Ali Koochi

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Contact Information

Assistant Professor
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Education

Amirkabir University of Technology, Tehran, Iran
Ph.D. Aerospace Structures Engineering, 2016
Sharif University of Technology, Tehran, Iran
M.S. Aerospace Structures Engineering, 2009
Amirkabir University of Technology, Tehran, Iran
B.S., Aerospace Engineering, 2006

Honors and Awards

- Google scholar H index=**23**
- The best thesis of aerospace engineering department, Amirkabir University of Technology, Iran, 2016.
- Rank **8** among 1644 participants in universities MS. entrance exam in aerospace engineering exam ,2006, Iran
- Semifinalist of National Computer Olympiad, Iran 2001.
- Semifinalist of National Physics Olympiad, Iran 2001.
- Semifinalist of National Mathematics Olympiad, Iran 2001.
- Semifinalist of National Mathematics Olympiad, Iran 2001.

Research Experiences:

- **Professor (Assistant)**

Department of Mechanical Engineering, University of Torbat Heydarieh, Torbat Heydarieh, Iran (February 2019- present)

- **Vice President of Education and Research**

University of Torbat Heydarieh, Torbat Heydarieh, Iran (May 2022- present)

- **Head of department**

Department of Mechanical Engineering, University of Torbat Heydarieh, Torbat Heydarieh, Iran (May 2020- May 2022)

- **Scientific secretary of Conference**

5th National Conference on Application of Novel Technologies in Engineering Sciences (February 2021)

- **Secretary of Conference**

6th National Conference on Application of Novel Technologies in Engineering Sciences (February 2023)

- **Member of research council**

University of Torbat Heydarieh, Torbat Heydarieh, Iran (January 2021- May 2022)

- **Editorial board member**

Journal of Modern Nanotechnology

Research Interest

- Micro/nano electromechanical systems (MEMS/NEMS)
- Nano-mechanics/Nano-structure stability
- Nonlinear/non-classical continuum mechanics
- Nonlinear analysis of beam, plates and shells
- Nonlinear Vibrations

Publications

a) Book

1. **A Koochi**, M Abadyan; "Nonlinear Differential Equations in Micro/Nano Mechanics: Application in Micro/Nano Structures and Electromechanical Systems", Elsevier 2020; ISBN: 9780128192351

b) Journal papers:

1. MR Gharib, SED Baygi, **A Koochi**; "Numerical simulation and new controller design of steerable nano-mirror in ionic liquid electrolytes"; Communications in Nonlinear Science and Numerical Simulation 125, (2023); 107394
2. MR Gharib, **A Koochi**, A Heydari, M Goharimanesh, "Robust QFT control design for a multivariable torsion/bending of rotational nanoscanner"; ISA transactions (2023); https://doi.org/10.1016/j.isatra.2023.07.028
3. MR Gharib, SED Baygi, **A Koochi**, "Lattice Boltzmann model for simulation of a nano-scanner immersed in ionic dense media"; Computers & Mathematics with Applications 140, (2023); 237-249
4. **A Koochi**, M Goharimanesh, M R Gharib; "An improved fuzzy controller on electromechanical nano-tweezers"; Journal of Vibration and Control 29 (11-12), (2022); 2658-2670
5. A Heydari, M Goharimanesh, M Gharib, **A Koochi**, "Modeling the Ultrasonic Atomization Process of Milk and Powder Production Using Spray Drying Method"; Iranian Food Science and Technology Research Journal 19 (1), (2023); 145-168
6. M Arhami, **A Koochi**, MR Gharib, "Nonlocal coupled thermoelastic analysis of nanobeam under Casimir force"; Archive of Applied Mechanics 92 (12), (2023); 3729-3746
7. **A Koochi**, M Yaghoobi; Nonlocal Timoshenko shear beam model for multilayer curved graphene nano-switches"; Physica Scripta 97 (9), (2022); 095818
8. A Gharib, M Goharimanesh, **A Koochi**, M R Gharib; "Designing an evolutionary optimal washout filter based on genetic algorithm"; Aviation, 26(1), (2022); 54-63
9. M R Salehi Kolahi, M R Gharib, **A Koochi**; "Design of a robust control scheme for path tracking and beyond pull-in stabilization of micro/nano-positioners in the presence of Casimir force and external disturbances"; Archive of Applied Mechanics, 91(10), (2021); 4191-4204
10. **A Koochi**, M R Gharib, M Goharimanesh, "Stability Analysis of Nano-wire Made Tweezers in Magnetic Flux"; Journal of Applied and Computational Sciences in Mechanics, 32(2), (2021); 149-164.
11. **A Koochi**; "Stability Analysis of CNT Based Nano-Actuator Under Magnetic Field and Rippling Deformation"; Journal of Modern Nanotechnology, 1(1), (2021), 3.
12. E Rajabiani, MR Gharib, **A Koochi**; "Buckling Analysis of Groove Corroded Pipe Due to Axial Pressure with Finite Element Method"; International Journal of Steel Structures, 21 (5), (2021); 1723-1740
13. **A Koochi,** M Yaghoobi; "Design and finite element analysis of electromechanical tapered nano-tweezers for extending the tweezering range"; Indian Journal of Physics 96 (7), (2022);1975-1984
14. M Yaghoobi, **A Koochi**; "Electromagnetic instability analysis of functionally graded tapered nano-tweezers"; Physica Scripta, 96 (8), (2021);085701

