Curriculum Vitae

First Name	Family Name	Job Title
HAMID REZA	**MIRDAMADI**	**Associate Professor of Dynamic and Mechatronic Systems**

Academic Degrees:

Degree	Offered by University	Title of Degree	Major Specialty
Ph.D.	**Sharif University of Technology**	Structural Dynamics/Earthquake Engineering	Nonlinear Structural Dynamics/Adaptive Structural Control
M.Sc.	**Sharif University of Technology**	Structural Engineering & Mechanics	Nonlinear Finite Element Analysis
B.Sc.	**Sharif University of Technology**	Structural Engineering	Structural Dynamics/Earthquake Design

Email Addresses	hamidreza.mirdamadi2@gmail.com	hrmirdamadi@iut.ac.ir
Google Scholar Link	https://scholar.google.com/citations?user=RrRd4BkAAAAJ	
Academic Website	https://mirdamadi.iut.ac.ir	
Cellular Phones	+989133949171	+989133163147
Home Phone	+983134390427	
ORCID ID	https://orcid.org/0000-0001-6500-5230	
Scopus Author ID	48461529900	
Web of Science ResearcherID	N-5014-2017 **(Publons)**	
Loop profile	161902	
Office Phone	+983133915248	
Department Fax	+983133912628	
Department Phones	+983133912625	+983133912627
Home Mailing Address	Unit#5, Flr.#2, Tavous Bldg., Alavinezhad alley, N. Banafshe St., Golkhane St., Khane-Esfahan Isfahan 8194969888, Iran	
Office Mailing Address	**Isfahan University of Technology** Department of Mechanical Engineering, Division of Dynamic & Mechatronic Systems Isfahan 8415683111, Iran	
Skype ID	hamidreza2225	

My Chronological Fields of Expertise (based on my publications & completed projects):

	Acronym	Full title of related specialty	During which period	
1	**FEM/CSD**	Finite Element Method/ Computational Structural Dynamics	During BSc/MSc curricula	1980-1990
2	**SSM/AVC**	Smart Structures & Materials/ Active Vibration Control	During PhD curricula	1990-2000
3	**ECM/DSI**	Engineering & Computational Math/Dynamic System Identification	Assisst. Prof./Civil Eng. Dept.	2000-2010
4	**SHM/CSM**	Structural Healrh Monitoring/ Composite Structures & Materials	Assisst. Prof./Civil Eng. Dept.	2000-2010
5	**FSI/NEMS**	Fluid-Structure Interaction/ Nano-eletromechanical Systems	Assisst. Prof./Mech. Eng. Dept.	2010-2015
6	**EHS/MEMS**	Energy Harvesting Systems/ Micro-eletromechanical Systems	Assoc. Prof./Mech. Eng. Dept.	2015-2020
7	**DST/CPS**	Digital Systems Technology/Cyber Physical Systems (Soft Robots)	Assoc. Prof./Mech. Eng. Dept.	2020-……

My Pivotal Unique Feature

A multidisciplinary/multi-physics/cross-disciplinary researcher, educator, supervisor, and engineer

Based on my curricula, it can be concluded that I have multidisciplinary/multi-physics/ inter-disciplinary engineering, instructional, supervising, and research characters and skills. I have started my higher education studies and research from ***civil engineering*** with strong emphasis on *matrix structural dynamics, design and analysis of bridges* (during my BSc at SUT) to ***structural mechanics/ engineering***, and ***applied/computational mechanics***, specifically, *nonlinear finite element analysis (FEA)* (during my MSc at SUT) to ***multi-body/computational dynamics***, specifically, *computer-aided analysis (CAA) of aerospace structures and mechanisms* (during my PhD at UofA) to ***earthquake engineering***, ***electronics/control engineering***, and ***structronics***, specifically, *adaptive/semi-active control of nonlinear structures* (during my PhD at SUT). Therefore, I have both widened and deepened my academic studies, skills, and research, starting from ***civil engineering/structural design*** *(BSc)****, structural engineering/computational mechanics (FEM/SEM)*** *(BSc/MSc/PhD),* and ***earthquake engineering/ structural dynamics/vibration control engineering/semi-active/ active/ passive structural control*** *(MSc/PhD) fields* to ***mechanical engineering/ applied/ continuum mechanics*** *(MSc/PhD)****, aerospace engineering/multi-body dynamics*** *(MSc/PhD)* and ***electrical engineering/electronics/control engineering*** *(PhD),* to ***smart structures/piezoelectric materials***, ***adaptronics***, ***composite structures/FGM***, ***spectral element methods***, ***axially moving structures***, ***machine learning*** *(ANN, SVM, GA/GP, computer vision),* ***SHM/damage detection/ ultrasonics/ structural system identification***, ***FSI***, ***nano-mechanics***, ***mechatronics***, *and* ***stochastic vibration/control*** *(assistant professor position at IUT and UI),* then, nowadays, to ***opto-mechatronics***, ***bio-mechatronics***, ***soft robotics***, and ***MEMS*** *(associate professor position at IUT).* As a result, I am capable of conducting research, teaching, supervising, and doing engineering design and practice in cross-disciplinary fields of *structural engineering, earthquake engineering, civil engineering and engineering mechanics, mechanical engineering, aerospace engineering, and control engineering,* as well as *applied* and *computational mechanics, electronics, structronics, mechatronics, opto-mechatronics, bio-mechatronics, soft robotics, intelligent dynamic systems, MEMS/NEMS,* and the related subfields.

In my idea, there should be no strong border lines among different engineering and applied science fields. Even as a more revolutionary idea, I believe that an engineer or scientist with expertise in dynamic systems may work on economic, social, or educational sciences in order to domesticate and capture these human behavioral-based dynamic systems to mathematical, computational, and/or experimental models and formulations, although s/he may be enforced to implement statistical concepts like structured/unstructured parameters or variables present during the dynamic model construction, mathematical formulation, analytical and/or numerical solution and simulation, experimental setup, signal processing and data interpretation, and result validation and/or verification.

Summary of My Top Achievements in my Fields of expertise:
(FEM/CSD, SSM/AVC, ECM/DSI, SHM/CSM, FSI/NEMS, EHS/MEMS, DST/CPS)

- Publishing many international/national journal and conference articles on these fields.
- Earning rank first among 14 Masters' level students at SUT.
- Earning rank first for research activities among 5 PhD students at SUT.
- Earning rank fifth among about 100 Bachelors' level students at SUT.
- Earning many prizes during my MSc, PhD at SUT, and during my assistant and associate professorship at Isfahan University of Technology (IUT) and University of Isfahan (UI).
- Education and research at borderlines of established fields like (1) Civil (2) Structural (3) Mechanical (4) Aerospace (5) Electronics (6) Control & (7) Computer Engineering, I think and believe in that my multi-disciplinary specialty is unique and valuable for Industry 4.0 age.
- Specialist in piezoelectric structures and materials for designing sensor and actuator transducers.
- Specialist in electromechanical finite element and spectral element modeling, analysis, and design of structures, like civil, mechanical, aerospace, automotive, marine, biomedical, and micro/nano.
- Specialist in seismic design of building, bridge, dam, off-shore, & on-shore, structures.
- Specialist in theoretical/computational modeling/analysis/design of MEMS/NEMS transducers.
- Teaching a lot of diverse undergrad/graduate engineering and mathematics courses as tabulated.

Education and Academic Degrees

Degree	**Doctor of Philosophy Ph.D.**	**Doctor of Philosophy Ph.D.**	**Master of Science M.Sc.**	**Bachelor of Science B.Sc.**	**High school Second Degree**
Institution	**Sharif University of Technology**	**University of Arizona**	**Sharif University of Technology**	**Sharif University of Technology**	**Hakim-Sanaei High school**
Location	Tehran, Iran	Tucson, AZ	Tehran, Iran	Tehran, Iran	Isfahan, Iran
Title of Degree	Structural Dynamics/Earthquake Engineering	Aerospace Engineering	Structural Mechanics & Engineering	Structural Civil Engineering	Mathematics & Physics
Period from-to	Sept. 1994-Sept. 30, 1999	Jun. 1993-May 1994	Feb. 1987-Jun. 20, 1990	Sept. 1979-Jul. 1986	Sept. 1975-Jun. 1979
Major	Nonlinear Structural Dynamics/Earthquake Engineering	Multibody Dynamics	Nonlinear Finite Element Analysis	Structural Dynamics & Earthquake Design	N/A
Minor	Adaptive Controls/Analog Electronics	Finite Element Analysis of Manufacturing Systems	Computational Structural Dynamics	Matrix Structural Dynamics, Analysis, & Design	N/A
Thesis Title	Nonlinear Control and Dynamics of Seismically-Excited Structures	No thesis	Nonlinear Geometric and Material Finite Element Stress Analysis of Continua by BFGS Algorithm	Matrix Structural Dynamics/Design/ Analysis of Bridges	N/A
GPA/Rank among classmates	16/20 Research Rank first among five PhD RA	4.0/4.0 Not known	18.2/20 Rank first among 14 MSc students (10 Structural+4 Water)	16.6/20 Rank five among 100 undergrad. students	19.4/20 Rank four among 80 high school students
No. of Semester Units gained	54	18	42	147	N/A

Ph.D. Fellowship offered by Iranian Ministry of Science, Research and Technology (MSRT)

*All of my BSc, MSc, and PhD degrees, earned from **Sharif University of Technology,** have been verified by International Academic Qualification iIssued by World Education Services (WES):*
https://www.credly.com/badges/beb8c357-5e7b-4c0f-a462-5bbb5a328ffe/linked_in

My Proposed Endeavor and Future Plans in the Academy and Industry

As an expert in the field of structural dynamics/structural control & earthquake engineering, my proposed endeavor is to utilize techniques in computational structural and system dynamics, nonlinear FEM modeling and solutions, smart structural & material systems, adaptive & robust control strategie, multi-body dynamics & vibrations, and MEMS/NEMS technologies to convert and promote mechatronic designs to manufactured rapid prototypes and pilot products in order to develop Industry 4.0-based smart structures and materials that improve active structural engineering systems, targeted drug delivery bio-devices, online, automatically monitored systems, and self-powered wearable devices.

Work Experience

No.	Job Title	Institution/Company	Department	Period From-To	Duty
1	**Associate Professor of Dynamic & Mechatronic Systems**	Isfahan University of Technology	Department of Mechanical Engineering	Jul. 2013 to Present	Conducting research, teaching and supervising undergrad and graduate engineering students. Research on Fluid-structure interaction for designing targeted drug delivery systems and energy harvesting systems and MEMS/NEMS for designing bio-devices and wearables
2	**Assistant Professor of Smart Structures & Vibration Control**	Isfahan University of Technology	Department of Mechanical Engineering	Sept. 2008 to Jul. 2013	Conducting research, teaching and supervising undergrad and graduate engineering students. Research on Structural Health Monitoring and Composite Structures and Materials for monitoring health and condition of structures
3	**Assistant Professor of Engineering Mathematics**	University of Isfahan	College of Engineering	Sept. 2003 to Sept. 2008	Teaching, conducting research and supervising undergrad and graduate students
4	**Assistant Professor of Earthquake Engineering & Structural Dynamics**	Isfahan University of Technology	Department of Civil Engineering	Dec. 2000 to Sept. 2003	Conducting research, teaching and supervising undergrad and graduate engineering students. Research on Earthquake Engineering and Computational Structural Dynamics for seismic-resistant design of structures
5	**Lecturer of Dynamics**	Sharif University of Technology	Department of Civil Engineering	Sept. 1995 to Jun. 1999	As a partial requirement for Ph.D. program: Teaching dynamics for 8 semesters
6	**Coastal Engineer**	Tehran-Berkeley Consulting Engineers	Department of Coastal Design	Oct. 1994 to Sept. 1995	Design and computation of damping systems for on-shore structures & harbors
7	**Graduate TA**	University of Arizona	Department of Aerospace and Mechanical Engineering	Jan. 1994 to Jun. 1994	Teaching course
8	**Graduate RA**	University of Arizona	Department of Civil Engineering and Engineering Mechanics	Jun. 1993 to Dec. 1993	Research on nonlinear R/C structures
9	**Military Service as a non-commissioned Air Force Army Captain Lecturer of Aircraft Structures**	University of Aeronautical Engineering-Tehran	Department of Aerospace Engineering	Dec. 1990 to Dec. 1992	Teaching courses
10	**Lecturer of Structural Engineering**	Sharif University of Technology	Department of Civil Engineering	Feb. 1991 to Jun. 1992	Teaching courses
11	**Lecturer of Structural Design & Engineering**	I.A. University, Tehran	Department of Civil Engineering	Feb. 1991 to Jun. 1993	Teaching courses
12	**Project Engineer/Project Manager**	MINOO Food Industries, Tehran	N/A	Sept. 1992 to Mar. 1993	Managing, control & check of civil & structural construction projects
13	**Earthquake/Structural Dynamics Design Engineer**	IJAD Group of Consulting Engineers, Tehran	Department of Structural Design	Jun. 1991 to Dec. 1992	Earthquake/Structural dynamics design of high-rise 20-storey steel residential building & 16-storey R/C hotel building structures by SAP90, ETABS,

					NISA II, and ADINA
14	**Composite Structures R&D Engineer**	Iranian Aeronautical Industry Organization - Tehran	Department of CAD/CAM	Sept. 1988 to Aug. 1989	R&D on finite element structural dynamics design of composite RPV by NASTRAN, SuperSAP, ADINA & NISA II Structural Analysis Sofwares
15	**Undergraduate TA**	Sharif University of Technology	Department of Civil Engineering	Sept. 1985 to Jan. 1986	Solving problems of mechanics of solids I for sophomore students

Teaching Experience

I'v been teaching a lot of diverse undergraduate and graduate mechanical, civil, and aerospace engineering as well as applied mathematics courses at the following universities and departments, like:

