Alireza Alfi

Associate Professor

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ACADEMIC DEGREES

- **Ph.D. Control Engineering, 2007**
  Iran University of Technology, Tehran, Iran
  Thesis Title: "*A New Control Structure for Bilateral Transparent Teleoperation Systems with Perturbed Delay Time in Communication Channel*"

- **M.Sc. Control Engineering, 2002**
  Iran University of Technology, Tehran, Iran
  Thesis Title: "*Fuzzy Control of Four-Wheel-Steering Vehicle*"

- **B.Sc. Control Engineering, 2000**
  Ferdowsi University of Mashhad, Mashhad, Iran
  Thesis Title: "*Design and Implementation of Control System for Control Laboratory*"

SCIENTIFIC SOCITIES MEMBERSHIP

- Member of IEEE
- Member of the Iranian Society of Instrumentation & Control Engineering

HONORS AND AWARD

- Rank 1 among Ph.D. students of Control Engineering at Iran University of Technology.
- Rank 2 among graduate students of Control Engineering at Iran University of Technology.

FIELDS OF INTEREST

- Time Delay Systems (specially Teleoperation Systems)
- Robust Control
- Evolutionary Algorithms
- Optimization
- Fractional Calculus
- Chaos (Control and Analysis)

TAUGH COURSES

- **Undergraduate**

Linear Control Systems, Signals & Systems, Electric Circuits I and II, Engineering Mathematics, Robot Sensors

- **Postgraduate**

Robust Control, Multivariable Control, Predictive Control, Artificial Intelligence, Modern Control

PUBLICATIONS

- **Journal Papers**

36. Design and implementation of robust-fixed structure controller for telerobotic systems, *Intelligent and Robotic Systems*, DOI: 10.1007/s10846-016-0335-2, 2016.
35. A fuzzy discrete harmony search algorithm applied to annual cost reduction in radial distribution systems, *Engineering Optimization*, DOI:10.1080/0305215X.2015.1120299, 2015.
34. A memetic algorithm applied to trajectory control by tuning of fractional order proportional-integral-derivative controllers, *Applied Soft Computing*, vol. 36, pp. 599–617, 2015.
33. Reliability analysis of H-infinity control for a container ship in way-point tracking control, *Applied Ocean Research*, vol. 52, pp. 309–316, 2015.
32. An extension of estimation of domain of attraction for fractional order linear system subject to saturation control, *Applied Mathematics Letters*, vol. 47, pp. 26-34, 2015.
31. An adaptive gradient descent-based local search in memetic algorithm for solving engineering optimization problems, *Information Sciences*, vol. 299, pp. 117–142, 2015.
30. A comparison between optimization algorithms applied to synchronization of bilateral teleoperation systems against time delay and modeling uncertainties, *Applied Soft Computing*, vol. 24, pp. 447–456, 2014.
29. Optimal synchronization of teleoperation systems via Cuckoo optimization algorithm, *Nonlinear Dynamics*, vol. 78, no. 4, pp. 2359–2376, 2014.
28. Design and implementation of hybrid SOC estimation for lithium-ion batteries, *IET Power Electronics*, vol. 7, no. 11, pp. 2758-2764, pp. 1–7, 2014.
27. Adaptive fuzzy sliding mode control for synchronization of uncertain non-identical chaotic systems using bacterial foraging optimization, *Journal of Intelligent and Fuzzy Systems*, vol. 26, pp. 2567–2576, 2014.
26. Swarm-based structure-specified controller design for bilateral transparent teleoperation systems via μ synthesis, *IMA Journal of Mathematical control and Information*, vol. 31, pp. 111–136, 2014.
27. Delay-dependent stability for transparent bilateral teleoperation system in presence of model mismatch: an LMI approach, *Journal of AI and Data Mining*, vol. 1, no. 2, pp. 75-87, 2013.
24. Teaching-learning-based optimal interval type-2 fuzzy PID controller design: A nonholonomic wheeled mobile robots, *Robotica*, vol. 31, no. 7, pp. 1059-1071, 2013.
23. Control of a class of nonlinear uncertain chaotic systems via an optimal type-2 fuzzy PID controller, *IET Science, Measurement & Technology*, vol. 7, no. 1, pp. 50-58, 2013.
22. Optimal state feedback control design and stability analysis of boost DC-DC converters in fuel cell power systems using PSO, *Intelligent Systems in Electrical Engineering*, vol. 3, pp. 65-74, 2012.