15. **A Koochi,** F Abadian, M Rezaei, M Abadyan; "Electromagnetic instability of electromechanical nano-bridge incorporating surface energy and size dependency"; Physica E, 129, (2021); 114643
16. **A Koochi,** M Goharimanesh, M R Gharib; "Nonlocal electromagnetic instability of carbon nanotube-based nano-sensor"; Mathematical Methods in the Applied Sciences; (2021); 1– 18. https://doi.org/10.1002/mma.7216
17. **A Koochi,** M Abadyan, S Gholami; "Electromagnetic instability analysis of nano-sensor"; The European Physical Journal Plus, 136(1), (2021); 1-12.
18. M R Gharib, **A Koochi**, M R Ghorbani; "Path tracking control of electromechanical micro-positioner by considering control effort of the system"; Proceedings of the Institution of Mechanical Engineers, Part I: Journal of Systems and Control Engineering, 235 (6), (2021); 984-991
19. **A Koochi**, M Goharimanesh; "Nonlinear Oscillations of CNT Nano-resonator Based on Nonlocal Elasticity: The Energy Balance Method"; Reports in Mechanical Engineering, 2 (1), (2021); 41-50
20. A Yekrangi, M Yaghobi, M Riazian, **A Koochi**; "Scale-Dependent Dynamic Behavior of Nanowire-Based Sensor in Accelerating Field"; Journal of Applied and Computational Mechanics, 5(2), (2019); 486-497.
21. M Keivani, J Mokhtari, N Abadian, M Abbasi, **A Koochi**, M Abadyan, "Analysis of U-shaped NEMS in the Presence of Electrostatic, Casimir, and Centrifugal Forces Using Consistent Couple Stress Theory" Iranian Journal of Science and Technology, Transactions A: Science; 42(3), (2018); 1647–1658
22. **A Koochi**, H Hosseini-Toudeshky, M Abadyan; "A corrected model for static and dynamic electromechanical instability of narrow nanotweezers: Incorporation of size effect, surface layer and finite dimensions"; International Journal of Modern Physics B 32 (2018), 1850089 (24 pp)
23. M Keivani, E Ghahremani, **A Koochi**, J Mokhtari, N Abadian, M Abadyan, "Dynamic instability analysis of U-shaped electromechanical nano-sensor operated in vdW regime" Journal of Vibroengineering; 20, (2018); 662-676.
24. H.M. Sedighi, **A Koochi**, M Keivani, M Abadyan, "Microstructure-dependent dynamic behavior of torsional nano-varactor" Measurement; 111, (2017); 114–121.
25. M Keivani, **A Koochi**, A Kanani, H M Navazi, M Abadyan, "Modeling the coupled effects of surface layer and size effect on the static and dynamic instability of narrow nano-bridge structure" Journal of the Brazilian Society of Mechanical Sciences and Engineering; 39, (2017); 1735-1744.
26. M Keivani, **A Koochi**, N Abadian, M Abadyan, "A 2-DOF model for incorporating the effect of microstructure on the coupled torsion/bending instability of nano-mirror in Casimir regime", Optik, 130, (2017); 1272–1284.
27. R Soroush, **A Koochi**, M Keivani, M Abadyan, "A Bilayer Model for Incorporating the Coupled Effects of Surface Energy and Microstructure on the Electromechanical Stability of NEMS", International Journal of Structural Stability and Dynamics, 17 (4), (2017); 1771005 (12 pages)
28. M Keivani, **A Koochi**, A Kanani, MR Mardaneh, HM Sedighi, M Abadyan; "Using strain gradient elasticity in conjunction with Gurtin–Murdoch theory for modeling the coupled effects of surface and size phenomena on the instability of narrow nano-switch"; Journal of Mechanical Engineering Science, 231(17), (2017); 3277-3288
29. H M Sedighi, M Moory-Shirbani **A Koochi**, M Abadyan; "A modified model for circular scanner-type micro/nano-mirrors with size-dependency, squeeze film damping and Casimir effects by considering finite conductivity"; Microsystem Technologies 23(2017); 875-888