No.	Course Title	Field of Course	Level	Department	University	No.	Years
1	Smart Structures	Mechatronics	G	ME	IUT	4	2008-2021
2	Smart Materials	Mechatronics	G	ME	IUT	3	2008-2012
3	Vibrations of Finite Element Systems	Computational Dynamics	G	ME	IUT	1	2015
4	Finite Element Method in Solids I	Computational Mechanics	G	ME	IUT	2	2013-2019
5	Theory of Piezoelectricity	Mechatronics	G	ME	IUT	2	2007-2012
6	Random Vibrations	Structural Dynamics	G	ME and CE	IUT	4	2010-2017
7	Advanced Vibrations	Structural Dynamics	G	ME	IUT	4	2013-2019
8	Continuum Mechanics	Theoretical Mechanics	G	ME	IUT	1	2020
9	Research Methodologies and Documentation in Engineering	Engineering Research	G	ME	IUT	4	2010-2014
10	Vibrations	Structural Dynamics	U	ME	IUT	10	2009-2019
11	Automatic Control	Control Engineering/Electronics	U	ME	IUT	4	2011-2017
12	Applied Electric Circuits & Electronics	Control Engineering/Electronics	U	ME	IUT	2	2015-2020
13	Applied Vibrations	Structural Dynamics	U	ME	IUT	3	2010-2013
14	Mechanics of composite materials	Solid Mechanics	G	CE	IAU	1	2015
15	Dynamics of Structures	Structural Dynamics	G	CE	IAU	1	2015
16	Piezoelectric Continuum Mechanics	Mechatronics	G	ME	IUT	1	2008
17	Dynamics I (4-unit)	Engineering Mechanics	U	ME	IUT	5	2008-2014-
18	Composite Materials (3-unit & 2-unit formats)	Solid Mechanics	U	ME	IUT	5	2009-2020
19	Methods of Research and Documentation in Mechanical Engineering	Engineering Research	U	ME	IUT	4	2010-2019
20	Engineering Mathematics	Mathematics	G	CE, ECE	UI	5	2004-2009
21	Differential Geometry	Mathematics	G	CE	UI	3	2004-2008
22	Numerical Computation Methods(3-unit & 2-unit formats)	Mathematics	U	CE, ECE	UI	4	2004-2008
23	Differential Equations	Mathematics	U	CE	UI	2	2007-2008
24	Engineering Probability & Statistics	Mathematics	U	CE	UI	1	2006
25	Statics	Engineering Mechanics	U	ME, CE	IUT, UI	5	2001-2006
26	Dynamics (3-unit)	Engineering Mechanics	U	ME, CE	SUT, IUT, UI	15	1995-2008
27	Strength of Materials I	Engineering	U	ME, CE	IUT, UI	5	2001-

		Mechanics					2009
28	Structural Analysis I	Structural Mechanics	U	CE	UI	1	2007
29	Soil Mechanics	Porous Media Mechanics	U	CE	UI	1	2008
30	Highway Pavement Design	Porous Media Mechanics	U	CE	UI	1	2006
31	Technology of Construction Materials	Civil Materials Engineering	U	CE	UI	1	2006
32	ESP for Geomatics Engineering	English for Engineers	U	CE	UI	1	2006
33	Structural Loads and Systems	Structural Design	U	CE	IUT	3	2000-2003
34	CAD by ANSYS	Computational Mechanics	U	AE	MAUT	1	2000
35	Introductory Finite Elements	Computational Mechanics	U	AE	MAUT	1	2000
36	Aircraft Structures (as TA)	Aerospace Structures	U	AME	UoA	1	1993
37	Analysis of Aircraft Structures	Aerospace Structures	U	AE	AFU	3	1992
38	Design of Aircraft Structures by NASTRAN	Aerospace Structures	U	AE	AFU	1	1991
39	Engineering Vibrations	Structural Dynamics	U	AE	AFU	2	1991
40	Theory of Structures I	Structural Mechanics	U	CE	SUT	1	1991
41	Design of Steel Structures I	Structural Design	U	CE	IAU	4	1990-1992
42	Design of Steel Structures II	Structural Design	U	CE	IAU	4	1990-1992
43	CAD of Structures by SuperSAP	Computational Mechanics	U	CE	IAU	1	1991
44	Computer Programming by FORTRAN 77	Computer Software	U	CE	IAU	1	1990
45	Earthquake Engineering	Structural Dynamics and Design	U	CE	IAU	1	1992
46	Computational Structural Analysis by SAP90	Computational Structural Mechanics	U	CE	IAU	1	1992
47	Mechanics of Solids I (as TA)	Engineering Mechanics	U	CE	SUT	1	1986
48	Dynamics II	Advanced Dynamics	U	ME	IUT	1	2020

U=undergraduate, G=graduate

Acronym	University	Deparment	City	Country
IUT	Isfahan University of Technology	ME, CE	Isfahan	Iran
SUT	Sharif University of Technology	CE	Tehran	Iran
UI	University of Isfahan	CE, ECE	Isfahan	Iran
UoA	University of Arizona	AME	Tucson	Arizona, US
MAUT	Malek Ashtar University of Technology	AE, ME	Isfahan	Iran
IAU	Islamic Azad University	CE	Tehran	Iran
AFU	Air Force University	AE	Tehran	Iran

I think if it could not be unique, it should be rare teaching so many diverse courses, of course during 30 years of teaching at university level (1990 t0 2020).

Teaching philosophy and approach

At present at IUT, we use Farsi MOODLE for uploading our course and online education. I upload my lectures by ACTIVEPRESENTER in MP4 format, then after hearing and observing by students, I arrange Q&A online classes as well as I pose a mini-project to be solved by students based on the information given in a package of lectures equal to a text chapter. At end, I propose some term projects to be solved based on the all information given in the course. In this way, I make the students study and apply their capabilities to apply the presented information in mini-projects as well as a course project. In between, they will solve some problems and apply their information to prepare home works as localized challenges to be solved by methods presented in the course.

We academics, as a part of Globe community, are stepping forward from information age to Internet of Things (IoT) age. We have to try to stay ourselves above the waves transforming the societies before being submerged, I mean we must accept the natural selection based on adaptivity and smartness for elites to survive even in didactic or pedagogical events. Therefore, the principal directions of my academic teaching and research are categorized as having potential for tolerating the change, evolution, and adaptiveness, for accepting the dawn of IoT age (age of Internet of Things, AI and machine learning), more listening to the audience (specifically to the students and colleagues) than speaking as a single-mode lecturing, as well as sharing, recycling, redirecting, and pruning our past knowledge and thoughts with those of our audience, prohibiting from prejudice of students, preventing from discrimination among students, but only for the scientific merit, of course.

Please refer to the attached documents (in Farsi and English) as concrete samples for my teaching practice and a number of concrete examples for teaching experience, the scope of teaching, pedagogical requirements, teaching formats, and feedback methods. However, some comments are needed for more clarification.

First of all, because the scope of my education, curriculum, and research has cross-passed from civil to structural, to earthquake, to mechanical, to aerospace, to control, to electronics, to mechatronics, finally, to bio-mechatronics engineering sciences, I believe that these roadmaps and approach have had strong influence and interaction on my teaching philosophy and practice. For example, more often than not always, when I present a course of "*Advanced vibrations*" for the current term in chalk and talk style (my favorite method in contrast to merely PowerPoint slide deck), I cannot convince myself to present that course for the upcoming term word by word as I did in the current term. I may change and modify iit by about 20-30% new materials in the context of subject but based on the current needs and the latest directions of research and advices by challenges of both the Globe and local society.

As a less serious comment, for instance, in the current term, I would try to connect the "*Advanced vibrations*" concepts to the formulation and solution of a dynamic system of first order ODEs (ordinary differential equations) for identifying, localizing, quantifying, and predicting the mechanism, spatial, and temporal distribution and interaction of people with positive corona virus tests, and predicting local areas subject to a threshold corona virus pollution and whether those areas which the rate of defection is decreasing or not, and so on.

A brief comment is given about receiving feedback from my students and colleagues. Since one of my expertise is "*feedback control of dynamic systems*", I strongly believe that the output of any system (here, response of students and my colleagues to my teaching) should be compared, modified, amplified, and corrected (the comparator and processor/controller) by a reference (here, a model reference teaching practice and didactic concepts). If the dynamic system of my pedagogical methodology would be passive, I could not adapt and evolve my didactic methods, while I would be submerged by the waves of the IoT age as well as AI learning systems.

As a matter of fact, if I could explain what novel courses I wish I could establish in any department, I would reply in this way. I hope, with the cooperation and advices of my colleagues in any department, I could establish and offer some of the following courses:

- (1) Smart/adaptive dynamic structures and systems (SS/AS), (2) Sensory/sensitive structures and systems, (3) Mechatronics/Structronics, (4) Machine learning/MEMS-embedded structures (MEMSS), (5) Structural health monitoring (SHM) or Machine monitoring

Finally, as I tried to outline, my hub of teaching and research philosophy are circled around adaptiveness and smart evolution (my ideas) but not based on a random selection phenomena. I emphasize, based on adaptive learning, and combining carbon-based intelligence together with silicon-based one.

Research philosophy, approach, and directions

My research directions and philosophy has evolved during past years. In 1985, when I was a senior student at Sharif University of Technology, I took courses on "Matrix Structural Analysis", "Structural Dynamics", and "Bridge Engineering", I got interested in seismic or dynamic structural design of bridges and became a design/project engineer, so I selected my BSc project on: *"Matrix Structural Dynamics, Analysis & Design of Highway Bridges of four types: Steel Truss Bridge, Steel Orthotropic Deck Bridge, Composite R/C-Steel Deck Bridge& R/C Deck Bridge"*

In 1986, as soon as I took a course on FEM at the beginning of my MSc curriculum at Sharif University of Technology, I decided to start my MSc thesis on ***Computational Structural Dynamics***. My academic Master and Sheikh became Prof. Klaus J. Bathe. Then, I got interested in *Finite Element Methods*, specifically, nonlinear solid and structural mechanics and dynamics problems. I selected my MSc thesis to conduct research on: *"Nonlinear Geometric & Material Finite Element Stress Analysis"*. In 1990, I wrote my first conference paper, entitled: *"An Assessment of Solution Algorithms of Nonlinear Equations Due to FEM Discretization in Nonlinear Structural Mechanics with Emphasis on BFGS".*

During my military service, from 1990 to 1992, I served as a lecturer in the department of aircraft engineering at the University of Aeronautical Engineering. So I got interested in *matrix design/ analysis of aircraft structures*. This became my eagerness to follow my PhD in aerospace structures.

During my stay in the department of Aerospace and Mechanical Engineering at The University of Arizona, from 1993 to 1994, my research focus turned toward *multi-body dynamics and computer-aided analysis of mechanical systems*, as proposed to me by Prof. P.E. Nikravesh.

After that, during my PhD at Sharif University of Technology, from 1994 to 1999, I got interested in *Earthquake Engineering*, specifically, *"Nonlinear Dynamics and Adaptive Control of Structures"*. So this field became my principal research theme in my remaining academic life. This, in addition to closely-related research subjects of *Smart Structures and Materials (SSM), Structural Health Monitoring (SHM), Composite Structurs & Materials (CSM),Finite Element Model-Updating, Passive Control of Viscoelastic Structures, and Stochastic Structural Dynamics* were the major theme during my research as full-time assistant professor in the departments of civil engineering, from 2000 to 2007.

From 2008 until present that I have changed my affiliation to the department of mechanical engineering, I have continued those previous topics, but with a taste of more mechanical and aerospace structures than civil and off-shore structures. These mechanically-oriented research themes are, from the oldest to the latest, *Fluid-Structure Interaction (FSI), Eenergy Harvesting Systems (EHS),MEMS/NEMS, nonlinear structural mechanics, random fields and excitations, mechatronics, vibro-acoustics, opto-mechatronics, biomechanics, and the latest are bio-mechatronics.*

In brief, I may divide my principal fields chronogically based on the following table:

	Acronym	Full title of related specialty	During which period	
1	**FEM/CSD**	Finite Element Method/ Computational Structural Dynamics	During BSc/MSc curricula	1980-1990
2	**SSM/AVC**	Smart Structures & Materials/ Active Vibration Control	During PhD curricula	1990-2000
3	**ECM/DSI**	Engineering & Computational Math/Dynamic System Identification	Assisst. Prof./Civil Eng. Dept.	2000-2010
4	**SHM/CSM**	Structural Healrh Monitoring/ Composite Structures & Materials	Assisst. Prof./Civil Eng. Dept.	2000-2010
5	**FSI/NEMS**	Fluid-Structure Interaction/ Nano-eletromechanical Systems	Assisst. Prof./Mech. Eng. Dept.	2010-2015
6	**EHS/MEMS**	Energy Harvesting Systems/ Micro-eletromechanical Systems	Assoc. Prof./Mech. Eng. Dept.	2015-2020
7	**DST/CPS**	Digital Systems Technology/Cyber Physical Systems (Soft Robots)	Assoc. Prof./Mech. Eng. Dept.	2020-……

As a matter of fact, my research has turned direction from more theoretical and computational mechanics research toward more mechatronics-oriented product design and manufacture. At present, I and my graduate students team are working on the product-based projects of *Adaptive Focus Liquid-Lens Eyeglasses and Liquid Crystal Contact Lens, Wire-less Lead-less Cardiac Pacemakers, Artificial Mitral Valves by SMA*, and the like.

