Curriculum Vitae

Personal

Name: Farid Najafi Date of birth: 27 June 1967

Education:

06/1994 - 12/1996	Ph.D. (Robotic Systems)
	Thesis Title:"Development of method and software programs for
	automated design of force/torque sensor system of adaptive robotic
	systems", Faculty of "Robotics and Automation", Moscow State
	Technical University (Bauman), (Moscow - Russia).
08/1992 - 05/1994	M.Sc. (Mechatronics - Robotic Systems)
	Faculty of "Robotics and Automation", Moscow State Technical
	University (Bauman) (Moscow- Russia).
08/1985 - 07/1990	B.Sc. (Mechanical Engineering – Solid Mechanics Design)
	Mechanical Eng. Dept., Sharif University of Technology (Tehran-Iran).

Professional Experiences:

02/1997 – Present:	Associate Professor of the Mechanical Engineering Faculty, K. N. Toosi University of Technology, Tehran, Iran. (Responsibilities include undergraduate and postgraduate teaching, research supervision and administration).
07/2009 - 12/2011:	Vice-President of Finance and Administrative Affairs, K. N. Toosi University of Tech.
10/2002 - Present:	Director of Actuators Research Laboratory, K. N. Toosi Univ. of Tech.
10/2006 – 09/2007:	Sponsored Research Fellow, Department of Mechanical and Manufacturing Engineering, University of Birmingham, UK. (Responsibilities include research, research supervision, teaching assistance and BEng/MEng and PhD projects supervision).
06/2005 - 04/2006:	Head of Mechanical Engineering Faculty, K. N. Toosi Univ. of Tech.
11/2002 - 10/2004 11/2007 - 09/2009	Director of Research Affairs and Industrial Relations Office, K. N. Toosi Univ. of Tech.

11/2001 - 04/2003:	Head of the Department "Mechanics Design", Mechanical Engineering Faculty, K. N. Toosi Univ. of Tech.	
05/1998 – 10/2001:	Deputy Research Affairs of Mechanical Engineering Faculty, K. N Toosi Univ. of Tech.	J.

Awards and Scholarships

10/2006 - 09/2007	Visiting Research Fellow award for one year to investigate Rehabilitation Robotics, University of Birmingham. UK
6/1994 – 12/1996	Scholarship for Ph.D. program including full tuition fee and full living expenses for three years, Moscow, Russia.
9/1992 - 6/1994	Scholarship for M.Sc. program on the bases of achieving fourth place in Iranian National Universities Entrance Examination including full tuition fee and full living expenses for two years, Moscow, Russia.

Research Interests

- Robotics and manipulator mechanisms;
- Rehabilitation Robotics;
- Mechatronics;
- Dynamic systems analysis and design;
- Servo actuators;
- Control of mechatronic systems;
- Machine design and optimization.

Supervision of student research groups for designing and manufacturing Rescue and Soccer Robots for international robotic competitions including ROBOCUP.

Current and Previous Research Projects

- Investigation of novel human-machine closed loop robotic system for lower limb rehabilitation, sponsored jointly by K. N. Toosi University of Technology, Iran, and University of Birmingham, UK;
- Development of criteria for optimum design of robot force / torque sensors,
- Analysis and design of a test stand for pneumatic servo-actuator;
- Design of pneumatic parallel robotic system for human lower limb rehabilitation;
- Singularity analysis for kinematics of robots,
- Design of high speed intermittent mechanism for high speed notching presses,
- Design and control of walking robots ;
- Criteria for analysis and design of new mechanical presses (as a mechatronic system);
- Design and optimization of switch-gear mechanisms;
- Analysis and design of mechanical parts of a vertical lathe;
- Analysis and design of a loader-unloader system for automatic loading of presses;
- Analysis and design of a laboratory unit for research of servo hydraulic systems;
- Analysis and design of a laboratory unit for research of servo pneumatic systems;
- Robot-assisted functional lower limb rehabilitation using patient's own motion signatures,

