

Ali Tavasoli

Postdoctoral Research Associate
School of Data Science
University of Virginia
Email: at9kf@virginia.edu
Phone: +1-434-235-0436

EDUCATION

- 09/2006 – 03/2012 **Ph.D., Mechanical Engineering**
Department of Mechanical Engineering, Amirkabir University of Technology
(Tehran Polytechnic), Tehran, Iran
Thesis title: Integrated vehicle dynamics control using optimal distribution of tire
forces for stability enhancement
- 09/2003 – 08/2006 **M.Sc., Mechanical Engineering**
School of Mechanical Engineering, Shiraz University, Shiraz, Iran
Thesis title: Dynamics and control of two cooperating robot manipulators
handling a flexible object
- 09/1999 – 07/2003 **B.Sc., Mechanical Engineering**
Department of Mechanical Engineering, Islamic Azad University of Karaj, Karaj,
Iran
Thesis title: Studying the effect of dynamical parameters on vehicle rollover
-

PROFESSIONAL EXPERIENCE

- 11/2021 Postdoctoral Research Associate, School of Data Science, University of Virginia
- 05/2020 – 11/2021 Associate Professor, Department of Mechanical Engineering, Payame Noor
University, Tehran (Karaj Center), Iran
- 09/2013 – 05/2020 Assistant Professor, Department of Mechanical Engineering, Payame Noor
University, Tehran (Karaj Center), Iran
- 09/2007 – 09/2013 Faculty Member, Department of Mechanical Engineering, Sama College, Islamic
Azad University of Karaj, Karaj, Iran.
-

PUBLICATIONS**Submitted/In Preparation Journal Papers**

- [1] **Ali Tavasoli**, Teague Henry, Heman Shakeri, “A purely data-driven framework for prediction, optimization, and control of networked processes” revised for *ISA Transactions*.
-

- [2] **Ali Tavasoli**, Mehrdad Fazli, Ehsan Ardjmand, William A. Young, Heman Shakeri, “Competitive pricing under local network effects”, revised for *European Journal of Operational Research*.
- [3] **Ali Tavasoli**, Ehsan Ardjmand, Heman Shakeri, “Maximizing the algebraic connectivity in multilayer networks with general interconnections”. submitted.
- [4] **Ali Tavasoli**, Heman Shakeri, “Load forecasting in power grids: a dynamical system theory approach to spatiotemporal mode decomposition, identification, and prediction” In preparation.

Peer-Reviewed Journal Publications

- [5] **Ali Tavasoli**, Heman Shakeri, Ehsan Ardjmand, and William A. Young II, “Incentive Rate Determination in Viral Marketing”, *European Journal of Operational Research* 2021; 289 (3): 1169-1187.
- [6] Ehsan Ardjmand, M Singh, Heman Shakeri, **Ali Tavasoli**, WA Young II, “Mitigating the risk of infection spread in manual order picking operations: A multi-objective approach”, *Applied Soft Computing* 2021; 100: 106953
- [7] Heman Shakeri, **Ali Tavasoli**, Ehsan Ardjmand, P Poggi-Corradini, “Designing Optimal Multiplex Networks for Certain Laplacian Spectral Properties”, *Physical Review E*, 2020; 102 (2): 022302.
- [8] **Ali Tavasoli**, Teague Henry, Heman Shakeri “A purely data-driven framework for prediction, optimization, and control of networked processes” arXiv preprint arXiv:2108.02005
- [9] **Ali Tavasoli**, Ehsan Ardjmand, Heman Shakeri, “Maximizing the algebraic connectivity in multilayer networks with general interconnections”, arXiv preprint arXiv:2008.13036
- [10] Omid Mohammadpour, **Ali Tavasoli** “A new discrete-time robust adaptive time-delay control for a class of uncertain nonlinear strict-feedback systems using sliding mode”, *ISA transactions*, 2019; 93: 40-54.
- [11] **Ali Tavasoli**, “Boundary control of a circular curved beam using active disturbance rejection control”, *International Journal of Control*, 2019, (5): 1137-1154.
- [12] **Ali Tavasoli**, “Exponential stabilization of two-dimensional vibration of a boundary-controlled curved beam with tip mass”, *International Journal of Systems Science*, 2018; 49 (13): 2847-2860.
- [13] **Ali Tavasoli**, “Active disturbance rejection boundary control of a Timoshenko beam including tip mass”, *ISA transactions*, 2018, 80: 221-231.
- [14] **Ali Tavasoli**, “Dynamic modelling and adaptive robust boundary control of a flexible robotic arm with two-dimensional rigid body rotation” *International Journal of Adaptive Control and Signal Processing*, 2018; 32(6): 891-907.
- [15] Sajjad Taghvaei, **Ali Tavasoli**, Navid Feizi, Zahra Rajestari, and Mohammad Abdi, “A control-oriented dynamic model for sit-to-stand motion with fixed support” *Proceedings of Institution of Mechanical Engineering Part K: Journal of Multi-body Dynamics*, 2018; 232(2): 265-273.