Research activities (By chronological order)

My research directions and philosophy have evolved during past years. I may partition my viewpoint into eight time intervals, based on a chronological order of my growth in academic life.

a) BSc curriculum at SUT (1979-1986):

In this period, I was immature and less educated in doing research. In 1985, during my senior undergraduate at Sharif University of Technology, I focused on design projects. My BSc design project was **Matrix Structural Dynamics, Analysis and Design of Highway Bridge Structures** of four types: (1) trussed, (2) orthotropic steel deck, (3) R/C deck, (4) composite steel/concrete deck bridges. In this period of my academic life, my research viewpoint is more design-oriented than analytical.

b) MSc curriculum at SUT (1986-1990):

In 1986, as soon as I took a course on FEM at the beginning of my MSc curriculum at Sharif University of Technology, and I got familiarized by the 1982 edition of "*Finite Element Procedures in Engineering Analysis*" textbook of Prof. Klaus J. Bathe, he became my academic Master and Sheikh. I found my interest on the topic of **Computational Structural Dynamics by FEM,** starting my MSc on **computational structural mechanics,** specifically, on nonlinear solid/ structural mechanics problems. I selected my MSc thesis to conduct research on: *"Nonlinear Geometric and Material Finite Element Stress Analysis of Continua by BFGS Algorithm".* In 1990, I wrote my first paper, entitled: *"An Assessment of Solution Algorithms of Nonlinear Equations Due to FEM Discretization in Nonlinear Structural Mechanics with Emphasis on BFGS".* During this period, I did some unpublished research on the structural design of composite RPV. In this period of my academic life, my research viewpoint is more computational/analytical-oriented than design. The textbook of "*Finite Element Procedures in Engineering Analysis*" by Prof. K.J. Bathe became a launcher for throwing me inside computational structural dynamics field and even further, this text showed me that there is no difference among different physical systems and their fundamental physics principles, whenever these systems are modeled by mathematical analysis, specifically by calculus, differential and integral equations (ODEs, PDEs, Green's functions, variational calculus), and finite/infinite dimensional vector spaces; finite for lumped-parameter and infinite for distributed-parameter modeling. This finding started my interests in system dynamics field (as well as feedback control) circumventing structural dynamics. This drove me toward active structural control during my PhD program.

Partial abstract of my MSc thesis (1990)

In this thesis, I developed nonlinear finite element algorithms for 2D plane stress, plane strain, and axisymmetric solids and continua subjected to large rotations, large deformations, and large strains like the extrusion and forging metal forming manufacturing processes. The problem formulation is highly nonlinear from geometry, material, and boundary conditions viewpoint. The analysis needs automatic re-mesh generation for avoiding non-convex finite elements to be generated. The solution procedure is based on two nested iteration loops, the outer loop for incremental load steps, and the inner loop for convergence between external incremental loads and generated internal incremental stress states in any discrete point of the structure. Transforming nonlinear PDEs of time-dependent and space-dependent to either nonlinear ODEs (time-dependent dynamic problems) or nonlinear algebraic equations (static problems) by finite element discretization properties establishes a system of highly nonlinear equations to be solved. In the case of nonlinear ODEs the discretization process continues with Newmark's β method. In any case, these nonlinear algebraic equations are solved by BFGS algorithm which is inherently an optimization solver. In the nonlinear continuum mechanics formulation, I have used Green-Lagrange strain tensor measures and 2nd Piola-Kirschhoff stress tensor. For coding my algorithms, I have used FORTRAN 77.

c) Military Service at University of Aeronautical Engineering (1990-1992):

During my military service, from 1990 to 1992, I served as a lecturer in the department of aircraft engineering at University of Aeronautical Engineering of Iranian Air Force Army. So I got interested in *matrix structural dynamics/design/analysis of aircraft structures*. This triggered my decision to follow my PhD in aerospace structures. In the military service period, I switched from large-scale civil structures toward large-scale aerospace structures.

d) PhD curriculum at University of Arizona (1993-1994):

During my stay in the department of AME at The University of Arizona, from 1993 to 1994, my research focus turned direction toward *multi-body dynamics and computer-aided analysis of mechanical systems*, as proposed to me by Prof. P.E. Nikravesh.

e) PhD curriculum at SUT (1994-1999):

After that, during my PhD at Sharif University of Technology, from 1994 to 1999, I was interested in *EarthquakeEengineering and Nonlinear StructuralDdynamics and Adaptive Control of Structures*. I conducted research on model-reference adaptive control (MRAC), semi-active switching control, model predictive control (MPC), robust control, and stochastic system parameter and state variable estimation algorithms, specifically filtered-x LMS and extended Kalman optimal filtering algorithms. I wrote my codes by MATLAB and Simulink. These research subjects, crystallized in the "**Smart Structures & Materials**", become my principal research theme in my remaining academic life.

Partial abstract of my PhD thesis ((1999)

In this thesis, I developed and implemented several nonlinear structural feedback and feedforward nonlinear controller/observer algorithms, specifically for finite element discretized continuous framed structures subjected to nonstationary non-Gaussian input signals as well as seismic records of strong motion. Nonlinearity for structures is a type of time-varying boundary conditions and of control algorithm is due to off/on commands and/or time varying static (stiffness) and dynamic (damping) properties of the structures. In addition, the adaptive type of control strategies has benefitted from a stochastic parameter and state estimation approach. Stochastic extended Kalman filtering has been implemented for estimating state variable signals (acceleration, velocity, and displacement), while filtered-x LMS has been used for estimating the system properties (stiffness and damping properties). Three important control strategies I have developed are: (1) model-reference adaptive control (MRAS), with two loops one inner loop for turning back the feedback state variable signals for comparison with reference model and the outer loop, a parameter identification/estimation algorithm for estimating time-dependent parameter variables, (2) model predictive control (MPC), with a horizon for extrapolation of state variable signals resulting from updated model and (3) robust control, with structured uncertainty blocks (by knowing a priori, either a specific probability distribution/density function of inputs or their auto-correlation/ cross-correlation functions) resulting from Bayes' theorem and statistics (past information). My codes is developed in the environment of MATLAB, its toolboxes, and Simulink.

f) Assistant Professor of Civil Engineering at IUT (2000-2003):

I did research on "finite element dynamic model updating by frequency response function Matrices and system output error model", "dynamics/passive controls of seismically-excited viscoelastic structures of tall buildings", and "stochastic dynamics finite element model updating by Bayesian theorem and random vibration techniques".

g) Assistant Professor of Engineering Math at UI (2003-2008):

The theme of "*Smart Structures & Materials*", in addition to closely-related research subjects of *structural health monitoring (SHM), piezoelectric smart structures, finite element model-updating, passive control of viscoelastic structures, and stochastic structural dynamics* were my major research themes.

h) Assistant Professor of Mechanical Engineering at IUT (2009-2013):

During my return to Isfahan University of Technology but this time, the department of mechanical engineering, my research directions turned towards mechanical engineering applications of structural dynamics and smart structures and got more interdisciplinary. I conducted research on *dynamic system identification of structures, structural health monitoring (SHM) and structural damage identification, NEMS and scale-dependent elasticity and continuum mechanics*.

i) Associate Professor of Mechanical Engineering at IUT (2013-2020):

From 2008 until present that I have changed my affiliation to the the department of mechanical engineering, I have continued those research topics in my stay in the departments of civil engineering, but with a taste of more mechanical structures and applied mechanics than civil structural mechanics and engineering. These mechanical-oriented research themes are, from the oldest to the latest, *fluid-structure interaction (FSI), MEMS/NEMS, nonlinear structural dynamics, random fields/vibrations,*

composite plate and shell nonlinear vibrations, energy harvesting systems (EHS), mechatronics, vibro-acoustics, opto-mechatronics, and the latest are bio-mechatronics.
As a matter of fact, recently, my research has turned direction from more theoretical and computational mechatronics research toward more innovative designs and mechatronics-oriented product design and industry 4.0-based manufacturing. At present, I and my graduate student teams are working on the subjects of *adaptive-focus liquid-lens eyeglasses, wire-less lead-less cardiac pacemakers, artificial mitral valves by SMA,* and continues.

Research plans for the next coming years

Based on present conditions of our world, I am predicting that my research plans may be divided along the following fundamental directions:

(I) Structural Dynamics/Mathematical Analysis, *i.e.*, multi-physics system modeling, analytical (physics-based), numerical (computer-based), and experimental (data-based) formulation, Monte Carlo simulations, and deterministic/stochastic solutions, validation/verification, structural/system identification/finite element model updating, and data interpretation/discussion, and parametric/case studies.

(II) Machine Learning-based Dynamic Systems Synthesis, Analysis & Design, 3D Print-aided Manufacturing.

Engineering/Mathematical Analysis phase is divided among the following areas:

(1) The most favorite direction, under the influence of my PhD curriculum, should be ***Smart structures and materials***, ***Adaptive structures, Intelligent structures, Active structures, Electronic structures, Piezoelectric structures and materials, Structronics***, ***Mechatronics***, and so on. The specific topic shows the level and grade of intelligence and adaptivity. I am also working in the subfields of **Structronics**, *i.e., Structural health monitoring (SHM), Structural system identification (SSI), Structural damage detection, Energy harvesting systems (EHS),* and so on. In fact, this branch of engineering knowledge brings together the subdomains of (1) **Dynamics** (structural dynamics and vibrations), (2) **Electronics and Controls** (actuator and sensor technology), and (3) **Computer Science** (AI and machine learning).

(2) I have been changing my research direction continuously toward a greater circle, *i.e.*, ***Smart systems and intelligent machines***, including multi-physics systems of *mechanical, electrical, magnetic, thermal, optical, hydraulic, pneumatic, chemical, and biological* phenomena and characteristics, and multi-physics modeling by **analytical/ theoretical**, **computational/ numerical**, and **experimental/ laboratory** methods. Up to this date, I have touched the interdisciplinary fields like, bio-mechatronics, opto-mechatronics, fluid-structure interaction (FSI), MOEMS and NOEMS.

(3) The third line of my research, as before, would have more attention towards *data-driven modeling* of multi-physics dynamic systems, using AI, machine learning, machine vision, and upgrading those dynamic models with mathematical and fundamental physics-driven modeling of dynamic systems.

(4) I am going to conduct research on ***soft robotics*** with my previous knowledge on *structural and system dynamics, adaptive control, robust control, and multi-body dynamics*.

(5) I am going to establish effective teams of younger faculty members/postdocs and graduate/ undergraduate students to convert and promote the conceptual and brainstormed mechatronic designs to manufactured rapid prototypes and pilot products. For this target, I need grants from industry, government, and academia. In addition, I am insisting on organizing an equipped Industry 4.0 AI-motivated laboratory for completing a mechatronics project from zero to one hundred.

Added value of my activities to the prospective department, campus, and university

If I would join any department, I would be one gear (one single faculty member) of a huge gearbox (the campus). Therefore, I could be of value based on the above-mentioned research directions, if the whole system (campus) could move forward, translate, and rotate intelligently and efficiently. I, as a single gear, try my best to move forward this gearbox as much as I can.

Awards, achievements, and fellowships

No.	Awarded	Date	For	Offering authority
1	Letters of Confirmation (2)	Jun. 2018	participating in a workshop of research methods	President of Isfahan University of Technology
2	Letters of Confirmation (2)	Aug. 2017	participating in a workshop of education methods	President of Isfahan University of Technology
3	Letter of Confirmation	Feb. 2017	participating in a workshop of research methods	President of Isfahan University of Technology
4	Letters of Confirmation (2)	Sept. 2015	participating in workshop of education methods	President of Isfahan University of Technology
5	Plate of Appreciation	Dec. 2015	promoting education	President of I. A. University-Tiran branch
6	Plate of appreciation	Oct. 2014	promoting teaching and education quality	Society of mechanical engineering students from Khomeini-shahr at Isfahan University of Technology
7	Plate of Academic Rank	Jul. 2013	Earning rank of associate professorship	President of Isfahan University of Technology
8	Plate of Appreciation	Oct. 2011	promoting teaching and education quality	Scientific society of mechanical engineering students at Isfahan University of Technology
9	Plate of Appreciation	Oct. 2005	promoting teaching and education quality	Geomatics engineering graduates of college of engineering at the University of Isfahan
10	Plate of Appreciation	Oct. 2002	promoting teaching and education quality	President of Isfahan higher education institute of Mohajer
11	Plate Distinction	Oct. 2001	distinguished PhD graduate at Sharif University of Technology	Board of trustee for Hamshahri newspaper published in Tehran
12	Plate of Distinction	Oct. 2000	Earning 1st rank PhD graduate	President of Sharif University of Technology
13	Professor Tavakkoli Endeavor Prize	Oct. 1998	the best PhD student researcher	President of Sharif University of Technology
14	Fellowship	Sept. 1994	Continuing PhD program at Sharif University of Technology	Iranian Ministry of Science and Higher education
15	Plate of Honor	Jan. 1992	Subject of Biographical Record of Who's Who in Science and Engineering	Marquis Who's Who Publications Board
16	Fellowship	Jun. 1990	Continuing PhD program at University of Victoria	Graduate admissions of University of Victoria, BC
17	Plate of Distinction	Oct. 1990	1st Rank MSc graduate at Sharif University of Technology	Iranian Vice President

Memberships and Journal/Conference paper Peer-review activities

No.	Institution	Date	For/As
1	ISME Member of Iranian Society of Mechanical Engineers (ISME)	Sept. 2008 to Present	Distinguished conference paper reviewer of ISME conferences
2	ISAV member of Iranian Society of Acoustics and vibration (ISAV)	Jan. 2012 to Present	Distinguished conference paper reviewer of ISAV conferences
3	AIAA member of American Institute of Aeronautics and Astronautics (AIAA)	Jan. 1990 to Jan. 1994	Graduate student member
4	Scientific Reviewer & Assistant Editor	Dec. 2000-present	Engineering & Research Journal of Esteghlal, Isfahan University of Technology
5	Scientific Reviewer & Assistant Editor	Dec. 2000-present	School of Engineering Journal, University of Tehran
6	Scientific Reviewer	Sept. 2008-present	Elsevier journals
7	Scientific Reviewer	Sept. 2008-present	Springer journals

Grants/Funds

In Iran, grants and funds, received by faculty members, are managed and distributed by the affiliated universities of the faculty members (in my case, IUT), which are governed themselves by the Iranian Ministry of Science, Research and Technology. The grants are severely limited due to economic instability and distributed probably by prejudice far from scientific merit. I have received grants from 2005 in IR Rial, but if it is exchanged to international currencies (if possible), nothing valuable remains for conducting experimental research and providing laboratory facilities. This is one of my reasons for leaving my current affiliation at IUT.

