pub. p2, c1*)

Implementation of triangular and quadrilateral shell finite elements. (*Pub. c2*)

Implementation of STARS on Cray Super-Computer at NASA-Dryden.

Implementation of the aerodynamic analysis software system (FASTEX) into the STARS package.

Development and implementation of graphics-oriented pre- & post-processor system into STARS package.

Aerodynamic and structural dynamic analyses of X-29 Aircraft. (*D.E. Dissertation, NASA internal publication*)

August 1990 - December 1994

Assistant Professor of Civil Engineering at University of Kerman, Iran.

Taught the following courses:

Undergraduate: Statics, Mechanics of Materials, Computer Methods in Civil Engineering, Mechanical Vibrations (service to Dept. of Mechanical Engineering), Engineering Economy

Graduate: Advanced Strength of Materials, Structural Dynamics, Finite Element Method, Boundary Element Method, Numerical Methods in Linear Algebra (service to Dept. of Mathematics)

Research and other activities:

Served as acting-chair for one year 1993-94

Collaborative Research (*Pub. c3, c4, c6, c7*)

Mathematics Textbook (*Pub. b1*)

May 1995 - May 2005

Research Associate in Mechanical Engineering at University of Kansas

Study of computational methods in heat transfer through composite materials. (*Pub. c8*)

Investigation of free edge effects observed while computationally one studies the stress fields in composite materials subjected to mechanical loads. (*Pub. c11, c12*)

Study of finite element computational methods as applied to solution of gas-dynamics equations, in context with higher continuity approximation spaces. (*Pub. c13, c14*)

Development and application of *k*-version finite element methodology as a general computational framework for solution of boundary value and initial value problems. (*Pub. p3-p7, c15, c16*)

January 1996 – June 2008

Independent technical consultant to Diamant Boart, Inc. Olathe, KS

Some of the major projects were:

Computational research on application of viscoelastic materials to grinding & grooving systems used in building and road construction industries with the objective of reducing unwanted vibrations so as to increase the components' life expectancy.

Vibration analysis on hand-held and side-mount drums groovers with the objective to design and implement damping mechanisms. (*Pub. c9*)

Analysis and design of polyurethane spacers for groover-head on a PGM-3600 machine.

Diagnostic analysis on GC-90 heavy grinding machine's vibrations and recommendations on reducing the unwanted vibrations.

Vibration isolation studies to reduce engine induced vibrations on CG65-groover. (*Pub. c10*)

May 2009 – May 2011

Researcher at International Center for Science, High Technology & Environmental Sciences, Kerman Iran

May 2011 – present

Faculty of mechanical engineering at Graduate University of Advanced Technology, Kerman Iran

Journal Publications:

- Ahmadi,A.R. (1991) *Finite Dynamic Element Method Applied to Higher-Order Plane Element* Int. J. of Eng., Iran University of Science and Technology 2, Nos 1a and 2a, pp.1-10

- Gupta,K.K., Lawson,C.L., & Ahmadi,A.R. (1992) *On Development of a Finite Dynamic Element and Solution of Associated Eigenproblem by a Block Lanczos Procedure* Int. J. of Numerical Methods in Engineering, 33, pp.1611-23

- Surana,K.S., Petti,S.R., Ahmadi,A.R., Reddy,J.N. (2002) *On p-version Hierarchical Interpolation Functions for Higher Order Continuity Finite Element Models,* Int. J. of Computational Engineering Science, Vol.3, No.1

- Surana,K.S., Ahmadi,A.R., Reddy,J.N. (2002) *The k-version of Finite Element Method for Self-Adjoint Operators in BVP,* Int. J. of Computational Engineering Science, Vol.3, No.2 155-218

- Surana,K.S., Ahmadi,A.R., Reddy,J.N. (2003) *The k-version of Finite Element Method for Non-Self-Adjoint Operators in BVP,* Int. J. of Computational Engineering Science, Vol.3, No.4 737-812

- Surana,K.S., Ahmadi,A.R., Reddy,J.N. (2004) *The k-version of Finite Element Method for Nonlinear Operators in BVP,* Int. J. of Computational Engineering Science, Vol.5, No.1 133-207

- Ahmadi,A.R., Surana,K.S., Maduri,R.K., Romkes,A., Reddy,J.N. (2009) *Higher Order Gloal Differentiability Local Approximations for 2-D Distorted Quadrilateral Elements,* Int. J. for Computational Methods in Engineering, Vol.10, No.1 1-19

- Rahgozar,R. Ahmadi,A.R. Sharifi,Y. (2010) *A Simple Mathematical Model for Approximate Analysis of Tall Buildings,* Applied Mathematical Modeling, 34, 2437-2451.