30. **A Koochi**, H Hosseini-Toudeshky, M Abadyan; "A modified model for stability analysis of narrow-width NEMS tweezers: Corrections due to surface layer, scale dependency and force distributions"; Scientia Iranica B (2017) 24(2), 673-683.
31. M Keivani, **A Koochi**, M Abadyan, "A New Bilayer Continuum Model Based on Gurtin-Murdoch and Consistent Couple-Stress Theories for Stability Analysis of Beam-Type Nanotweezers", Journal of Mechanics 23(2), (2017); 137-146.
32. M Keivani, **A Koochi**, J Mokhtari, N Abadian, M Abadyan, "Modeling the effect of microstructure on the coupled torsion/bending instability of rotational nano-mirror in Casimir regime", Microsystem Technologies 23, (2017); 2931–2942.
33. M Keivani, **A Koochi**, M Abadyan, "Coupled effects of surface energy and size dependency on the stability of nanotweezers using GDQ method", Microsystem Technologies 23, (2017); 1295–1308.
34. A Kanani, **A Koochi**, M Farahani, E Rouhi, M Abadyan, "Modeling the size dependent pull-in instability of cantilever nano-switch immersed in ionic liquid electrolytes using strain gradient theory", Scientia Iranica. Transaction B, Mechanical Engineering 23 (3), (2016); 976
35. M Keivani, **A Koochi**, M Abadyan, "A new model for stability analysis of electromechanical nano-actuator based on Gurtin-Murdoch and consistent couple-stress theories" Journal of Vibroengineering 18 (3), (2016); 1406-1416
36. M Keivani, N Abadian, **A Koochi**, J Mokhtari, M Abadyan, "A 2-DOF microstructure-dependent model for the coupled torsion/bending instability of rotational nanoscanner", Applied Physics A 122, (2016); 927 (9 pages)
37. M Keivani, **A Koochi**, HM Sedighi, A Abadian, M Abadyan, "A Nonlinear Model for Incorporating the Coupled Effects of Surface Energy and Microstructure on the Electromechanical Stability of NEMS" Arabian Journal for Science and Engineering, 41 (11), (2016); 4397-4410
38. HM Sedighi, M Moory-Shirbani, M Shishesaz, **A Koochi**, M Abadyan, "Size-Dependent Dynamic Behavior and Instability Analysis of Nano-Scale Rotational Varactor in the Presence of Casimir Attraction"; International Journal of Applied Mechanics 8 (02), (2016); 1650018
39. M Keivani, **A Koochi**, A Kanani, M Abadyan, "A bilayer model for incorporating the simultaneous effects of surface energy and microstructure size dependency on the dynamic response and stability of electromechanical nanocantilever"; Surface Review and Letters 23 (05), (2016); 1650043 (16 pp).
40. M Keivani, **A Koochi**, N Abadian, M Rezaei, M Abadyan, "Static and dynamic instability of nanowire-fabricated nanoelectromechanical systems: effects of flow damping, van de Waals force, surface energy and microstructure"; Canadian Journal of Physics 94 (6), (2016); 594-603
41. **A Koochi**, H Hosseini-Toudeshky, M Abadyan; "Nonlinear beam formulation incorporating surface energy and size effect: Application in nano-bridges"; Applied Mathematics and Mechanics: English Edition 37(5), (2016); 583–600
42. M Keivani, **A Koochi**, H M Sedighi, M Abadyan, A Farrokhabadi, A M Shahedin; "Effect of surface layer on electromechanical stability of tweezers and cantilevers fabricated from conductive cylindrical nanowires"; Surface review and letters 23(2), (2016); 1550101 (19 pages)
43. I Karimipour, A Kanani, **A Koochi**, M Keivani, M Abadyan; "Electromechanical instability of nanobridge in ionic liquid electrolyte media: influence of electrical double layer, dispersion forces and size effect"; Indian Journal of Physics 90(5), (2016);563–575