Skills (categorized)

Field 1. FEM/CSD (Finite Element Method/ Computational Structural Dynamics)

Sub-Fields:

FEM (Finite Element Methods), SEM (Spectral Element Methods), FDM (Finite Difference Method), DQM (Differential Quadrature Method), BEM (Boundary Element Method), FSM (Finite Strip Method), DEM (Discrete Element Method), Matrix Structural Dynamics, Random Vibrations, Nonlinear Vibrations, Earthquake Engineering (Seismic Design, Optimal Design, Reliability Engineering), Wave Propagation, DSP

Field 2. SSM/AVC (Smart Structures & Materials/ Active Vibration Control)

Sub-Fields:

Adaptronics/ Structronics, Mechatronics, Vibration & Noise Control/ Active Structural Control, Stochastic Control, Nonlinear Control, Piezoelectric Structures, Adaptive/Robust/Multivaraible Structural Control, Multidisciplinary system modeling

Field 3. SHM/CSM (Structural Health Monitoring/ Composite Structures & Materials)

Sub-Fields:

Structural System Identification, Damage Detection & Localization, Piezoelectric Transducers & Composites, Wavelet Analysis, Adaptive/Random Signal Processing, Composite Plates and Shells,

Field 3. FSI/NEMS (Fluid-Structure Interaction/ Nano-Electro-Mechanical Systems)

Sub-Fields:

Targeted-Drug Delivery Systems, Flow-Induced Vibrations, Aero-elasticity, Nano-Mechanics, Control-Structure Interaction (CSI), Flight Dynamics & Control, Piezoelectric Nano-Sensors & Actuators,

Field 5. EHS/MEMS (Energy Harvesting Systems/ Micro-Electro-Mechanical Systems)

Sub-Fields:

Biomedical Engineering, Bio-Mechatronics, Micro-Sensors & Actuators, Wearable Sensors & Actuators, Liquid Crystal Technology, Piezoelectric Micro-Sensors & Actuators,

Field 6. ECM/DSI (Engineering & Computational Math/ Dynamic System Identification)

Sub-Fields:

Initial/Boundary-Value Problems, Digital Signal Processing, Random Signal Processing, Wave Equation (Hyperbolic), Diffusion Equation (Parabolic), Equilibrium/Distribution Equation (Elliptic), Boundary Element Method (BEM), Discrete Green's Functions, Stochastic Finite Element Method (SFEM), Spectral Finite Element Method (SEM), XFEM (Extended FEM), hp-FEM, Conformal Mapping, Complex-variable Analysis, Theory of Space Curves and Surfaces, Topology Shape Optimization, Discrete-time Signal Processing, Adaptive Signal Processing, Adaptive Control, Robust Control, Finite Element Model Updating, Inverse Problems, Subspace System Identification, Optimal Estimation, Filtering & Control, Extended Kalman Filtering

Field 7. DST/CPS (Digital Systems Technology/Cyber-Physical Systems)

Sub-Fields:

Soft Robotics/ Flexible robots, *Smart Home, Smart Building, Cryptography, Exoskeleton Robotics,* Machine learning/AI/GA/GP/ANN/Pattern regognition/SVM, Machine vision, ANSYS/ ABAQUS/ COMSOL Multiphysics, MATLAB/SIMULINK/Control & Signal processing toolboxes, MAPLE IV, CAD/CAM softwares

Links, URLs, Websites

No	Website	Link/URL
1	Google Scholar Citations	https://scholar.google.com/citations?user=RrRd4BkAAAAJ&hl=en
2	ORCID ID	http://orcid.org/0000-0001-6500-5230
3	IUT Homepage	https://mirdamadi.iut.ac.ir
4	SCOPUS	https://www.scopus.com/authid/detail.uri?authorId=48461529900
5	LinkedIn	https://www.linkedin.com/in/hamid-reza-mirdamadi-phd-91055a36/
6	ResearchGate	https://www.researchgate.net/profile/Hamid_Mirdamadi?ev=pubfeed_xperson
7	LOOP	https://loop.frontiersin.org/people/161902/overview
8	Twitter	https://twitter.com/hrmirdamadi
9	Facebook	https://www.facebook.com/hamidreza.mirdamadi
10	Instagram	https://www.instagram.com/hamidreza.mirdamadi2/?hl=en

List of publications

In all of the following published articles which I have a role as an author, I am also the supervisor or advisor for the first author who is my student (graduate/undergraduate) or one of my graduated students. For triggering the study and research, first I look for the latest works on the cutting edge of engineering knowledge available open literature and on the Internet, which are surrounded by my previous expertise or my interests with links to my fundamental engineering knowledge. I brainstorm, conceive, classify, organize, generalize, and present the core idea for more search, literature review, study, research, and feedback from my students, in general and private sessions that I have periodically with my students. Normally I have a weekly general meetings with all of my graduate and undergraduate students in separate sessions, as well as private meetings whenever necessary. Off and on I introduce the latest peer-reviewed journal papers in the subject to my students. I advise and guide them in research methodology, e.g., pruning my ideas by more search and study, encouraging them for more brainstorming without any fear for being an impossible mission and/or contradicting fundamental laws of continuum physics, i.e., (1) & (2) conservation of linear and angular momenta, (3) conservation of energy (the first law of thermodynamics), (4) conservation of mass, (5) conservation of electric charge, (6) no possibility for decrease in entropy (the second law of thermodynamics), (7) & (8) Gauss's laws for electricity and magnetism, (9) Ampere's circuital law, and (10) Faraday's laws of electromagnetic induction, crystallizing concepts, establishing simplifying hypothesis, transforming physical systems to mathematical models, formulating models to analytical tools, e.g., (1) establishing ordinary/partial differential equations (ODEs/PDEs) having independent variables in time and/or space or more abstractive, establishing infinite/finite dimensional vector spaces in a more general context, (2) building system matrix impulse responses/matrix frequency response functions for lumped-parameter systems, or system Green's functions for distributed-parameter systems, (3) constituting energy functional terms and applying variational calculus and energy methods, and solving the formulated model by analytical/theoretical, computational/numerical simulation, and/or experimental/laboratory tools, interpreting the results, performing parametric/case studies, comparing, verifying, and validating by the work of other researchers, documenting and customizing a detailed version of our achievements for thesis and a more compact version for paper publishing in an authentic journal.

ISI Journal articles (chronological order from most recent):

No.	year	Authors	Article Title	Journal/ Publisher	Index	Field/Subfield
	2021	Saberi Saeed, M. Ghayour, Hamid Reza Mirdamadi & M. Ghamami	Free vibration analysis and mode management of bistable composite laminates using deep learning	Archive of Applied Mechanics	doi.org /10.10 07/s00 419- 021- 01930- 4	
0	2021	Shahbazi Yaser, Hamid Reza Mirdamadi, Mohammad Reza Chenaghlou	Finite element modelling of smart adaptive composite beam	Journal of Civil and Environmenta l Engineering	DoI: 10.220 34/JCE E.2021 .30100. 1724	Smart Structures, Mechatronics, Vibration Control, Composite Structures, Structural Dynamics, FEM
0	2021	Reisi Alireza, Hamid Reza Mirdamadi, Mohammad Ali Rahgozar	Nested-eccentric-shells damper with an improved approach to increasing hysteresis behavior	*Amirkabir Journal of Civil Engineering*	53(1), pp 7-10, 2021	Passive Structural Control, Vibration Control, Earthquake Engineering, Steel Structures, Structural Dynamics
0	2021	Reisi Alireza, Hamid Reza Mirdamadi, Mohammad Ali Rahgozar	Seismic performance of the nested-eccentric-shells damper	Journal of Structural and Construction Engineering, Iranian Society of Structrual Engineering	DOI:10 .22065 /JSCE. 2021.2 46832. 2228	Passive Structural Control, Vibration Control, Earthquake Engineering, Steel Structures, Structural Dynamics
	2021	Karimi, AH, Hamid	The effect of surface tension and pulling	Journal of	V.34,	Biomechanics, Bio-

		Reza Mirdamadi, S Ziaei-rad	rate on the dynamic behavior of tether extrusion process using a mathematical model	Cellular and Molecular Research (Iranian Journal of Biology)	Issue 1, PP 117-131, Spring 2021	mechatronics, Biomedical Engineering
1	2020	Reisi Alireza, Hamid Reza Mirdamadi, Mohammad Ali Rahgozar	Numerical and experimental study of the nested-eccentric-cylindrical shells damper	*Earthquakes and Structures, Techno-Pres*	Vol. 18, No. 5, pp. 637-648	Passive Structural Control, Vibration Control, Earthquake Engineering, Steel Structures, Structural Dynamics, FEM
2	2020	Fattahi Iman, Hamid Reza Mirdamadi	A novel multi-modal and multi-directional energy harvester by asymmetric 3D skeletal frame structures	*Journal of the Brazilian Society of Mechanical Sciences and Engineering*	42:274	EHS, Smart Materials, Piezoelectric Transducers, Composite Structures, Biomedical Engineering, Structural Dynamics, FEM
3	2020	Fattahi Iman, Hamid Reza Mirdamadi, Hamid Abdollahi	Application of consistent geometric decomposition theorem to dynamic finite element of 3D composite beam based on experimental and numerical analyses	*Frontiers of Structural and Civil Engineering*	18:44: 12, FSC-20625-IF.3d	EHS, Smart Materials, Piezoelectric Transducers, Composite Structures, Biomedical Engineering, Structural Dynamics, FEM
4	2020	Fattahi Iman, Hamid Reza Mirdamadi	Electro-vibration modeling and response of 3D skeletal frame configuration for energy harvesters	*Extreme Mechanics Letters/ Elsevier*	36, 100646	EHS, Smart Materials, Piezoelectric Transducers, Composite Structures, Biomedical Engineering, Structural Dynamics, FEM
5	2020	Karimi Amir Hossein, M. Rahimi, S Ziaei-Rad, Hamid Reza Mirdamadi	Instability and critical pulling rate of tethers in tether extension process using a mathematical model	*Mechanics of Soft Materials/Springer*	2, Article number : 2	Micro/Nano-Mechanics, Biomedical Engineering, Structural Dynamics
6	2019	Fattahi Iman, Hamid Reza Mirdamadi	A novel 3D topology for energy harvesting systems	*Microelectronics Journal, Elsevier*	V. 83, pp. 5-17	EHS, Smart Materials, Piezoelectric Transducers, Composite Structures, Biomedical Engineering, Structural Dynamics, FEM
7	2019	Milad Hafezi, Hamid Reza Mirdamadi	A novel design for an adaptive aeroelastic energy harvesting system: flutter and power analysis	*Journal of the Brazilian Society of Mechanical Sciences and Engineering*	41:9, pp. 1-20	EHS, Smart Materials, Piezoelectric Transducers, Aerospace Engineering, Structural Dynamics, FEM
8	2018	Karimi Amir Hossein, Hamid Reza Mirdamadi Saeed Ziaei-rad	Mathematical modeling of dynamic behavior of fluid bilayer membranes under the effect of density asymmetry	*Journal of Theoretical Biology, Elsevier*	V. 454, pp. 330-344, 7	Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics
9	2018	Ghadami Amin, Mehdi Behzad, Hamid Reza Mirdamadi	Damage identification in multi-step waveguides using Lamb waves and scattering coefficients	*Archive of Applied Mechanics, Springer*	V. 88, Issue 6, pp 1009–1026	SHM, Smart Materials, Piezoelectric Transducers, Structural Dynamics
10	2018	Mokhtari Ali; Hamid Reza Mirdamadi	Study on vibration and stability of an axially translating viscoelastic Timoshenko beam: non-transforming spectral element analysis	*Applied Mathematical Modeling, Elsevier*	56, 342-358	Structural Dynamics, Biomedical Engineering,
11	2018	Ebrahimi Reza, Hamis Reza Mirdamadi, Saeed Ziaei-Rad	Operational modal analysis and fatigue life estimation of a chisel plow arm under soil-induced random excitations	*Measurement , Elsevier*	116, 451-457	Vibration Modal Analysis, Structural Dynamics, , Random Vibrations, Biosystems Engineering
12	2018	Rahmati Mehdi, Hamis Reza Mirdamadi, Sareh Goli	Divergence instability of pipes conveying fluid with uncertain flow velocity	*Physica A: Statistical Mechanics and its Applications, Elsevier*	491 650–665	MEMS/NEMS, Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics, Random Vibrations
13	2018	Mortazavi Parvaneh, Hamid Reza Mirdamadi, Ali Reza Shahidi	Post-buckling, limit point, and bifurcation analyses of shallow nano-arches by generalized displacement	*International Journal of Structural*	Vol. 18, No. 1	Micro/Nano-Mechanics, Biomedical Engineering, Structural Dynamics,