- Ahmadi,A.R. (2010) *SyNA - a general purpose finite element software system,* Computational Research Center at Graduate University of Advanced Technology.

- Ahmadi,A.R. Farahmand,H. Arabnejad,S. (2011) *Static Deflection Analysis of Flexural Simply Supported Sectorial Micro-plate using p-version Finite Element Method,* Journal for Multiscale Computational Engineering, 9 (2): 193-200.

- Rahgozar,R. Ahmadi,A.R. Hosseini,O. Malekinejad,M. (2011) *A simple mathematical model for static analysis of tall buildings with two outrigger-belt truss system,* Structural Engineering and Mechanics 40(1) 65-84.

- Frahmand,H. Ahmadi,A.R. Arabnejad,S. (2011) *Thermal buckling analysis of rectangular micro plates using higher continuity p-version finite element method,* Thin-walled structures 49, 1584-1591.

- Ahmadi,A.R. Farahmand,H. Arabnejad,S. (2012) *Buckling analysis of rectangular flexural Micro-plate using Higher Continuity p-version Finite Element Method,* Int. Journal for Multiscale Computational Engineering, 10 (3) 249-259.

- Ahmadi,A.R. Farahmand,H. (2012) *Static deflection analysis of flexural rectangular microplate using higher continuity finite element method,* Mechanics & Industry DOI:10.105/meca/2012019.

- Farahmand,H. Ahmadi,A.R. Arabnejad,S. (2013) *A novel application of higher continuity finite element in vibration analysis of micro-plates,* International Journal of Structural Stability and Dynamics, 13(4) DOI: 10.1142/ S0219455412500800.

- Shahrokhabadi,S.H. Ahmadi,A.R. (2013) *Method of Fundamental Solution (MFS) coupled with Particle Swarm Optimization (PSO) to determine optimal phreatic line in unconfined seepage problem,* Scientia Iranica. Transaction A, Civil Engineering, 20(5) 1327.

- Rahgozar,R. Ahmadi,A.R. Ghelichi,M. Goudarzi,Y. Rahgozar,P. (2014) *Parametric stress distribution and displacement functions for tall buildings under lateral loads,* The Structural Design of Tall and Special Buildings 23, 22-41   DOI:10.1002/tal.1016.

- Ahmadi,A.R. (2015) *Free vibration analysis of annular flexural micro-plates using C2 quadrilateral finite elements*, International Journal for Multiscale Computational Engineering, 13(4) 311-319.

- Dehghanifard,Z. Ahmadi,A.R. Ganjoi,A.R. Bolorizadeh,M.A. (2015) *Space-Time Coupled Finite Element Simulation of PECVD Reactor*, International Journal of Applied Computational Mathematics, DOI: 10.1007/s40819-015-0061-7.

- Mohammadi,H. Ebrahimi,M.A. Jalalifar,H. Ahmadi,A.R. (2015) *A Geometric Computational Model for Calculation of Longwall Face Effects on Gate Roadways*, Rock Mechanics and Rock Engineering, DOI: 10.1007/s00603-015-0739-5.

- Shahsavari,S. Ganjovi,A.R. Ahmadi,A.R. Shojaei,F. (2016) *A Numerical Study of Sour Gas Reforming in a Dielectric Barrier Discharge Reactor*, Iranian Journal of Oil & Gas Science and Technology, 5(4) 36-52.

- Bagheri,M. Alizadeh,M. Ahmadi,A.R. (2017) *A Study on Hot Tearing Behavior of Al-1 Wt Pct Cu Alloy Under Various Strain Rates During Casting Process*, The Minerals, Metals & Material Society and ASM International, DOI: 10.1007/s11661-017-3993-1.

- Abodolzadeh,M. Sadeqkhani,M. Ahmadi,A.R. (2017) *Computational Modeling of a BIPV/T ethylene tetrafluoroethylene (ETFE) Cushion Structure Roof*, Energy, 133 998-1012, http://dx.doi.org/10.1016/j.energy.2017.05.144

- Hoseinian,M.S Ahmadi,A.R. Alvanforoush,M. Zakerifar,A.A. Bolorizadeh,M.A. (2017) *Galerkin Finite-Elements Method for the Analysis of Second Harmonic Generation in Wagon Wheel Fibers*, International Journal of Optics and Photonics(IJOP), 11(2) 113-122, DOI: 10.18869/acadpub.ijop.11.2.113

Conferences:

- Ahmadi,A.R. (1992) *Software Development for the Solution of Quadratic Eigenvalue Problems* Regional Conference on Mathematics and Theoretical Physics Tabriz, Iran.

- Ahmadi,A.R. Javadpour,S.H. (1993) *Generation of a Finite Element Using Mathematica* 24th Annual Iranian Mathematics Conference.