44. M Keivani, M Mardaneh, **A Koochi**, M Rezaei, M Abadyan; "On the Dynamic Instability of Nanowire-Fabricated Electromechanical Actuators in the Casimir Regime: Coupled Effects of Surface Energy and Size Dependency"; Physica E 76, (2016); 60-69
45. I Karimipour, YT Beni, **A Koochi**, M Abadyan; "Using couple stress theory for modeling the size-dependent instability of double-sided beam-type nanoactuators in the presence of Casimir force"; Journal of the Brazilian Society of Mechanical Sciences and Engineering; 38(6), (2016); 1779-1795
46. **A Koochi**, H Hosseini-Toudeshky; "Coupled Effect of Surface Energy and Size Effect on the Static and Dynamic Pull-In Instability of Narrow Nano-Switches"; International Journal of Applied Mechanics 7(4), (2015); 1550064 (24pp)
47. HM Sedighi, **A Koochi**, F Daneshmand, M Abadyan; "Non-linear dynamic instability of a double-sided nano-bridge considering centrifugal force and rarefied gas flow"; International Journal of Non-Linear Mechanics 77, (2015); 96-106
48. I Karimipour, A Kanani, **A Koochi**, M Keivani, M Abadyan; "Modeling the electromechanical behavior and instability threshold of NEMS bridge in electrolyte considering the size dependency and dispersion forces"; Physica E 74, (2015); 140–150.
49. S Adibnazari, M Farsadi, **A Koochi**, SN Khorashadizadeh; "New approach for fatigue life prediction of composite plates using micromechanical bridging model"; Journal of Composite Materials; 49(3), (2015); 309-319
50. A Farrokhabadi, J Mokhtari, **A Koochi**, M Abadyan, "A theoretical model for investigating the effect of vacuum fluctuations on the electromechanical stability of nanotweezers", Indian Journal of Physics 89 (6), (2015); 599-609
51. **A Koochi**, A Farrokhabadi, M Abadyan; "Modeling the size dependent instability of NEMS sensor/actuator made of nano-wire with circular cross-section"; Microsystem Technologies, 21 (2) (2015); 355-364
52. N Fazli, **A Koochi**, AS Kazemi, M Abadyan; "Influence of electrostatic force and the van der Waals attraction on the pull-in instability of the CNT-based probe–actuator"; Canadian Journal of Physics 92 (2014), 1047-1057
53. **A Koochi**, H M Sedighi, M Abadyan; "Modeling the size dependent pull-in instability of beam-type NEMS using strain gradient theory"; Latin American Journal of Solids and Structures 11(2014); 1806-1829
54. HM Sedighi, **A Koochi**, M Abadyan, "Modeling the size dependent static and dynamic pill-in instability of cantilever nanoactuator based on strain gradient theory", International Journal of Applied Mechanics 6(5) (2014); 1450055 21pp
55. A Farrokhabadi, **A Koochi**, A S Kazemi, M Abadyan, "Effects of size-dependent elasticity on stability of nanotweezers" Applied Mathematics and Mechanics: English Edition, 35 (12) (2014); 1573-1590
56. **A Koochi**, N Fazli, R Rach, M Abadyan; "Modeling the pull-in instability of the CNT-based probe/actuator under the Coulomb force and the van der Waals attraction"; Latin American Journal of Solids and Structures 11(2014); 1315-1328
57. A Farrokhabadi, **A Koochi**, M Abadyan; "Modeling the instability of CNT tweezers using a continuum model"; Microsystem Technologies 20 (2014), 291-302