			control and finite difference considering small-scale effects	*Stability and Dynamics/ World Scientific*		FDM
14	2017	Fattahi Iman, Hamid Reza Mirdamadi	Novel composite finite element model for piezoelectric energy harvesters based on 3D beam kinematics	*Composite Structures*	Vol. 179, pp. 161–171	EHS, Smart Materials, Piezoelectric Transducers, Composite Structures, Biomedical Engineering, Structural Dynamics, FEM
15	2017	Mokhtari Ali, Hamid Reza Mirdamadi, Mostafa Ghayour	Wavelet-based spectral finite element dynamic analysis for an axially moving Timoshenko beam	*Mechanical Systems and Signal Processing, Elsevier*	Vol. 92, pp. 124-145	Biomedical Engineering, Structural Dynamics, SFEM
16	2017	Sarvestan Vahid, Hamid Reza Mirdamadi, Mostafa Ghayour	Vibration analysis of cracked Timoshenko beam under moving load with constant velocity and acceleration by spectral finite element method	*International Journal of Mechanical Sciences, Elsevier*	Vol. 122, pp. 318-330	SHM, Composite Structures, Structural Dynamics, SFEM
17	2017	Mahrughi Masoud, Hamid Reza Mirdamadi	An equivalent micromechanical multi-unit cell model carried by macromechanical full-layerwise theory for flexural analysis of 3D braided composite and thick plates	*Archive of Applied Mechanics*	Vol. 87, pp. 349-364	SHM, Composite Structures, Structural Analysis, Layerwise Theory
18	2017	Salehipour Hamzeh, Hassan Nahvi, Ali Reza Shahidi, Hamid Reza Mirdamadi	3D elasticity analytical solution for bending of FG micro/nanoplates resting on elastic foundation using modified couple stress theory	*Applied Mathematical Modelling, Elsevier*	Vol. 47, pp. 174–188	Micro/Nano-Mechanics, Biomedical Engineering, Analytical Elasticity
19	2017	Karimi Morteza, Hamid Reza Mirdamadi, Ali Reza Shahidi	Positive and negative surface effects on the buckling and vibration of rectangular nanoplates under biaxial and shear in-plane loadings based on nonlocal elasticity theory	*Journal of the Brazilian Society of Mechanical Sciences and Engineering*	Vol. 39, No. 4, pp. 1391-1404	Micro/Nano-Mechanics, Biomedical Engineering, Structural Dynamics
20	2017	Karimi Morteza, Hamid Reza Mirdamadi, Ali Reza Shahidi	Shear vibration and buckling of double-layer orthotropic nanoplates based on RPT resting on elastic foundations by DQM including surface effects	*Microsystem Technologies, Springer*	Vol. 23, No. 3, pp. 765-797	Micro/Nano-Mechanics, Biomedical Engineering, Structural Dynamics
21	2017	Jabbari Majid, Mostafa Ghayour, Hamid Reza Mirdamadi	Energy Harvesting of a Multilayer Piezoelectric Beam in Resonance and Off-resonance Cases	*ASME Journal of Engineering Materials and Technology*	Vol. 139, No. 3, 031008, Paper No: MATS-15-1201	EHS, Smart Materials, Piezoelectric Transducers, Biomedical Engineering, Structural Dynamics
22	2016	Mokhtari Ali, Vahid Sarvestan, Hamid Reza Mirdamadi	Thermal and tensile loading effects on size-dependent vibration response of traveling nanobeam by wavelet-based spectral element modeling	*Meccanica*		Micro/Nano-Mechanics, Biomedical Engineering, Structural Dynamics, SEM
23	2016	Mokhtari Ali, Vahid Sarvestan, Hamid Reza Mirdamadi	Spectrally formulated finite element for vibration analysis of an Euler-Bernoulli beam on Pasternak foundation	*Journal of Theoretical and Applied Vibration and Acoustics*	2(2) 119-132 2016	Structural Dynamics, SFEM
24	2016	Jabbari Majid, Mostafa Ghayour, Hamid Reza Mirdamadi	Dynamics Analysis of the Steady and Transient States of a Nonlinear Piezoelectric Beam by a Finite Element Method	*Journal of Solid Mechanics*	Vol. 8, No. 2, pp. 247-261	EHS, Smart Materials, Piezoelectric Transducers, Biomedical Engineering, Structural Dynamics, FEM
25	2016	Tahmasebi-Moradi Ahmad Ali, Saeed Ziaei-Rad, Reza Tikani, Hamid Reza Mirdamadi	A finite element model for extension and shear modes of piezolaminated beams based on von Karman's nonlinear displacement-strain relation	*Journal of Theoretical and Applied Vibration and Acoustics*	2(1) 35-64	Smart Structures, Vibration Control, Structural Dynamics, FEM
26	2016	Jabbari Majid, Mostafa Ghayour, Hamid Reza Mirdamadi	Increasing the performance of energy harvesting in vibration mode shapes	*Advances in Computational Design*	Vol. 1, No. 2, pp. 155-173	EHS, Smart Materials, Piezoelectric Transducers, Biomedical Engineering, Structural Dynamics

27	2016	Alizadeh Ali-Asghar, Hamid Reza Mirdamadi, and Ahmadreza Pishevar	Reliability analysis of pipe conveying fluid with stochastic structural and fluid parameters	*Engineering Structures, Elsevier*	Vol. 122, pp. 24-32, 1	Biomedical Engineering, FSI, Structural Dynamics, Random Vibrations
28	2016	Hajheidari Peyman, Mostafa Ghayour, Hamid Reza Mirdamadi	Flap-lag vibration analysis of rotating tapered solid beams having functionally graded characteristics	*ASCE Journal of Aerospace Engineering*	Vol. 29, Issue 1, 04015018-1	Vibration Control, Aerospace Engineering, Composite Structures, Structural Dynamics, FEM
29	2016	Hajheidari Peyman, Mostafa Ghayour, Hamid Reza Mirdamadi	Erratum: Flap-lag vibration analysis of rotating tapered solid beams having functionally graded characteristics	*ASCE Journal of Aerospace Engineering*	Vol. 29, Issue 1, 08215001	Vibration Control, Aerospace Engineering, Composite Structures, Structural Dynamics, FEM
30	2016	Biglar Mojtaba and Hamid Reza Mirdamadi	Configuration optimization of piezoelectric patches attached to functionally graded shear-deformable cylindrical shells considering spillover effects	*Journal of Intelligent Material Systems and Structures/SAGE*	Vol. 27(3) pp 295–313	Smart Structures, Mechatronics, Vibration Control, Composite Structures, Structural Dynamics, FEM
31	2016	Mokhtari Ali, Hamid Reza Mirdamadi, Mostafa Ghayour, Vahid Sarvestan	Time/ wave domain analysis for axially moving pre-stressed nanobeam by wavelet-based spectral element method	*International Journal of Mechanical Sciences, Elsevier*	Vol. 105, pp. 58-69	Micro/Nano-Mechanics, Biomedical Engineering, Structural Dynamics, SEM
32	2016	Davoodi Kermani Iman, Hamid Reza Mirdamadi, Mostafa Ghayour	Nonlinear stability analysis of rotational dynamics and transversal vibrations of annular circular thin plates functionally graded in radial direction by differential quadrature	*Journal of Vibration and Control, SAGE*	Vol. 22(10), pp 2482-2502	Composite Structures, Structural Dynamics, Nonlinear Dynamics
33	2016	Shokrani Mohammad Hossein, Morteza Karimi, Mehdi Salmani Tehrani, Hamid Reza Mirdamadi	Buckling analysis of double-orthotropic nanoplates embedded in elastic media based on non-local two-variable refined plate theory using the GDQ method	*Journal of the Brazilian Society of Mechanical Sciences and Engineering*	Vol. 38, No. 8, pp. 2589-2606	Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics, GDQ
34	2015	Vahid Sarvestan, Hamid Reza Mirdamadi, Mostafa Ghayour, Ali Mokhtari	Spectral finite element for vibration analysis of cracked viscoelastic Euler-Bernoulli beam subjected to moving load	*Acta Mechanica*	Vol. 226, Issue 12, pp 4259-4280	SHM, Composite Structures, Structural Dynamics, Nonlinear Dynamics, SFEM
35	2015	Majid Jabbari, Mostafa Ghayour, Hamid Reza Mirdamadi	Experimental and numerical results of Dynamics behavior of a Nonlinear Piezoelectric Beam	*Mechanics of Advanced Materials and Structures, Taylor & Francis*		EHS, Smart Materials, Piezoelectric Transducers, Biomedical Engineering, Structural Dynamics, Nonlinear Dynamics,
36	2015	Masoud Karimi, Reza Tikani, Saeed Ziaei-Rad, Hamid Reza Mirdamadi	Experimental and theoretical studies on piezoelectric energy harvesting from low-frequency ambient random vibrations	*PROCEEDINGS OF THE IMECHE PART C-Journal of Mechanical Engineering Science, SAGE*		EHS, Smart Materials, Piezoelectric Transducers, Biomedical Engineering, Structural Dynamics, Random Vibrations
37	2015	Behnam Zehtab, Hamid Reza Mirdamadi, A. Asadi, M. Rafeeyan	Experimental study on damage identification in GFRP-strengthened RC beams using novel cubic energy-based damage index	*Advances in Structural Engineering*		SHM, Composite Structures, Structural Dynamics, FEM
38	2015	Amin Ghadami, Mehdi Behzad, Hamid Reza Mirdamadi	A mode conversion-based algorithm for detecting rectangular notch parameters in plates using Lamb waves	*Archive of Applied Mechanics, Springer*		SHM, Structural Dynamics, Wave Propagation
39	2015	Ramin Bighamian, Hamid Reza Mirdamadi, Jin-Oh Hahn	Damage identification in collocated structural systems using structural markov parameters	*ASME Journal of Dynamic Systems, Measurement, and Control*	137(4), 041001-1 (9 pages) Paper No: DS-12-1162	SHM, Smart Structures, Structural Dynamics, System Identification

40	2015	Danial Panahandeh-Shahraki, Hamid Reza Mirdamadi, Omid Vaseghi	Thermoelastic buckling analysis of laminated piezoelectric composite plates	*International Journal of Mechanics and Materials in Design, Springer*	Vol 11, Issue 4, pp 371-385	Smart Structures, Mechatronics, Composite Structures, Vibration Control, Structural Dynamics, FEM
	2015	AA Alizadeh, Hamid Reza Mirdamadi	Free vibration and divergence instability of pipes conveying fluid with uncertain structural parameters	Modares Mechanical Engineering	15 (4), 247-254	Biomedical Engineering, FSI, Structural Dynamics, Random Vibrations
41	2014	Danial Panahandeh-Shahraki, Hamid Reza Mirdamadi, Omid Vaseghi	Fully coupled electromechanical buckling analysis of active laminated composite plates considering stored voltage in actuators	*Composite Structures, Elsevier*	Vol. 118, 94-105	Smart Structures, Mechatronics, Vibration Control, Composite Structures, Structural Dynamics, FEM
42	2014	Hossein Zamani HosseinAbadi, Rassoul Amirfattahi, Behzad Nazari, Hamid Reza Mirdamadi, Seyed Abdolrahim Atashipour	GUW-based structural damage detection using WPT statistical features and multiclass SVM	*Applied Acoustics, Elsevier*	Vol. 86, pp. 59-70	SHM, Smart Materials, Piezoelectric Transducers, Composite Structures, Structural Dynamics, Machine Learning
43	2014	Mojtaba Biglar and Hamid Reza Mirdamadi	Integrated and Consistent Active Control Formulation and Piezotransducer Position Optimization of Plate Structures considering Spillover Effects	*Shock and Vibration*	vol. 2014, Article ID 276714, 14 pages	Smart Structures, Mechatronics, Vibration Control, Piezoelectric Transducers, Structural Dynamics, FEM
44	2014	Mehran Mirramezani, Hamid Reza Mirdamadi, Mostafa Ghayour	Nonlocal vibrations of shell-type CNT conveying simultaneous internal and external flows by considering slip condition	*Computers Methods in Applied Mechanics and Engineering, Elsevier*	Vol. 272, pp. 100-120, 15	Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics, FEM
45	2014	Hossein Zamani HosseinAbadi, Behzad Nazari, Rassoul Amirfattahi, Hamid Reza Mirdamadi, Amir Reza Sadri	Wavelet network approach for structural damage identification using guided ultrasonic waves	*IEEE Transactions on Instrumentation & Measurement*	Vol. 63, Issue 7 pp. 1680-1692, 05	SHM, Smart Materials, Piezoelectric Transducers, Composite Structures, Structural Dynamics, Machine Learning
46	2014	Ali Esmaeili, Mehrnaz Aghanouri Kupaei, Hamed Faghihian, Hamid Reza Mirdamadi	An adaptable broadband MEMS vibratory gyroscope by simultaneous optimization of robustness and sensitivity parameters	*Sensors and Actuators A: Physical, Elsevier*	Vol. 206, pp. 132-137	MEMS/NEMS, Micro/Nano-Mechanics, Biomedical Engineering, Structural Dynamics
47	2014	Mojtaba Biglar, Hamid Reza Mirdamadi, Mohammad Danesh	Optimal locations of piezoelectric sensors and actuators on cylindrical shell based on gramians of contributed and undesired Rayleigh–Ritz modes using genetic algorithm	*Journal of Sound and Vibration, Elsevier*	Vol 333, Issue 5, pp. 1224-1244	Smart Structures, Mechatronics, Vibration Control, Piezoelectric Transducers, Structural Dynamics, FEM
48	2014	Danial Panahandeh-Shahraki, Hamid Reza Mirdamadi	Shell-tensionless foundation interaction and nonlinear thermoelastic stability analysis of laminated composite cylindrical panels	*Acta Mechanica, Springer*	Vol. 225, Issue 1, pp. 131-149	SHM, Smart Materials, Piezoelectric Transducers, Composite Structures, Structural Dynamics, Nonlinear Dynamics, FEM
49	2014	Danial Panahandeh-Shahraki, Hamid Reza Mirdamadi	Erratum to: Shell-tensionless foundation interaction and nonlinear thermoelastic stability analysis of laminated composite cylindrical panels	*Acta Mechanica, Springer*	Vol. 225(1), pp. 151-155	SHM, Smart Materials, Piezoelectric Transducers, Composite Structures, Structural Dynamics, Nonlinear Dynamics, FEM
50	2014	Milad Mehrkash, Mojtaba Azhari, Hamid Reza Mirdamadi	Assessment of reliability range of plate theories for elastic wave propagation analysis of functionally graded material plates	*Journal of Ultrasonics, Elsevier*	Vol. 54, Issue 1, pp. 106-120	SHM, Smart Materials, Composite Structures, Structural Dynamics, Wave Propagation
51	2014	Reza Moradi, Omid Vaseghi, and Hamid	Constrained thickness optimization of rectangular orthotropic fiber-reinforced	*Optimization and*	Vol. 15,	Vibration Control, Composite Structures,