- [16] **Ali Tavasoli**, “Adaptive nonlinear boundary control of a hybrid Euler-Bernoulli beam with coupled rigid and flexible dynamics”, *Iranian Journal of Science and Technology*, **2018**; 42(3): 311–315.
- [17] **Ali Tavasoli**, “Robust Adaptive Boundary Control of a Perturbed Hybrid Euler-Bernoulli Beam with Coupled Rigid and Flexible Motion” *International Journal of Control, Automation and Systems*, **2017**; 15(2): 680–688.
- [18] **Ali Tavasoli**, Vali Enjileli, “Active disturbance rejection and Lyapunov redesign approaches for robust boundary control of plate vibration” *International Journal of Systems Science*, 2017; 48(8):1656-1670
- [19] **Ali Tavasoli**, Vali Enjileli, “Boundary control of coupled bending-torsional vibration of beams with only one axis of symmetry” *International Journal of Adaptive Control and Signal Processing*, **2017**; 31: 761–784.
- [20] **Ali Tavasoli**, “Robust boundary stabilization of a vibrating rectangular plate using disturbance adaptation”, *International Journal of Adaptive Control and Signal Processing*, **2016**; 30(11):1603–1626.
- [21] Vali Enjilela, Davoud Salimi, **Ali Tavasoli**, and M. Lotfi, “Stabilized MLPG-VF-based method with CBS scheme for laminar flow at high Reynolds and Rayleigh numbers”, *International Journal of Modern Physics C*, **2016**; 27(7):1650081(1-31).
- [22] **Ali Tavasoli**, “Robust boundary control with adaptive upper-bounds to stabilize two-dimensional vibration of flexible spinning shaft including model uncertainties and external disturbances with unknown bounds” *International Journal of Adaptive Control and Signal Processing*, **2015**; 29:537–562.
- [23] **Ali Tavasoli**, “Dynamic modelling and nonlinear boundary control of hybrid Euler-Bernoulli beam system with a tip mass” *Proceedings of the Institution of Mechanical Engineers, Part K: Journal of Multi-body Dynamics*, **2015**; 229(1):3-15.
- [24] **Ali Tavasoli**, Mahyar Naraghi, “Interior-point method to optimize tire force allocation in 4 wheeled vehicles using sliding mode technique with adaptive gain”, *Asian Journal of Control*, **2013**; Vol. 15, No. 4, pp. 1188–1200.
- [25] **Ali Tavasoli**, Mahyar Naraghi, Heman Shakeri, “Optimized coordination of brakes and active steering for a 4WS passenger car”, *ISA Transactions*, **2012**; 51, pp. 573–583.
- [26] **Ali Tavasoli**, Mahyar Naraghi, “Vehicle sliding mode control with adaptive upper bounds: static versus dynamic allocation to saturated tire forces”, *Mathematical Problems in Engineering*, Volume **2012**.
- [27] **Ali Tavasoli**, Mahyar Naraghi, “An optimized multi-stage scheme to coordinate steering and braking”, *IJST, Transactions of Mechanical Engineering*, **2013**; Vol. 37, No. M2, pp 161-174.
- [28] **Ali Tavasoli**, Mahyar Naraghi, “Optimal distribution of braking and steering tire forces subject to stability constraints” *Scientia Iranica, Transactions B: Mechanical Engineering*, **2013**; 20(6), 1709-1719.
- [29] Mahyar Naraghi, Ali Roshanbin, **Ali Tavasoli**, “Vehicle stability enhancement – an adaptive optimal approach to the distribution of tyre forces”, *Proc. IMechE Part D: J. Automobile Engineering*, **2010**; Vol. 224, 443-453.
- [30] **Ali Tavasoli**, Mohamad Eghtesad, Hamed Jafarian, “Two-time scale control and observer design for trajectory tracking of two cooperating robot manipulators moving a flexible beam”, *Robotics and Autonomous Systems* 57, **2009**; pp. 212–221.