21. Design of optimal self-regulation Mamdani-type fuzzy inference controller for type 1 diabetes mellitus, *Arabian Journal for Science and Engineering*, vol. 39, pp. 977-986, 2014.

20. Optimal design of type-2 fuzzy controller using particle swarm optimization for HVAC systems, *Automatika- Journal for Control, Measurement, Electronics, Computing and Communications*, vol. 55, vol. 1, pp. 69-78, 2014.

19. Swarm optimization tuned Mamdani fuzzy controller for diabetes delayed model, *Turkish Journal of Electrical Engineering and Computer Sciences*, vol. 21, pp. 2110-2126, 2013.

18. Constrained nonlinear optimal control via a hybrid BA-SD, *International Journal on Engineering*, vol. 25, no. 3, pp. 197-204, 2012.

17. Control of nonlinear systems using a hybrid APSO-BFO algorithm: An optimum design of PID controller, *Journal of Advances in Computer Research*, vol. 2, no. 4, pp. 81-93, 2011.

16. Optimal power system stabilizer design to reduce low frequency oscillations via an improved swarm optimization algorithm, *International Journal on Technical and Physical Problems of Engineering*, vol. 4, no. 2, pp. 24-33, 2012.

15. Chaos suppression on a class of uncertain nonlinear chaotic systems using an optimal H_∞ adaptive PID controller, *Journal of Chaos, Solitons & Fractals*, vol. 42, no. 3, pp. 351-357, 2012.

14. Employing adaptive PSO algorithm for parameter estimation of an exciter machine, *ASME Journal of Dynamic Systems, Measurement, and Control*, vol. 134, Issue 1, DOI:10.1115/1.4005371, 2012.

13. Particle swarm optimization algorithm with dynamic inertia weight for online parameter identification applied to Lorenz chaotic system, *International Journal of Innovative Computing, Information and Control*, vol. 8, no. 2, pp. 1191-1203, 2012.

12. PSO with adaptive mutation and inertia weight and its application in parameter estimation of dynamic systems, *Acta Automatica*, vol. 37, no. 5, pp. 541-549, 2011.

11. Intelligent identification and control using improved fuzzy particle swarm optimization, *Expert Systems with Applications*, vol. 38, pp. 12312-12317, 2011.

10. System identification and control using adaptive particle swarm optimization, *Journal of Applied Mathematical Modelling*, vol. 35, pp. 1210-1221, 2011.

9. Identification of nonlinear systems using modified particle swarm optimization: A hydraulic suspension system, *Journal of Vehicle System Dynamics*, vol. 46, no. 6, pp. 871-887, 2011.

8. Parameter estimation of bilinear systems based on an adaptive particle swarm optimization, *Journal of Engineering Applications of Artificial Intelligence*, vol. 23, pp. 1105-1111, 2010.

7. Parameter identification based on a modified PSO applied to suspension system, *Journal of Software Engineering and Applications*, vol. 3, no. 3, pp. 221-229, 2010.

6. Parameter identification of chaotic dynamic systems through an improved particle swarm optimization, *Expert Systems with Applications*, vol. 37, no. 5, pp. 3714-3720, 2010.

5. Prediction of coal grind ability based on petrography, proximate and ultimate analysis using neural networks and particle swarm optimization technique, *Energy Exploration & Exploitation*, vol. 27, no.3, pp. 201-212, 2009.