58. Y Tadi Beni, **A Koochi**, M Abadyan; "Using Modified Couple Stress Theory for Modeling the Size-Dependent Pull-In Instability of Torsional Nano-Mirror under Casimir Force"; International Journal of Optomechatronics 8 (2014); 47-71
59. **A Koochi**, H Hosseini-Toudeshky, H R Ovesy, M Abadyan ; "Modeling the Influence of Surface Effect on Instability of nano-cantilever in Presence of van der Waals Force"; International Journal of Structural Stability and Dynamics, 13(4), (2013); 1250072 (19pp).
60. R Soroush, **A Koochi**, A S Kazemi, and M Abadyan; "Modeling the effect of van der Waals attraction on the instability of electrostatic Cantilever and Doubly-supported Nano-beams using Modified Adomian Method"; International Journal for Structural Stability and Dynamics, 12(5) (2012); 1250036 (18 pp).
61. **A Koochi,** AS Kazemi, F Khandani and M Abadyan; "Influence of surface effects on size-dependent instability of nano-actuators in the presence of quantum vacuum fluctuations"; Physica Scripta 85 (2012); 035804 (7pp)
62. Y Tadi Beni, **A Koochi**, AS Kazemi, and M Abadyan; "Modeling the influence of surface effect and molecular force on pull-in voltage of rotational nano–micro mirror using 2-DOF model"; Canadian Journal of Physics 90, (2012) 963-974.
63. A Yousefi Salekdeh, **A Koochi,** Y Tadi Beni and M Abadyan "Modeling effects of three nano-scale physical phenomena on instability voltage of multi-layer MEMS/NEMS: material size dependency, van der Waals force and non-classic support conditions", Trends in Applied Sciences Research, 7(1), (2012); 1-17
64. **A Koochi** and M Abadyan, "Efficiency of Modified Adomian Decomposition for Simulating the Instability of Nano-Electromechanical Switches: Comparison with the Conventional Decomposition Method", Trends in Applied Sciences Research, 7(1), (2012); 57-67
65. Y Tadi Beni, M Abadyan, **A Koochi**; "Effect of the Casimir attraction on the torsion/bending coupled instability of electrostatic nano-actuators", Physica Scripta 84 (2011); 065801 (9pp)
66. **A Koochi**, A S Kazemi, M Abadyan; "Simulating deflection and determining stable length of freestanding CNT probe/sensor in the vicinity of grapheme layers using a nano-scale continuum model"; Nano 6(5) (2011); 419–429
67. J Abdi, **A Koochi**, A S Kazemi, M Abadyan; "Modeling the Effects of Size Dependence and Dispersion Forces on the Pull-In Instability of Electrostatic Cantilever NEMS Using Modified Couple Stress Theory"; Smart Materials and Structures 20 (2011); 055011 (9 pp)
68. Y Tadi Beni, **A Koochi**, M Abadyan; "Theoretical study of the effect of Casimir force, elastic boundary conditions and size dependency on the pull-in instability of beam-type NEMS"; Physica E 43(4) (2011); 979-988
69. **A Koochi**, AS Kazemi, A Noghrehabadi; A Yekrangi and M Abadyan; "New approach to model the buckling of carbon nanotubes near graphite sheets"; Materials & Design 32(5), (2011); 2949-2955
70. **A Koochi**; A Noghrehabadi; M Abadyan; E Roohi; "Approximating of the effect of van der Waals force on the instability of electrostatic Nano-cantilevers"; International Journal of Modern Physics B 25(29), (2011); 3965–3976
71. Z Razavi Hesabi, **A Koochi**, Y Tadi Beni, M Abadyan; "Modeling fatigue behavior of quasi-isotropic laminates"; Procedia Engineering, 10, (2011); 3772-3776
72. J Abdi, Y Tadi Beni, A Noghrehabadi, **A Koochi**, A S Kazemi, A Yekrangi, M Abadyan, M Noghrehabadi; "Analytical Approach to Compute the Internal Stress Field of NEMS Considering Casimir Forces"; Procedia Engineering, 10, (2011); 3765-3771