- Ahmadi,A.R. (1993) *Development of a Higher-Order Plane Triangular Element Based on Finite Dynamic Element Method* International Congress on Computational Methods in Engineering Shiraz, Iran.

- Ahmadi,A.R. & Javadpour,S.H. (1995) *A Study of Non-Newtonian Fluid Flow Through a Wavy Channel using Finite Element Technique* Tribology Symposium of the 1995 Energy Technology Conference and Exhibition, ASME.

- Ahmadi,A.R. & Abdollahi,N. (1995) *Eigenvalue Analysis of the Coupled Solid-Fluid System using Finite Element Technique*, 26th Annual Iranian Mathematics Conference.

- Ahmadi,A.R. & Toufigh,M.M. (1996) *Least Squares Finite Element Formulation of the Nonlinear Seepage Problem*, 27th Annual Iranian Mathematics Conference.

- Javadpour,S.H. & Ahmadi,A.R. (1996) *Second Kind Integral Equation Formulation of Stoke's Flow Past a Particle with Piecewise Twice Differentiable Boundary with Corners*, Tribology Symposium of the 1996 Energy Technology Conference and Exhibition, ASME.

- Surana,K.S. & Ahmadi,A.R. (1996) *A Comparison of Galerkin and Least Squares Finite Element Methods for Nonlinear Heat Conduction in Laminated Composites*, Composite Materials, Design, and Analysis Symposium of the 1996 Energy Technology Conference and Exhibition, ASME.

- Ahmadi,A.R., Surana,K.S., Norland,R.S., Asmelash,Z. (1997) *Numerical Simulation of Damping Characteristics of Viscoelastic Materials in System Response Composite Materials*, Design, and Analysis Symposium of the 1997 Energy Technology Conference and Exhibition, ASME.

- Ahmadi,A.R. Surana,K.S. (1997) *Determination of Damping Properties in Laminated Composites via Numerical Simulation Composite Materials*, Design, and Analysis Symposium of the 1997 Energy Technology Conference and Exhibition, ASME.

- Surana,K.S., Ahmadi,A.R., Sorem,R.M. (1997) *Free Edge Effects in Laminated Composites and their Numerical Simulation Composite Materials,* Design, and Analysis Symposium of the 1997 Energy Technology Conference and Exhibition, ASME.

- Surana,K.S., Ahmadi,A.R., Ganne,E. (1998) *Numerical Simulation of Free Edge Effects in Laminated Composites using h- and p-Version Galerkin Finite Element Formulation,* Proceedings of the Symposium on Composite Material Design and Analysis, Energy Technology Conference and Exhibition, ASME.

- Surana,K.S. & Ahmadi,A.R. (2001) *Computations of Non-Weak Solutions in Gas Dynamics in Eulerian Frame of Reference,* Theoretical Framework, Computational Strategy and Numerical Studies, Energy Technology Conference and Exhibition, ASME.

- Surana,K.S. & Ahmadi,A.R. (2001) *Computations of Non-Weak Solutions in Gas Dynamics in Lagrangian Frame of Reference,* Theoretical Framework, Computational Strategy and Numerical Studies, Energy Technology Conference and Exhibition, ASME.

- Ahmadi,A.R., Surana,K.S., Reddy,J.N. (2006) *Higher Order Global Differentiability Approximations for 2D Distorted Element Geometries,* 7th World Congress on Computational Mechanics, LA Ca.

- Surana,K.S., Maduri,R. Reddy,J.N., Ahmadi,A.R., (2006) *Higher Order Global Differentiability Approximations for 3D Distorted Element Geometries,* 7th World Congress on Computational Mechanics, LA Ca.

- Ahmadi,A.R., Ghasemi,F., Sadrossadat,E., Ghasemi,A., (2011) *A Comparison of Sophisticated neural network and finite element method in estimating of variations in permeability of earth-dam body in leakage phenomenon,* 6th National Congress on Civil Engineering, Semnan University, Semnan, Iran.

- Hoseinian,M.S. Bolorizadeh,M.A. Ahmadi,A.R. (2016) *Fast and Accurate Detection of Cancer Cells Using a Versatile Three-Channel Plasmonic Sensor*, SPIE Nanoscience + Engineering, Number 9921-80, San Diego, 28 August - 1 September 2016.

Text Book:

- Javadpour,S.H. & Ahmadi,A.R. (1994) *An Introduction to Ordinary and Partial Differential Equations* Alavi's Publishing Co. Tehran

- Javadpour,S.H. & Ahmadi,A.R. (2001) *An Introduction to Ordinary and Partial Differential Equations, 2nd ed*. Alavi's Publishing Co. Tehran