4. Hybrid state-feedback sliding-mode controller design using fuzzy logic for four-wheel-steering vehicles, *Vehicle System Dynamics*, vol. 47, Issue. 3, pp. 265– 284, 2009.

3. A simple structure for bilateral transparent teleoperation systems with time delay, *ASME Journal of Dynamic Systems, Measurement, and Control*, vol. 130, no. 4, 2008.

2. Force reflecting bilateral control of master-slave systems in teleoperation, *Journal of Intelligent and Robotic Systems*, vol. 52, no. 2, pp. 209-232, 2008.

1. Bilateral control of teleoperation systems with bounded uncertain time delay, *Iranian Journal of Electrical and Computer Engineering*, vol. 7, no. 1, pp. 39-46, 2008.

- **Conference Papers**:

31. PID type fuzzy logic controller optimization for networked control systems using meta-heuristic algorithm, 2nd International Conference on Electrical, Computer, Mechanical and Mechatronics Engineering, 2015.
30. Reliability analysis of ship designed controller, 3th International Reliability Engineering Conference (Accepted for publication), 4-5 February 2014.
29. Model predictive control of transparent bilateral teleoperation systems under uncertain communication time-delay, 9th Asian Control Conference, pp. 1-6, 2013.
28. Reinforcement learning-based control of Chronic Myelogenous Leukemia (CML), 1th Isfahan Electrical Engineering Conference, pp. 822-827, 15-17 May 2012.
27. μ-Synthesis for teleportation system in presence of uncertainties in time delay and task environment, 20th Iranian Conference on Electrical Engineering, pp. 822-827, 15-17 May 2012.
26. Design of optimized reduced order observer for glucose control with intelligent methods, 20th Iranian Conference on Electrical Engineering, pp. 617-622, 15-17 May 2012.
25. An LMI based delay-dependent robust controller for transparent bilateral teleoperation System, 2nd International Conference on Control, Instrumentation, and Automation (ICCIA), Iran, 27-29 December 2011.
24. Designing power system stabilizer using improved PSO method to reduce low frequency oscillations, 7th International Conference on Technical & Physical Problems of Power Engineering, pp. 124-129, Turkey, 2011.
23. Stability analysis and state feedback controller design of boost DC-DC convertors based on average and detailed model in fuel power systems, ICEE 2011. (in Persian)
22. Chaos Synchronization of Fractional-Order Chaotic Lorenz-Stenflo System via Fractional Sliding Mode Control, 5th SASTECH 2011.
21. A study on FOREX forecasting steps utilizing neural network model, 5th SASTECH 2011.
20. An improved PID neural network controller for long time delay systems using particle swarm optimization algorithm, 5th International Symposium on Advances in Science and Technology (SASTECH), 2011.
19. Robust controller design for DC stimulation of generator as a current source, 25th International Power System Conference PSC 2010, pp. 1-8, Iran, 2010.
18. Designing a robust controller for doubly-fed wind generator, 6th International Conference on Technical & Physical Problems of Power Engineering (ICTPE), Iran, 14-16 September 2010.
17. Designing of mixed H_2 and H_∞ controller for doubly-fed wind generator, 6th International Conference on Technical & Physical Problems of Power Engineering, Iran, 14-16 September 2010.
16. A particle swarm optimization approach for parameter identification of Lorenz chaotic system, 35th Annual Conference on the IEEE Industrial Electronics Society IECON 2009, pp. 3303-3308, Portugal, 3-5 November 2009.
15. Sliding mode control of Lorenz chaotic system on a moving fuzzy surface, International IEEE Conference EUROCON 2009, pp. 964-970, Russia, 2009.
14. Robust control for bilateral teleoperation systems with time delay in Communication Channel, The Second International Conference on Control, Instrumentation and Mechatronic Engineering, pp. 43-48, Malaysia, 2009.
13. Bilateral control of master-slave manipulators, 15th Annual (International) Conference on Mechanical Engineering, Tehran, Iran, 2007.
12. Bilateral transparent teleoperation with long time-varying delay: new control design and stability analysis, IEEE Conference on Decision and Control, pp. 4502-4507, San Diego, USA, 2006.
11. Bilateral control to achieve transparent teleoperation with perturbation of static time delay, IEEE Industrial Electronic Conference, Paris, France, 2006.