- Ph.D. Student Supervision

2006-2007	"Prediction of geometrical variations during aerospace assembly ", University of Birmingham, Department of Mechanical and Manufacturing Engineering, (Associate Supervisor)
2006 - 2011	"Modeling, analysis, and control of electro-servo-hydraulic actuation system based on multi-disciplinary approach and two-time-scale behavior" K. N. Toosi University of Technology, Faculty of Mechanical Engineering.
2005 - 2009	"Improvement of On/Off pneumatic valves model to be used in servo pneumatic actuators with PWM algorithm", K. N. Toosi University of Technology, Faculty of Mechanical Engineering.
2008- present	"Control performance improvement of servo-pneumatic actuator using PWM linearization and nonlinear model-base control method ", K. N. Toosi University of Technology, Faculty of Mechanical Engineering;
2008 – present	"Modeling , Control and Guarantied stability of a Pneumatic Actuator in Tracking of a Wide Range of Impedance for Using in Rehabilitation Robot" , K. N. Toosi University of Technology, Faculty of Mechanical Engineering;
2009 – present	" Modeling and design of a fast switching pneumatic on/off valve on the base of piezo electric actuator"

Membership of professional societies

- Member of Manufacturing Engineering Society of Iran;
- Member of Robotics Society of Iran.

Academic editorial activities

- 1. Associate editor of IEEE Conference on Control Applications;
- 2. Reviewer of International Journal of Advanced Manufacturing Technology;
- 3. Reviewer of Journal "Assembly Automation ";
- 4. Reviewer of International Journal of Engineering (Iran).

Teaching Experience

i. M.Sc. modules:

- Robotics (kinematics and dynamics of manipulators);
- Mechatronics;
- Optimal design of mechanical elements.

ii. B.Sc./B.Eng. Modules:

- Mechanisms Design (Synthesis of mechanisms);

- Dynamics of Machines (Theory of machines and mechanisms);
- Automatic Control;
- Vehicle Chassis and Body Design.

Languages ability:

- English; Russian; Persian.

Publication

- A. Articles in Peer- Reviewed Journals:
- 1. **Farid Najafi** and Sergey A. Vorotnikov, "Computer-Aided Design Method for Force/Torque Sensors for Robotic systems", Journal of Bauman Moscow State Technical University, No.2. 1996.
- 2. **Farid Najafi** and Sergey A. Vorotnikov, "Design Method of the Force/Torque Sensors for Robotic Systems", Journal of Bauman Moscow State Technical University, No.1., 1997.
- 3. **Farid Najafi**, Mehran Shirvani, "A New Method in Solving Kinematic Problems of Robots in Singular Configurations", Journal of Faculty of Engineering, University of Tabriz (Iran), No.23, 1999.
- 4. **Farid Najafi** and Farzad Fariba, "Seam-Tracking Sensor for Robot-Welders and Its Working Algorithm", Journal of Welding, Iranian Society of Welding and Nondestructive Evaluations, No.17, Summer 2000.
- 5. **Farid Najafi**, "Automation a Practical Way in Vehicle Industry", Journal of Scientific, Industrial and Commercial Problems of Iran (JAR), No. 11, Summer 2000.
- 6. **Farid Najafi** "Human and Robots", Journal of Mechanics of Sharif University of Technology, Vol. 3, No. 6, 2000.
- 7. **Farid Najafi** and Amirhossein Mehvar, "An Algorithm for Determining Feasible Robot's Trajectories for Leaving a singular Point", Journal of Faculty of Engineering, University of Tabriz (Iran), No. 27, 2002.
- 8. Ahmad Bagheri, **Farid Najafi** and Reza Farrokhi "Motion Dynamics of a Bipedal Walking Robot by Means of a Passive Model", Amirkabir Journal of Science and Technology, Vol. 15, No. 58-B, Spring 2004.
- 9. **F. Najafi** and M. R. Homaenejad "New Mathematical Modeling of Servo-Pneumatic Systems Using Sliding Mode Algorithm for Force-Position Control", Mechanical and Aerospace Engineering Journal, Vol. 1, No. 2, Nov. 2005.