73. A Noghrehabadi, Y Tadi Beni, **A Koochi**, A S Kazemi, A Yekrangi, M Abadyan, M Noghrehabadi; "Closed-form Approximations of the Pull-in Parameters and Stress Field of Electrostatic Cantilever Nano-actuators Considering van der Waals Attraction"; Procedia Engineering, 10, (2011); 3750-3756
74. **A Koochi** and M Abadyan, "Evaluating the Ability of Modified Adomian Decomposition Method to Simulate the Instability of Freestanding Carbon Nanotube (CNT): Comparison with Conventional Decomposition Method", Journal of Applied Sciences 11(19) (2011); 3421-3428
75. **A Koochi**, A S Kazemi, Y Tadi Beni, A Yekrangi, M Abadyan; "Theoretical study of the effect of Casimir attraction on the pull-in behavior of beam-type NEMS using modified Adomian method"; Physica E 43(2) (2010); 625-632
76. R Soroush, **A Koochi**, H Haddadpour, M Abadyan, A Noghrehabadi; "Investigating the effect of Casimir and van der Waalsattractions on the electrostatic pull-in instability of nanoactuators"; Physica Scripta 82 (2010); 045801

c) Conferences papers:

1. A Koochi, M Goharimanesh, M R Gharib, "Stability analysis of nano-actuator: Coupled effects of magnetic field, size dependency and elastic boundary condition"; The 30th Annual International Conference of Iranian Society of Mechanical Engineers-ISME2022, 27-29 May, 2020, Tehran, Iran
2. M Goharimanesh, A Gerami, E Azimirad, **A Koochi**, M Gharib, "Multi-Objective Optimized Controller for a Three-Link Manipulator"; The 28th Annual International Conference of Iranian Society of Mechanical Engineers-ISME2020, 10 May, 2022, Tehran, Iran
3. F Alimoradi, M Farsadi, **A Koochi**, H Mansoori, M Abadyan "Closed-form Solutions to Model the Buckling and Stable Length of Multi Walled Carbon Nanotube Probes Near Graphite Sheets"; AERO 2011, Tehran, Iran 2011
4. H Mansoori**, A Koochi**, S Adib, "Predicting the residual strength and residual stiffness of composite laminate under fatigue loading using micromechanical bridge model"; 10th Iranian aerospace conference; Iran, Tehran, 2011 (In Persian)
5. **A Koochi**, S Adib, "Micromechanical approach for predict the stiffness degradation of composite plate under cyclic loading"; 9th Iranian aerospace conference; Iran, Tehran, 2010 (In Persian)

Journal Referee

- Microsystem Technologies
- Materials and Design
- Proceeding of the iMeche, Part C: Journal of Mechanical Engineering science
- International Journal of Structural Stability and Dynamics
-Metrology and Measurement Systems
-Thin walled structures
-Zeitschrift fur Naturforschung A - A Journal of Physical Sciences
-Journal of Applied and Computational Mechanics
-Micro & Nano Letters
-Applied Composite Materials
-Journal of the Brazilian Society of Mechanical Sciences and Engineering
- Journal of Applied and Computational Mechanics
- Facta Universitatis, Series: Mechanical Engineering
- Micromachines
- Steel and Composite Structures
- Symmetry
- Mathematics
- Sensors