[31] Hamed Jafarian, Mohamad Eghtesad, **Ali Tavasoli**, “Combined adaptive-robust and neural network control of two RLED cooperating robots using backstepping design”, *International Journal of Robotics and Automation*, **2008**; Vol. 23, No. 1.

[32] Hamed Jafarian, Mohamad Eghtesad, **Ali Tavasoli**, “Neural network control of two 6DoF electrically driven manipulators carrying a rigid object”, *Iranian Journal of science and Technology, Transaction B, Engineering*, **2009**; Vol. 32, No. B4, pp. 353-365.

Peer-Reviewed Conference Publications/ Presentations

[33] Ali Roshanbin, Mahyar Naraghi, **Ali Tavasoli**, “Integrated Vehicle Control –An Adaptive Optimal Distribution of Tire Force in Presence of Driver’s Braking”, The 11th International Symposium on Advanced Vehicle Control (AVEC’12), September 9-12, 2012 Seoul Korea, **2012**

[34] **Ali Tavasoli**, Mahyar Naraghi, “Comparison of Static and Dynamic Control Allocation Techniques for Integrated Vehicle Control”, IFAC 18th World Congress (IFAC WC 2011), August 28 - September 2, 2011, Milano, Italy, **2011**

[35] **Ali Tavasoli**, Mahyar Naraghi, “Optimal Distribution of Tire Forces Constrained to Stability Conditions for Vehicle Stability Improvement”, Future Active Safety Technology towards zero-Traffic-accident (FAST-zero’11), September 5-9, 2011, Shibaura Institute of Technology, Tokyo, Japan, **2011**

[36] **Ali Tavasoli**, Mahyar Naraghi, “Application of Dynamic Control Allocation for Integrated Vehicle Control”, ISME 2011, Birjand University, Birjand, Iran, **2011**

[37] **Ali Tavasoli**, Sajad Taghvaei, Mohamad Eghtesad”, “Flocking of a Team of Lagrangian Agents”, Proceedings of the 2009 IEEE International Conference on Robotics and Biomimetics, December 19 -23, 2009, Guilin, China, **2009**

[38] **Ali Tavasoli**, Mohamad Eghtesad and Hamed Jafarian, “Two-Time Scale Control and Observer Design for Trajectory Tracking of Two Cooperating Robot Manipulators Moving a Flexible Beam”, American Control Conference (ACC), **2007**

[39] Hamed Jafarian, Mohamad Eghtesad and **Ali Tavasoli**, “Neural network control of two electrically driven cooperating 6 DOF robot manipulators”, The World Automation Congress (WAC 2006), July 2006, Budapest, Hungary, **2006**

[40] Hamed Jafarian, Mohamad Eghtesad and **Ali Tavasoli**, “Combined Adaptive-Robust and Neural Network Control of RLED Robot Manipulators Using Backstepping Design”, 9th IEEE International Workshop on Advanced Motion Control (AMC), March 2006, Istanbul, Turkey, **2006**