- Ahmad Bagheri, Farid Najafi, Reza Farrokhi, Rahman Yousefi Moghaddam and Mohammad Ebrahimi Felezi, "Design, Dynamic Modification and Adaptive Control of a Biped Walking Robot", International Journal of Humanoid Robotics, Vol. 3, No. 1, 2006.
- 11. M. Saadat, R. Sim and **F. Najafi**, "Prediction of Geometrical Variations in Airbus Wingbox Assembly", J. of Automation Assembly, Vol. 27, Issue: 4, 2007.
- 12. **F. Najafi** and M. Pordel "Fault detection in a Servo Hydraulic System in Presence of White Noise , Using an Observer ", Mechanical and Aerospace Engineering Journal, Vol. 3, No. 3 , 2007.
- F. Najafi and M. Fathi "Position Control of an Experimental Servo Pneumatic Actuator, Using Sliding Mode Control", Mechanical and Aerospace Engineering Journal, Vol. 3, No. 3, 2007.
- 14. S.H. Sadati , M. Karimi-Masooleh and **F. Najafi** "Speed Control of a Servo Hydraulic Actuator , Using Artificial Neural Networks and Feedback Error Learning Algorithm ", Mechanical and Aerospace Engineering Journal, Vol. 3, No. 3 , 2007.
- 15. Saadat M, Sim R, **Najafi F**, "Modelling and analysis of Airbus wingbox assembly", Proceedings of the IMechE Part B: Journal of Engineering Manufacture . Volume 222, Number 6 / 2008, pp. 701-709.
- 16. Karimi M., Najafi F., Sadati S.H., and Saadat M., "Application of Flexible Structure Artificial Neural Network on a Servo Hydraulic Rotary Actuator", International Journal of Advanced Manufacturing Technology, Volume 39, Numbers 5-6 / November, 2008 pp. 559-569.
- 17. **Najafi F.**, Fathi M. and Saadat M., "Performance improvement of a PWM- sliding mode position controller used in pneumatic actuation, International J. of Automation and Soft Computing, Vol. 15, No.1, 2009, pp. 73-84.
- Saadat M, Cretin L, Sim R, Najafi F, "Deformation analysis of large aerospace components during assembly", International Journal of Advanced Manufacturing Technology, Volume 41, Numbers 1-2 / March, 2009, pp. 145-155.
- 19. Taghizadeh M., Ghaffari A. and Najafi F. "Modeling and identification of a solenoid valve for PWM control applications " Comptes Rendus Mecanique,vol.337,pp.131-140, 2009.
- 20. Taghizadeh M, Ghaffari A. and **Najafi F**. "Improving dynamic performances of OWMdriven servo- pneumatic systems via a novel pneumatic circuit" ISA Transaction, vol.48, pp. 512-518, 2009.

- 21. Taghizadeh M., **Najafi F**.and Ghaffari A. "Increased tracking ability of PWM- driven pneumatic servo systems via a modified pneumatic circuit" Electrical Engineering, vol.91, pp.79-87, 2009.
- 22. F. Najafi, M. Karimi, and M. Ghayour "Optimal Trajectory Planning and Obstacle Avoidance of a Manipulator in the Presence of Ellipsoidal Obstacles Using Genetic Algorithms", Journal of Tarbiat Moddaress – Mechanical Engineering, Vol. 10, No. 4, 2009.
- 23. Taghizadeh M., **Najafi F**. and Ghaffari A, "Multimodel PD.control of a pneumatic actuator under variable loads "Int.J.Adv. Manuf. Technol, Volume 48, Numbers 5-8, 2010, pp. 655-662.
- 24. M. H. Toufighi, S. H. Sadati and F. Najafi, "Model-based fault diagnosis of a pumpdisplacement-controlled actuator with a multidisciplinary approach using bond graph", International Journal of Multiphysics, Vol. 4, No. 1, 2010.
- 25. M. Hasan Tofighi, Hadi Sazgar, **Farid Najafi**, S. Hossein Sadati, "Modeling and Experimental Identification of a rotary Servo-Hydraulic System in Presence of Noise and Structural Uncertainties ", Journal of Control, Vol. 3, No. 4, 2010, pp. 1-10.
- 26. Nima Enayati and **Farid Najafi** "Design and Manufacturing of a tele-operative Rescue Robot With a Novel Track Arrangement", International Journal of Industrial Robot, Vol. 38, No. 5, 2011, pp. 476-485.