		Reza Mirdamadi	plate for fundamental frequency maximization	*Engineering, Springer*	Issue 1, pp. 293-310	Structural Dynamics, Structural Optimization
52	2013	Amin Ghadami, Ameneh Maghsoodi, Hamid Reza Mirdamadi	A new adaptable multiple-crack detection algorithm in beam-like structures	*Polish Academy of Sciences, Institute of Fundamental Technological Research, Archives of Mechanics, Warszawa*	65(6), pp 1-15	SHM, System Identification, Structural Dynamics,
53	2013	Omid Vaseghi, Hamid Reza Mirdamadi, Danial Panahandeh-Shahraki	Nonlinear stability analysis of laminated composite plates on one-sided foundation by hierarchical Rayleigh-Ritz and finite elements	*International Journal of Nonlinear Mechanics, Elsevier*	Vol. 57, pp. 65-74	SHM, Smart Structures, Piezoelectric Transducers, Composite Structures, Structural Dynamics, Nonlinear Dynamics, FEM
54	2013	Mehran Mirramezani, Hamid Reza Mirdamadi, Mostafa Ghayour	Innovative coupled fluid-structure interaction model for CNTs conveying fluid by considering the size effects of nano-flow and nano-structure	*Computational Materials Science, Elsevier*	Vol. 77, pp 161-171	Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics
55	2013	Mahmood Ali-Asgari, Hamid Reza Mirdamadi, Mostafa Ghayour	Coupled effects of nano-size, stretching, and slip boundary conditions on nonlinear vibrations of nano-tube conveying fluid by homotopy analysis method	*Physica E: Low-dimensional Systems and Nanostructures, Elsevier*	Vol. 52, pp. 77-85	MEMS/NEMS, Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics, Nonlinear Dynamics
56	2013	Hesam Hajheidari and Hamid Reza Mirdamadi	Frequency-dependent vibration analysis of symmetric cross-ply laminated plate of Levy-type by spectral element and finite strip procedures	*Applied Mathematical Modelling, Elsevier*	Vol. 37, pp. 7193-7205	Smart Structures, Mechatronics, Vibration Control, Earthquake Engineering, Composite Structures, Structural Dynamics, SEM
57	2013	Mohammad Reza Matin, Hamid Reza Mirdamadi, Mostafa Ghayour	Effects of nonlocal elasticity and slip condition on vibration of nano-plate coupled with fluid flow	*Physica E: Low-dimensional Systems and Nanostructures, Elsevier*	Vol. 48, pp 85-95	Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics, CFD
58	2013	Seyed Abdolrahim Atashipour, Hamid Reza Mirdamadi, Mohammad Hamid Hemasian, Rasoul Amirfattahi and Saeed Ziaei-Rad	An effective damage identification approach in thick steel beams based on guided ultrasonic waves for structural health monitoring applications	*Journal of Intelligent Material Systems and Structures, SAGE*	24(5), pp 584-597	SHM, Smart Materials, Piezoelectric Transducers, Composite Structures, Structural Dynamics
59	2013	Fareed Kaviani and Hamid Reza Mirdamadi	Wave propagation analysis of carbon nano-tube conveying fluid including slip boundary condition and strain/inertial gradient theory	*Computers and Structures, Elsevier*	116, pp 75-87	Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics, Wave Propagation
60	2013	Danial Panahandeh-Shahraki, Hamid Reza Mirdamadi, Ali Reza Shahidi	Nonlinear buckling analysis of laminated composite curved panels constrained by Winkler tensionless foundation	*European Journal of Mechanics A/Solids, Elsevier*	39, pp 120-133	Vibration Control, Earthquake Engineering, Composite Structures, Structural Dynamics, Nonlinear Analysis, FEM
61	2013	Reza Hosseini-Ara, Hamid Reza Mirdamadi, Hassan Khademyzadeh, Haleh Salimi	Thermal effect on dynamic stability of single-walled carbon nanotubes in low and high temperatures based on nonlocal shell theory	*Advanced Materials Research, Trans Tech Publications, Switzerland*	Vols. 622-623, pp 959-964	Micro/Nano-Mechanics, Biomedical Engineering, Structural Dynamics, Nonlinear Dynamics,
62	2013	Ameneh Maghsoodi, Amin Ghadami, Hamid Reza Mirdamadi	Multiple-Crack Damage Detection in Multi-Step Beams by a Novel Local Flexibility-based Damage Index	*Journal of Sound and Vibration, Elsevier*	332(2), 21 Jan. pp. 294-305	SHM, System Identification, Structural Dynamics
63	2013	Fareed Kaviani, Hamid Reza Mirdamadi	Snap-through and bifurcation of nano-arches on elastic foundation by the strain gradient and nonlocal theories	*International Journal of Structural*	13(5), 135002 2 (21	Micro/Nano-Mechanics, Biomedical Engineering, Structural Dynamics,

				Stability and Dynamics (IJSSD), World Scientific	pages)	Nonlinear Dynamics
64	2013	Danial Panahandeh-Shahraki, Alireza Shahidi, Hamid Reza Mirdamadi, Omid Vaseghi	Nonlinear analysis of uni-lateral buckling for cylindrical panels on tensionless foundation	*Thin-Walled Structures, Elsevier*	Vol. 62, pp. 109-117	Earthquake Engineering, Composite Structures, Structural Analysis, Nonlinear Analysis, FEM
65	2013	Ramin Bighamian and Hamid Reza Mirdamadi	Input/output system identification of simultaneous mass/stiffness damage assessment using discrete-time pulse responses, differential evolution algorithm, and equivalent virtual damped SDOF	*Structural Control and Health Monitoring, Wiley*	20:576 –592	SHM, System Identification, Structural Dynamics, Machine Learning
	2013	SA Atashipour, HR Mirdamadi, R Amirfattahi, S Ziaei-Rad	Application of wavelet transform in damage identification in a thick steel beam based on ultrasonic guided wave propagation	The Modares Journal of Mechanical Engineering	12 (5), 154-164	SHM, Smart Materials, Piezoelectric Transducers, Composite Structures, Structural Dynamics
66	2012	Amin Ghadami, Ameneh Maghsoodi, Hamid Reza Mirdamadi	Energy analysis of multiple-cracked Euler-Bernoulli beam	*Journal of Vibroengineering*	14(3), pp. 1399-1412	SHM, Structural Dynamics
67	2012	Hesam Hajheidari and Hamid Reza Mirdamadi	Free and transient vibration analysis of un-symmetric cross-ply laminated plate by spectral finite element	*Acta Mechanica, Springer*	223(11), pp. 2477-2492	Vibration Control, Earthquake Engineering, Composite Structures, Structural Dynamics, SFEM
68	2012	Iman Davoodi Kermani, Mostafa Ghayour, Hamid Reza Mirdamadi	Free vibration analysis of multi-directional functionally graded circular and annular plates	*Journal of Mechanical Science and Technology, Springer*	26(11), pp. 3399-3410	Vibration Control, Earthquake Engineering, Composite Structures, Structural Dynamics
69	2012	Mehran Mirramezani, Hamid Reza Mirdamadi	Effects of nonlocal elasticity and Knudsen number on fluid-structure interaction in carbon nanotube conveying fluid	*Physica E: Low-dimensional Systems and Nanostructures, Elsevier*	Vol. 44(10), pp. 2005–2015	Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics
70	2012	Reza Hosseini Ara, Hamid Reza Mirdamadi, Hasan Khademyzadeh	Buckling analysis of short carbon nanotubes based on a novel Timoshenko beam model	*Journal of Theoretical and Applied Mechanics (JTAM), Warsaw University of Technology*	ISSN 1429-2955,50(4), pp. 975-986	Micro/Nano-Mechanics, Biomedical Engineering, Structural Analysis
71	2012	Reza Hosseini Ara, Hamid Reza Mirdamadi, Hasan Khademyzadeh, R. Mostolizadeh	Stability Analysis of Carbon Nanotubes Based on a Novel Beam Model and Its Comparison with Sanders Shell Model and Molecular Dynamics Simulations	*Journal of the Brazilian Society of Mechanical Sciences and Engineering*	34(2), pp. 126-134	Micro/Nano-Mechanics, Biomedical Engineering, Structural Analysis
72	2012	Ramin Bighamian, Hamid Reza Mirdamadi and Fariborz Fariborzi	Sensor-Based Extraction of Physical Property Matrices from Realized State-Space Models	*International Journal of Modelling, Identification and Control (IJMIC), Inderscience publishers*	1746-6180, ISSN (Print): 17(3), pp. 261-270	SHM, Structural Control, Structural Dynamics, FEM
73	2012	Fareed Kaviani, Hamid Reza Mirdamadi	Influence of Knudsen number on fluid viscosity for analysis of divergence in fluid conveying nano-tubes	*Computational Materials Science, Elsevier*	61 270-277	Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics
74	2012	Azam Arefi, Hamid Reza Mirdamadi, and Mahmoud Salimi	Stability Analysis of Circular Nanorings Under Different Loading Behavior by Nonlocal Elasticity Theory	*Journal of Computational and Theoretical Nanoscience, American*	9(6), 794-801	Micro/Nano-Mechanics, Biomedical Engineering, Structural Analysis

				Scientific Publishers		
75	2012	Mehran Mirramezani, Hamid Reza Mirdamadi	The effects of Knudsen-dependent flow velocity on vibrations of a nano-pipe conveying fluid	*Archive of Applied Mechanics, Springer*	Vol. 82, No. 7, 879-890	Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics
76	2012	Vahid Rashidi, Hamid Reza Mirdamadi, Ebrahim Shirani	A novel model for vibrations of nanotubes conveying nanoflow	*Computational Materials Science, Elsevier*	51, 347–352	Micro/Nano-Mechanics, Biomedical Engineering, FSI, Structural Dynamics
77	2012	Fariborz FARIBORZI; Ramin BIGHAMIAN, Hamid Reza Mirdamadi	Model-Order Reduction by Simultaneous Realization of Eigenvalues and Mode Shapes	*Journal of Dynamic Systems, Measurement, and Control, Transactions of the ASME*	134(1), Article no. 014502	SHM, System Identification, Structural Dynamics, FEM
78	2002	Hamid Reza Mirdamadi, Ali Akbar Golafshani	Adaptive Control of Structures by LMS Algorithm: A Comparative Study	*Structures and Buildings Journal, Thomas Telford, London, UK*	Vol. 152, No. 2, pp. 175-191	Structronics, Vibration Control, Adaptive Control, Earthquake Engineering, Structural Dynamics, FEM
79	2001	Ali Akbar Golafshani, Hamid Reza Mirdamadi	Semi-active Multivariable Adaptive Control of Structures under Earthquake Excitations	*Scientia Iranica, International Journal of Science and Technology, Sharif University of Technology, Tehran, Iran*	Vol. 8, No. 1, pp. 38-53	Structronics, Vibration Control, Adaptive Control, Earthquake Engineering, Structural Dynamics, FEM

Partial list of ISC (Peer-reviewed) Research papers

1. Farshad Ghasemi, Hamid Reza Mirdamadi, Javad Jafari Fesharaki, " Damage detection and structural health monitoring of ST-37 plate using smart materials and signal processing by artificial neural networks", Journal of Advanced Materials and Processing, Vol. 4, No. 3, pp. 33-44, 2017.

Partial list of conference Papers (in English):

1. Mirdamadi, H.R., "An Assessment of Solution Algorithms of Nonlinear Equations Due to FEM Discretization in Nonlinear Structural Mechanics with Emphasis on BFGS", presented at 3rd International Iranian Congress of Civil Engineering, Department of Civil Engineering, School of Engineering, University of Shiraz, Shiraz, Iran, May 14-16, 1990.
2. Hosseini, M. & Mirdamadi, H.R., "The Effects of Structure Properties and Earthquake-characteristics on the Effectiveness of Passive Control Systems", presented at Post SMiRT Structural Mechanics in Reactor Technology, 14th International Seminar on: Passive Safety Features in Nuclear Installation, Pisa, Italy, Aug. 25-27th 1997.
3. Mirdamadi, H.R., "Semi-active Control and Optimal Estimation of Dynamic Characteristics of Structures by Digital Adaptive Filters", presented at SEE3 3rd International conference on seismology and Earthquake Engineering, Tehran, Iran, May 17-19, 1999.
4. Golafshani, A.A.; Mirdamadi, H.R. & Tehrani, F.M., "Application of Base Isolation Systems in Low-rise Buildings", Technical Report, Research Department, Sharif University of Technology, Tehran, Iran, 1996. (in Persian)
5. Haeri, M. & Mirdamadi, H.R., "Adaptive Control of Structures under Earthquake Excitation", presented at 6th Iranian Annual Conference of Electrical Engineering, Department of Electrical Engineering, K.N. Toosi University of Technology, Tehran, Iran, May 11-13, 1998. (in Persian)
6. Golafshani, A.A. & Mirdamadi,H.R., "Switching Control of Structures with Multiple Linear Models Using Earthquake Input Energy Transference between Natural Modes of Vibration", presented at SEE3 3rd International conference on seismology and Earthquake Engineering, Tehran, Iran, May 17-19, 1999. (in Persian)
7. Alibeigi, Mohammad; Mirdamadi, Hamid Reza, & Halabian, Amirmehdi, "Finite Element Dynamic Model Updating by Frequency Response Function Matrices and System Output Error Model", The First National Conference on Civil Engineering, NCCE1383, Sharif University of Technology, Tehran, Iran, May 14-16, 2004.