10. On the closed-loop stability analysis of transparent teleoperation systems with time-varying delay using a new structure, 6th IFAC Workshop on Time-Delay Systems, vol. 6, no. 1, pp. 240-245, L'Aquila, Italy, 2006.
9. A new control method for telerobotic systems, 14th Annual (International) Conference on Mechanical Engineering, Isfahan, Iran, 2006.
8. Robust bilateral teleoperation with varying time-delay, 14th Iranian Conference on Electrical Engineering, Tehran, Iran, 2006.
7. Control of flexible-joint robot manipulators moving in vertical plane in presence of disturbances, 13th Annual (International) Conference on Mechanical Engineering, Isfahan, Iran, 2005. (in Persian)
6. Handling improvement of four-wheel-steering vehicles at high speeds, 12th Iranian Conference on Electrical Engineering, Mashhad, Iran, 2004. (in Persian)
5. Adaptive fuzzy controller for handling improvement of four-wheel-steering systems, 15th IFAC World Congress, Barcelona, Spain, 2002.
4. Fuzzy-sliding state-feedback control of nonlinear ball suspension system," 15th IFAC World Congress, Barcelona, Spain, 2002.
3. Robust and stable state-feedback controller design in sliding mode for four-wheel-steering vehicles, 10th Iranian Conference on Electrical Engineering, Tabriz, Iran, 2002. (in Persian)
2. Incremental fuzzy P+ID controller design for four-wheel-steering vehicles for improvement of handling characteristics, 10th Annual (International) Conference on Mechanical Engineering, Tehran, Iran, 2002. (in Persian)
1. Design of adaptive fuzzy controller for four-wheel steering vehicles with fuzzy modeling, 9th Iranian Conference on Electrical Engineering, vol. 4, pp. 401-407, Tehran, Iran, 2001. (in Persian)

- **Book Chapters**

A. Hajizadeh, **A. Alfi**, "Chapter 15- Intelligent Control of Hybrid Electric Vehicles", Advances in Energy Research: Energy and Power Engineering, NOVA Science Publishers, INC, pp. 407-424, 2012.

- **Translation of Books**

F. Lin, *Robust Control Design: An Optimal Approach*, John Wiley & Sons, 2007.

- **Books**

5. **A. Alfi** and et al., Exam of Electrical Engineering-Solution of Azad Exams, Day System, 2012. (*For Master of Science*-Electrical Engineering)
4. **A. Alfi**, Linear Control Systems, Alavi Farhikhtegan, 2006. (*For Master of Science*)
3. **A. Alfi**, Electric Circuits, Alavi Farhikhtegan, 2006. (*For Master of Science*-Electrical Engineering)
2. **A. Alfi**, Electronics, Sanjesh Takmili, 2005. (*For Bachelor of Science*-Electrical Engineering)
1. **A. Alfi**, Electric Circuits, Sanjesh Takmili, 2005. (*For Bachelor of Science*-Electrical Engineering)

- **Executive Responsibilities**

1. Dean of Technology Incubator- Semnan Science and Technology Park, (2008-2011)
2. Dean of Automation and Artificial Intelligent Research Center, (2012-Continue)

- **Reaserch Laboratory**

1. Complex and Control Systems Lab

- **Reaserch Projects**

1. Robust control of master-slave systems, Shahrood University of Technology.
2. Study of bactericidal and bacteriostatic effect alternating current against staphylococcus aureus and pseudomonas aeroginosa, Shahrood University of Technology.
3. Teleoperation control using iterative learning control, Shahrood University of Technology.
4. Design, implementation and control of balancing mobile robots, Shahrood University of Technology.