[41] **Ali Tavasoli**, Mohamad Eghtesad and Hamed Jafarian, “Dynamics and Control of Two Planar Robot Manipulators Handling a Flexible Beam”, 15th International Workshop on Robotics (RAAD 2006), June 2006, Balatonfüred, Hungary, **2006**

[42] **Ali Tavasoli**, Mohamad Eghtesad and Hamed Jafarian, “Combined Adaptive-Robust and Neural Network Control of Two RLED Cooperating 6 DOF Robot Manipulators Using Backstepping Design”, Automatic Control Conference (CACCS) 2006, Taiwan, **2006**

[43] Hamed Jafarian, **Ali Tavasoli** and Mohamad Eghtesad, “Neural Network Control of Two 6 DOF Cooperating Robot Manipulators”, Automatic Control Conference(CACS) 2006, Taiwan, **2006**

[44] **Ali Tavasoli**, Mohamad Eghtesad and Hamed Jafarian, “A Fuzzy Nonlinear Modeling of a McPherson Suspension System”, ASME International Mechanical Engineering Congress and Exposition, November 2005, Orlando Florida, **2005**

[45] **Ali Tavasoli**, Hamed Jafarian and Mohamad Eghtesad, “ H^∞ Control For Active Suspension System of A Half-Car Model”, 13th Annual (International) Mechanical Engineering Conference, May 2005, Isfahan University of Technology, Isfahan, Iran, 2005

RESEARCH EXPERIENCE

1. Data-driven dynamical processes identification, optimization and control
 - Data-driven transfer operators approach to prediction and control
 - A data-driven dynamical system approach to load forecasting over power grids
 - Data-driven identification and control of dynamical systems over complex networks
 - Data-driven dynamic mode decomposition and modeling of auditory cortex in Zebra finches
 - Detecting brain disorders by dynamic mode decomposition of signals in neuroimaging
 2. Modeling, analysis, optimization, and control of nonlinear dynamical systems over networks
 - Controlling the epidemic over networks
 - Optimizing spectral properties of interconnected networks
 - Regulating the control parameters of marketing strategies over social networks
 - Biologically plausible training of recurrent networks of spiking neurons
 3. Model-based nonlinear control and analysis
 - Lyapunov approach, Adaptive control, Robust control, Optimal control, High-gain observers, Active disturbance rejection control
 4. Dynamics, nonlinear control, and optimization of mechanical and electromechanical systems
 - Dynamics and control of advanced robotic systems (cooperating and lightweight manipulators)
 - Optimized integrated vehicle dynamics control
 - Partial Differential Equation (PDE) control of systems with infinite states through very limited actuators and sensors
 - Biologically inspired approaches for vibration semi-active control and artificial muscles
 5. Dynamical modelling of human daily life activities to design assistive biomedical devices
 - Modelling and validation of sit-to-stand motion
 6. Nonlinear dynamics and chaos
 - Complex nonlinear phenomena, fractals, Lyapunov exponent calculation techniques, chaos exploration, and chaos control
-

JOURNAL REVIEWERSHIPS

1. Automatica
 2. Journal of Sound and Vibration
 3. International Journal of Adaptive Control and Signal Processing
 4. Proceedings of the IMechE, Part I: Journal of Systems and Control Engineering
 5. International Journal of Control, Automation and Systems
 6. Asian Journal of Control
 7. International Journal of Robust and Nonlinear Control
 8. ISA Transactions
 9. IEEE Transactions on System, Man, and Cybernetics
 10. IEEE Transactions on Control Systems Technology
 11. IEEE/CAA Journal of Automatica Sinica
 12. International Journal of Systems Science
 13. International Journal of Control
 14. Journal of Vibration and Control
 15. Biomedical Engineering
 16. Mechanical Systems and Signal Processing
 17. Mathematical Reviews
-

COMPUTER SKILLS AND PROGRAMMING

MATLAB and SIMULINK, Python, ADAMS, FORTRAN, Mathematica, Mathcad, Maple, CATIA, Solidworks, and AutoCAD.