8. Atashi, Masood; Mirdamadi, Hamid Reza, “Dynamics and Passive Controls of Seismically-Excited Viscoelastic Structures of Tall Buildings”, The First National Conference on Civil Engineering, NCCE1383, Sharif University of Technology, Tehran, Iran, May 14-16, 2004.
9. Khodaparast, Alireza; Mirdamadi, Hamid Reza, & Halabian, Amirmehdi, “Stochastic Dynamics Finite Element Model Updating by Bayesian Theorem and Random Vibration Techniques”, The First National Conference on Civil Engineering, NCCE1383, Sharif University of Technology, Tehran, Iran, May 14-16, 2004.
10. Mirdamadi, Hamid Reza, & Yaser Shahbazi, “Numerical Simulation Of Electromechanical Finite Element Formulation Of Extension Actuators In Smart Adaptive Laminated Composites”, SMSST'07: The World Forum on Smart Materials and Smart Structures Technology, Chongqing & Nanjing, China, May 22-27, 2007.
11. Mirdamadi, Hamid Reza, & Amir Adibzadeh, “Robust Control And System Analysis Of Adaptive Telescopic Space Structures”, 18th International Conference of Adaptive Structures and Technologies, ICAST 2007, 3-5 October 2007, Ottawa, Canada.
12. Mirdamadi, Hamid Reza, & Yaser Shahbazi, “Hamiltonian Mechanics Formulation And Finite Element Modeling Of Adaptive Telescopic Space Structures”, 18th International Conference of Adaptive Structures and Technologies, ICAST 2007, 3-5 October 2007, Ottawa, Canada.
13. S.M. Tabatabaei, H.R. Mirdamadi, S. Behbahani, “A Complex Variable Procedure for the Formulation of Elastoelectromagnetic Wave Propagation in Multilayered Half-space Piezo Media”, 17th. Annual (International) Conference on Mechanical Engineering-ISME2009, May, 2009, University of Tehran, Iran.
14. Ramin Bighamian and Hamid Reza Mirdamadi, “Off-line/On-line Multi Mass-Stiffness Damage Detection by Structural Input-Output Data”, Iranian Aircraft Structural Integrity Program Conference, IASIP 2011, Department of Aerospace Engineering, Sharif University of Technology, Tehran, Iran, Paper ID: 1060-IASIP, 05-07 July, 2011.
15. Y. Shahbazi, M. R. Chenaghlou, K. Abedi, H. R. Mirdamadi, M. J. Khosrowjerdi,"Hamiltonian Mechanics Formulation of Smart Membrane Structure" 6th International Conference on Seismology and Earthquake Engineering- SEE6, Tehran, Iran, 16-18 May 2011.
16. Y. Shahbazi, M. R. Chenaghlou, K. Abedi, H. R. Mirdamadi, M. J. Khosrowjerdi, "ELECTROSTATIC ANALYSIS OF SMART CYLINDRICAL MEMBRANE STRUCTURES", 6th International Conference on Seismology and Earthquake Engineering- SEE6, Tehran, Iran, 16-18 May 2011.
    Tahmasebi. M, S. Adibi, H. R. Mirdamadi, "Finite Element Modeling of the Piezolaminated Beam Using Von Karman Nonlinear Strain-Displacement Relation", 18th Annual International Conference on Mechanical Engineering-ISME2010, 11-13 May, 2010, Sharif University of Technology, Tehran, Iran, ISME2010-3609.
17. Hamid Reza Mirdamadi, Navid Mozaffari, "HAMILTONIAN MECHANICS FORMULATION & FINITE ELEMENT SIMULATION OF ADAPTIVE SMART AXISYMMETRIC TELESCOPIC STRUCTURES"
18. Hamid Reza Mirdamadi, Mohammadreza Ebrahimi and Navid Mozaffari, "ROBUST VIBRATION CONTROL AND SYSTEM ANALYSIS OF SMART ANTISYMMETRIC TUBULAR STRUCTURES"
19. Iman Davoodi Kermani, Mostafa Ghayour and Hamid Reza Mirdamadi, Free vibration of multidirectional functionally graded circular clamped plate, ISME2012-1927, 20th Annual International Conference on Mechanical Engineering-ISME2012, 15-17 May, 2012, School of Mechanical Eng., Shiraz Univ., Shiraz, Iran.
20. Iman Davoodi Kermani, Mostafa Ghayour and Hamid Reza Mirdamadi, Free Vibration Analysis of a Rotating Functionally Graded Annular Clamped Plate, ISAV2011, 1st International Conference on Acoustics and Vibration, Amir Kabir University of Technology, Tehran, 21-22 Dec 2011.
21. M. Jamali Ghahderijani, A. Fadaei Tehrani and H.R. Mirdamadi, Utilizing a Maskless Laser Lithography System in Photochemical Machining, 3rd International Conference on Manufacturing Engineering, ICME2011, University of Tehran, Tehran, Iran, 27-29 December 2011.
22. Ameneh Maghsoodi, Amin Ghadami and Hamid Reza Mirdamadi, Inverse Problem and Damage Identification of Beams Based on Equivalent Rotational Spring Models for Simultaneous Cracks, ISAV2011, 1st International Conference on Acoustics and Vibration, Amir Kabir University of Technology, Tehran, 21-22 Dec 2011.
23. R. Hosseini-Ara, Hamid Reza Mirdamadi, H. Khademyzadeh, H. Salimi, Thermal effect on dynamic stability of single-walled carbon nanotubes in low and high temperatures based on nonlocal shell theory, 2012 International Conference on Nanostructures, Nanomaterials and Nanoengineering ICNNN 2012, Singapore, 5-7 Oct. 2012.

24. R. Hosseini Ara[1], H.R. Mirdamadi[1], H. Khademyzadeh, Axial Buckling Analysis of Clamped Carbon Nanotubes Using Nonlocal Boundary Conditions, International Congress on Nanoscience & Nanotechnology (ICNN2012) 8-10 September 2012, Kashan, Iran.
25. Ameneh Maghsoodi, Amin Ghadami and Hamid Reza Mirdamadi, Energy-based Procedure For Detection Of Crack In Stepped-beam Like Structures, 21st Annual International Conference on Mechanical Engineering-ISME2013, 7-9 May, 2013, School of Mechanical Engineering, K.N.Toosi University of Technology, Tehran, Iran
26. Ramin Bighamian, Hamid Reza Mirdamadi and Jin-Oh Hahn, "Damage Identification in Collocated Structural Systems Using Structural Markov Parameters", ASME 2013 Dynamic Systems and Control Conference, Palo Alto, California, USA, October 21–23, 2013.
27. Vahid Sarvestan, Ali Mokhtari, Hamid Reza Mirdamadi, Mostafa Ghayour, "Free vibration of undamped Euler-Bernoulli and Timoshenko beams by using spectral finite element method for different boundary conditions", The First Global Conference on Civil, Archtectural, Electrical, and Mechanical Engineering, Azar 27 1393, Gargan, University of Golestan.
28. Ali Mokhtari, Vahid Sarvestan, Hamid Reza Mirdamadi, Mostafa Ghayour, "Using spectral finite element method for time domain analysis of Timoshenko beam under concentrated impulse load, The First Global Conference on Civil, Archtectural, Electrical, and Mechanical Engineering, Azar 27 1393, Gargan, University of Golestan.
29. Mehdi Rahmati, Hamid Reza Mirdamadi, "Stability analysis of CNTs conveying fluid by considering non-uniform flow velocity and size effects of nano-structure", 16th Conference On Fluid Dynamics, fd2015, Nov., 17-19, Razi University, Kermanshah, Iran.
30. Mehdi Rahmati, Hamid Reza Mirdamadi, "Vibrational behavior of fluid-conveying carbon nanotubes with non-uniform flow velocity based on nonlocal elasticity theory", 16th Conference On Fluid Dynamics, fd2015, Nov., 17-19, Razi University, Kermanshah, Iran.
31. Mehdi Rahmati, Hamid Reza Mirdamadi, " Non-uniformityeffects of flow velocity onthe fluid-structureinteraction in carbon nanotubesconveying fluid', ISAV2015, 5th International Conference on Acoustics and Vibration, University of Tehran, Tehran, 25-26 Nov 2015.

IUT innovations center and knowledge-based company activities

(1) Project of a continuous auto-focus eyeglasses with liquid lenses
Sept. 2018- present
Phase I:
To invent a pair of eyeglasses, which lenses are transparent silicon liquid inside a mini-pump whose piston translate approximately back and forth by turning a small screw on the rim supporter of those lenses. This translational movement, in fact, is a combination of both translation and rotation about a fixed axis. The diopter range of this pair of eyeglasses is about 3 to 4. The major advantage is that it can change from convex shaped-lens with positive diopter (near-sight vision)) to concave shaped-lens with negative diopter values (far-sight vision). So it is appropriate those people with age larger than 40 to 45 and having eye sight refractive errors.
Sept. 2019- present
Phase II;
To automatize the above-mentioned system consisting of liquid lenses inside a miniaturized piston and cylinder pump with a piezoelectric actuator, Op-Amps, two pairs of triboelectric sensors, a PID feedback control algorithm, a general-purpose micro CPU/GPU/Arduino/Raspberry Pi or application-specific IC like FPGAs, and a mini power supply.

(2) Project of automatic vacuum cleaner
Sept. 2017- Sept 2018
This is a moving wheeled robot having two gearboxes for maneuvering in every horizontal direction and rotation, together with two electric motors and an axial pump. The cleaner microchip equipped with a LIDAR is an ASIC for mapping the room and then storing the map and finding the geometric coordinates and the point of start and finish and point of charging.

(3) Project of prosthetic or artificial heart mitral or aortic valves
Sept. 2019- present
These mechanical valves are actuated and rotated by hinges made of magnetic shape memory alloys (MSMAs). The required magnetic field is actuated from outside body under consideration.

(4) Project of battery-less lead-less cardiac pace maker
Sept. 2017- present
This is an energy harvesting system having a 2D structure and a hybrid piezoelectric/triboelectric sensor for converting mechanical vibrational energy to electric energy.

(5) Project of an architectural and interior design of a kitchen with a rotating partition for splitting the space of kitchen into two parts of primary and secondary sub-kitchens and vice versa.
Sept. 2018- 2019
The rotation of that wall can be implemented either manually or automatically. In the automatic case, the partition can rotate by means of a number of electric motors and IR or RF sensors.
Smart Home: Rotating Wall in a Two-Part Kitchen
Video link
https://youtu.be/asT-_bR1qjM

Partial list of academic administrative

- Dec. 2005-up to Dec 2007:
  The Head and The Acting Head for Initiative of Civil Engineering Dept. in Faculty of Engineering of The University of Isfahan, Isfahan, Iran.
- Dec. 2005-up to Sep 2008:
  Representative in the Committees for employing Academic Faculty Members for Civil and Mechanical Engineering Depts. in Faculty of Engineering of The University of Isfahan, Isfahan, Iran.
- Dec. 2006-up to Sep. 2008:
  The Designer, Innovator, and responsible for Planning and Initiating of the New Master of Science Degree Program of "Smart Structures" in Ministry of Science, Research and Technology, and also Civil & Mechanical Engineering Depts. in Faculty of Engineering of The University of Isfahan, Isfahan, Iran.
- Sept. 2011-Sept. 2015
  Establishing Smart Structures lab and acting as head of lab.
- Aug. 2011- Aug. 2013:
  The Head of Mechatronics Division, Department of Mechanical Engineering, Isfahan University of Technology.

PhD/MSc abstracts:

Partial abstract of my PhD thesis ((1993-1999), entitled

"*Nonlinear Control and Dynamics of Seismically-Excited Structures*"

In this thesis, I develop and implement several nonlinear vibration control feedback and feedforward MIMO controller/observer algorithms, specifically, for nonlinear and/or time-varying MDOF finite element (FE) assemblages. They could be obtained from discretization of continuous-space framed/skeletal structures (1D distributed-parameter systems), like 2D and 3D trusses, continuous-span beams, 2D and 3D frames with rigid diaphragms, and grillages, subjected to non-stationary non-Gaussian continuous-time continuous-valued random disturbance signals or stochastic seismic records. For some active/semi-active/hybrid structural control problems that I investigated, the nonlinearity for structures is a type of time-varying on-off switching BCs (boundary conditions) and that of compensating algorithm is due to on- off command signals and/or time varying static (elastic and/or geometric stiffness) and dynamic (viscous damping) properties of the MDOF structure under control. In addition, the adaptive character of control strategies has benefitted from a stochastic parameter-identification and state-estimation approaches. Stochastic extended Kalman filtering (EKF) has been implemented for estimating state-variable signals (acceleration, velocity, and displacement), while Filtered-X NLMS (Normalized Least Mean-Squares) algorithm has been used for real-time (on-line) identification of the system model (elastic and/or geometric stiffnesses and viscous damping) and system input/output signals (frequency content, PGA/PGV/PGD, and phase-shift) properties. The geometric stiffness and phase-shift properties are estimated for detecting onsets of instability. Three important MIMO semi-active/active/hybrid control strategies that I have developed are as follows. (1) MIMO seismic model reference adaptive control (SMRAS), with two nested feedback loops, one inner feedback loop for turning back the fast-changing feedback state-variable signals and an outer feedback loop, as an identification/estimation algorithm for updating the slow-changing parameter-variable signals. (2) MIMO seismic model predictive control (SMPC), with a horizon for extrapolation of state-variable signals resulting from the existence of model. (3) MIMO seismic modal energy transfer (SMET) among natural and non-natural mode shapes of the structure switching among different linear models in a context of robust control strategy. It consists of structured uncertainty blocks in the switching operation successful or not (by knowing a priori, either a specific probability distribution/density function or auto-correlation and cross-correlation functions) resulting from Bayes' theorem and available statistics (past information). Three kinds of hardwares would be implemented for actuating mechanisms: (1) A wind bracing on/off switching mechanism with controllable friction bolt connection dampers, (2) An on/off-orifice viscous fluid energy dissipating actuator as the hardware of hybrid compensator, (3) A variable-orifice viscous fluid energy dissipating mechanism, as a continuous counterpart of the case (2). The sensor technology is based on piezoelectric accelerometers, tachometers, LVDTs, and strain gauges, for measuring acceleration, velocity, displacements, and strains in predetermined DOF's of the key points of the structure under control. The computer routines are developed in the environments of MATLAB, its toolboxes like control and signal processing toolboxes, and Simulink. Some of the results of simulations are as follows. Intelligent structures would get smarter during resonance phenomenon. Sudden switching among different linear models of a structure, having dynamic characterizations far from each other, might render system into the instability threshold. Dissatisfaction of Lipschitz condition for switching control systems might cause inaccessibility to the methods of mathematical analysis. Better performance of stiff structures could be observed in on/off wind bracing actuating mechanism controlled by switching control and predictive control. Better performance of flexible structures would be observed in on/off-orifice damper actuators and adaptive control. On/off-orifice mechanism-based control scheme is more stable than on/off wind bracing-based switching control. Better performance of energy dissipating mechanisms would be observed for earthquake signals having low-pass filter dynamic characterizations. Non-uniformity of convergence would be observed for Markov parameters of FIR filters, which model seismic disturbance in the predictive algorithms. By running predictive algorithms, a more exact identification of earthquake dynamics could result for broadband seismic signals. More desirable performance of adaptive control could be observed for broadband seismic signals as compared to narrowband ones. Better performance of predictive control algorithms

could be observed for seismic signals having band-pass filter dynamic characteristics as compared to earthquake records possessing low-pass dynamics. Unsatisfactory performance of both adaptive and predictive control schemes would be observed for short-duration seismic signals as compared to longer duration earthquake records. It could be noticed that proportional viscous damping forces would not be zero-mean random processes in the variable-orifice energy dissipating semi-active systems. Adaptive structural control strategies could be interpreted as a tool for designing nonlinear filters that could mimic the dynamic behavior of the physical structure under control with about a 180^0 phase shift. The superiority of adaptive control for structural control could be emphasized as compared to the other investigated strategies implemented in this research.

Partial abstract of my MSc thesis (1986-1990), entitled

"Nonlinear Material and Geometric Finite Element Stress Analysis of Continua by BFGS Algorithm"

In this thesis, I developed nonlinear equation solver algorithms for displacement-based isoparametric continuum MDOF finite element (FE) assemblages based on 2D plane stress, plane strain, axisymmetric solid and general 3D continuum constitutive formulations subjected to large rotations, large deformations, and large strains like the extrusion and forging occurring in metal forming manufacturing processes. The FE procedure is implemented to transform a distributed-parameter system (an infinite-dimensional vector space or a model with infinite DOFs) into a lumped-parameter system (a finite-dimensional vector space or a model with finite DOFs) in spatial domain. The continuous integral formulations are derived by virtual displacements (virtual work priciple) in the case of statics, and by combination of the principles of virtual displacements and D'Alembert in the case of dynamics. The formulations are based on both updated Lagrangian viewpoint (with measures of Green-Lagrange strain and 2nd Piola-Kirschhoff stress tensors) and updated Lagrangian viewpoint (with logarithmic strain and Cauchy stress measures), variational calculus, and tensor notation. The problem formulation is highly nonlinear from viewpoint of geometry, material, and boundary conditions (BCs). Rigid-body large displacements do not cause geometric nonlinearity but rigid-body intermediate and large rotations do. Large displacements may cause nonlinear BCs. Material nonlinearities are due to running material behavior from linear elastic range into nonlinear elastic or even plastic or viscoplastic response. The analysis needs automatic re-mesh generation for avoiding non-convex finite elements to be generated. The nonlinear solution procedure is based on two nested iteration loops. The outer loop is for incrementing load steps (or time steps in the case of dynamics), while the inner loop is for measuring an energy-based convergence criterion between the incremental external equivalent nodal loads and generated incremental internal stress resultants calculated in the Gaussian integration points of FEs of the structure or continuum. Transforming nonlinear (space and/or time-dependent) PDEs into either nonlinear system of (time-dependent only) ODEs (dynamic problems) or nonlinear system of algebraic equations (Static problems) by FE discretization of mass, elastic stiffness, geometric stiffness, and classical viscous (viscoelastic in the case of visco-elastoplastic material response) damping properties remains a system of highly nonlinear equations. In the case of nonlinear ODEs the discretization process continues with one of the most efficient direct and implicit time integration schemes, *i.e.*, Newmark's β time stepping methods (in the case of structural dynamics or second-order representation of time-dependent ODEs) or Runge-Kutta methods (in the case of state space or first-order representation of time-dependent ODEs) for temporal discretization. In any case, in each load or time increment of loading, these nonlinear algebraic equations are solved by BFGS (*Broyden-Fletcher-Goldfarb-Shanno*) algorithm, which is one of the most effective procedures of quasi-Newton or matrix update methods. BFGS is inherently an optimization solver. In each iteration, for approaching convergence criteria, I used the direct linear equation solver algorithms based on computer implementation of Gauss elimination, *i.e.*, the active column solution. I implemented the skyline matrix solver for efficient use of computing storage. For part of metal plasticity, I developed algorithms for calculating von Mises yield surface criterion, associated flow rule normality rule), isotropic hardening rule, incompressibility condition, and equivalent stress and strain rates. For coding my algorithms to computer routines and subroutines, I used FORTRAN 77.

BSc/MSc/PhD transcripts (sorted from highest to lowest grades)

(The grading system is out of 20 for Sharif University of Technology and out of 4.0 for University of Arizona.)

Degree program/Specialty	Course title.	University	No of units	Grade	Semester
BSc/Engineering Mathematics	Numerical Computations	SUT	2	20.0 out of 20	Fall 1983-84
BSc/Water Resources	Hydrology	SUT	2	20.0 out of 20	Spring 1984-85
BSc/Structural Mechanics	Matrix Analysis of Structures	SUT	3	20.0 out of 20	Fall 1985-86
MSc/Engineering Mathematics	Advanced Engineering Mathematics	SUT	4	20.0 out of 20	Fall 1987-88
PhD/Engineering Mathematics	Advanced Engineering Analysis I	UoA	3	4.0 out of 4	Fall 1993-94
PhD/Rigid-body Dynamics	Advanced Dynamics	UoA	3	4.0 out of 4	Fall 1993-94
PhD/Multibody Dynamics	Computer-Aided Analysis of Mechanical Systems I	UoA	3	4.0 out of 4	Fall 1993-94
PhD/Engineering Mathematics	Advanced Engineering Analysis II	UoA	3	4.0 out of 4	Spring 1993-94
PhD/Manufacturing Engineering	Advanced Finite Elements	UoA	3	4.0 out of 4	Spring 1993-94
PhD/Multibody Dynamics	Computer-Aided Analysis of Mechanical Systems II	UoA	3	4.0 out of 4	Spring 1993-94
BSc/Engineering Statistics	Engineering Probability and Statistics	SUT	3	19.8 out of 20	Spring 1982-83
BSc/Humanities	Islamic Culture I	SUT	3	19.7 out of 20	Spring 1982-83
BSc/Structural Mechanics	Plastic Analysis of Structures	SUT	3	19.5 out of 20	Fall 1985-86
MSc/Structural Mechanics	Theory of Elasticity	SUT	3	19.5 out of 20	Spring 1987-88
BSc/Structural Dynamics	Vibration of Structures	SUT	3	19.3 out of 20	Spring 1985-86
BSc/Computer Science	Computer Programming	SUT	2	19.0 out of 20	Fall 1983-84
BSc/English	ESP I	SUT	3	19.0 out of 20	Spring 1982-83
MSc/Seminar	MSc Seminar	SUT	2	19.0 out of 20	Spring 1987-88
MSc/Thesis	MSc Thesis	SUT	*8*	19.0 out of 20	Spring 1989-90
PhD/Structural Dynamics	Nonlinear Vibrations	SUT	3	19.0 out of 20	Spring 1994-95
PhD/English	Language for PhD	SUT	3	19.0 out of 20	Summer 1997-98
PhD/Structural Dynamics	Nonlinear Vibrations	SUT	3	19.0 out of 20	Fall 1998-99
PhD/Thesis	Doctorate Thesis	SUT	24	19.0 out of 20	Summer 1998-99
MSc/Structural Mechanics	Finite Elements	SUT	3	18.8 out of 20	Spring 1986-87
BSc/Hydraulics	Hydraulics	SUT	2	18.5 out of 20	Spring 1983-84
BSc/Structural Design	Structural Loads	SUT	2	18.5 out of 20	Spring 1984-85
BSc/Structural Design	Steel Structures Project	SUT	1	18.5 out of 20	Fall 1985-86
MSc/Structural Dynamics	Random Vibrations	SUT	3	18.5 out of 20	Spring 1986-87
BSc/Engineering Mechanics	Statics	SUT	3	18.3 out of 20	Spring 1982-83
BSc/Construction Engineering	Building Installations	SUT	2	18.3 out of 20	Spring 1985-86
BSc/English	Language for Civil Engineering	SUT	2	18.2 out of 20	Spring 1983-84
MSc/Engineering Mathematics	Differential Equations	SUT	3	18.0 out of 20	Spring 1982-83
BSc/Systems Engineering	Systems Engineering	SUT	2	18.0 out of 20	Spring 1983-84
BSc/Hydraulics	Water and Wastewater Engineering	SUT	3	18.0 out of 20	Spring 1984-85
MSc/Engineering Mathematics	Numerical Analysis Methods	SUT	3	18.0 out of 20	Fall 1987-88
MSc/Structural Mechanics	Stability of Structures	SUT	3	18.0 out of 20	Spring 1987-88
BSc/English	English I	SUT	2	17.7 out of 20	Fall 1979-80
BSc/Structural Design	Design of Reinforced Concrete Structures II	SUT	3	17.6 out of 20	Spring 1984-85
BSc/Humanities	History of Science I	SUT	2	17.5 out of 20	Fall 1983-84
PhD/Solid Mechanics	Fracture Mechanics	SUT	3	17.5 out of 20	Spring 1994-95
BSc/Geomatics	Surveying	SUT	3	17.5 out of 20	Spring 1983-84
BSc/Engineering Mechanics	Mechanics of Solids Lab	SUT	1	17.5 out of 20	Fall 1985-86
BSc/English	English II	SUT	2	17.3 out of 20	Spring 1979-80
PhD/Seismology	Risk Analysis	SUT	3	17.3 out of 20	Fall 1994-95
BSc/Structural Mechanics	Structural Analysis II	SUT	3	17.0 out of 20	Fall 1984-85
BSc/Hydraulic Structures	Hydraulic Structures	SUT	3	17.0 out of 20	Fall 1985-86
MSc/Structural Mechanics	Theory of plates and shells	SUT	3	17.0 out of 20	Spring 1986-87
MSc/Structural Dynamics	Earthquake Engineering	SUT	3	17.0 out of 20	Fall 1987-88
MSc/Solid Mechanics	Engineering Plasticity	SUT	3	17.0 out of 20	Fall 1988-89
PhD/Structural Design	Optimum Structural Design	SUT	3	17.0 out of 20	Fall 1994-95
PhD/Seismology	Seismo-tectonics	SUT	3	17.0 out of 20	Fall 1995-96
PhD/Control Engineering	Adaptive Control	SUT	3	17.0 out of 20	Spring 1996-97
BSc/Geotechnical Engineering	Soil Mechanics	SUT	3	16.8 out of 20	Spring 1983-84
BSc/Structural Mechanics	Structural Analysis I	SUT	3	16.7 out of 20	Spring 1983-84
BSc/Physics	Physics Lab I	SUT	1	16.6 out of 20	Fall 1979-80
		SUT			
MSc/Solid Mechanics	Continuum Mechanics I	SUT	3	16.5 out of 20	Spring 1986-87
PhD/Structural Design	Advanced Design of Steel Structures	SUT	3	16.5 out of 20	Fall 1994-95
BSc/Physics	General Physics II	SUT	4	16.5 out of 20	Spring 1982-83
BSc/Engineering Mechanics	Mechanics of Solids I	SUT	3	16.5 out of 20	Fall 1983-84
BSc/Engineering Mechanics	General Fluid Mechanics	SUT	3	16.5 out of 20	Fall 1983-84

BSc/Humanities	Islamic Culture II	SUT	3	16.5 out of 20	Fall 1983-84
BSc/Transportation Engineering	Pavement Design	SUT	3	16.5 out of 20	Fall 1984-85
BSc/Structural Design	Design of Steel Structures II	SUT	3	16.5 out of 20	Spring 1984-85
BSc/Art	Architecture	SUT	3	16.3 out of 20	Spring 1983-84
BSc/Geotechnical Engineering	Soil Mechanics Lab	SUT	1	16.2 out of 20	Fall 1985-86
BSc/Structural Design	Design of Steel Structures I	SUT	3	16.1 out of 20	Fall 1984-85
BSc/Sport	Physical Education I	SUT	1	16.0 out of 20	Fall 1979-80
BSc/Engineering Mechanics	Dynamics	SUT	3	16.0 out of 20	Fall 1983-84
BSc/Structural Design	Concrete Structures Project	SUT	1	16.0 out of 20	Spring 1985-86
BSc/Structural Design	Bridge Design	SUT	3	16.0 out of 20	Spring 1985-86
PhD/Solid Mechanics	Theory of Continuum Plasticity	SUT	3	16.0 out of 20	Fall 1995-96
MSc/Structural Dynamics	Applied Finite Elements	SUT	2	15.8 out of 20	Fall 1987-88
BSc/Materials Engineering	Materials and Concrete Technology	SUT	3	15.6 out of 20	Fall 1984-85
BSc/Humanities	Persian Literature I	SUT	4	15.5 out of 20	Spring 1984-85
BSc/Geotechnical Engineering	Foundation Engineering	SUT	3	15.5 out of 20	Fall 1985-86
BSc/Physics	Physics Lab II	SUT	1	15.5 out of 20	Spring 1985-86
PhD/Communications Engineering	Random Processes	SUT	3	15.5 out of 20	Fall 1996-97
BSc/Transportation Engineering	Highway Design	SUT	2	15.3 out of 20	Summer 1983-84
BSc/Engineering Mechanics	Mechanics of Solids II	SUT	3	15.0 out of 20	Spring 1983-84