B. Articles in Conferences:

- 1. Najafi F., "New Method for Automated Grinding Process by Robots", Proc. of 2nd Conf. of Production & Manufacturing Engineering, Tehran, 1995.
- 2. **Farid Najafi** and Farzad Fariba "Design of Sensor for Correcting Seam- Tracking of a Robot-Welder", Proc. Of 7th Annual Conf. of Iranian Society of Mechanical Engineers, Zahedan, Iran May 15-17, 1999.
- 3. **Farid Najafi** and Mehran Shirvani, "Singular Points in Robot Kinematics", Proc. of 4th International and 8th Annual Conf. of Iranian Society of Mechanical Engineers, Tehran, Iran Vol. 1., May 16-19, 2000,.
- Farid Najafi "New Criterion in Optimum Design of Force/Torque Sensors For Industrial Robots", Proc. of 4th International and 8th Annual Conf. of Iranian Society of Mechanical Engineers, Tehran, Iran, Vol. 1, May 16-19, 2000,.
- 5. **Farid Najafi**, "Existing Relation Problems Between Industries and Universities", Proc. of the 2nd International and the 5th Annual (National) Congress on Government, University and Industry Cooperation for National Development, Tehran -Iran, May 20-22,2000.
- Farid Najafi, and Behnam Kabiri, "Optimum Design of Force/Torque Sensors for Industrial Robots", Proc. of 32nd International Symposium on Robotics (ISR2001), Seoul , Korea April 19-21, 2001.

- Farid Najafi, Farshid Najafi and Navid Sadri " Loader-Unloader System For Press-Shops", Proc. of 10th International Conference on Mechanical Engineering, Tehran - Iran, 25-27 May, 2002.
- 8. Roushanian J. and **Najafi F.**, "A Simplified Methodology for the Synthesis of Adaptive Flight Control systems", WSEAS International Conf. on Electronics, Control, and Signal Processing, Singapore, December 9-12, 2002.
- Farid Najafi, Aliasghar Jafari, and S. Saeed Z. Tabatabaee "Error Analysis in Linear Vibrational Modeling of Mc-Pherson Suspension Mechanism", Proc. of 11th International Conference on Mechanical Engineering, Mashhad -Iran, 13-15 May 2003.
- 10. Farid Najafi, Mohammad Teshnehlab, and Ehsan Falsafi "Dynamic Equations for a Ten Degrees of Freedom Walking Robot ", Proc. of 11th International Conference on Mechanical Engineering, Mashhad - Iran, 13-15 May 2003.
- Farid Najafi, Ahmad Bagheri and Reza Farrokhi, "Adaptive Control Algorithm for Single – Support Phase of Motion of a New Biped Robot", Proc. of the 9th IEEE International Conf. on Methods and Models in Automation and Robotics (MMAR2003), Poland, 25-28 Aug. 2003.
- F. Najafi, A. Bagheri, and R. Farrokhi, "Design and Simulation analysis of a New Planar Biped Robot", 6th International Conf. on Climbing and Walking Robots (CLAWAR2003), Italy, 17-19 September 2003.
- 13. S. Saied Z. Tabatabaee and Farid Najafi, "Design of Neural Network based Controller for a Active Suspension System of a Car", Proc. of 12th International Conference on Mechanical Engineering, Tehran – Iran, 18-20 May 2004.
- 14. **Farid Najafi** and Ehsan Falsafi, "Trajectory Generation for a New Bipedal Robot With Ten Degrees of Freedom", Proc. Of 5th IFAC/EURON Symposium on Intelligent Autonomous Vehicles (IAV2004), Lisbon, Portugal 5-7 July 2004.
- 15. Bagheri A., Najafi F., Farrokhi R., Alitavoli M., and Yousefi Moghadam R "Dynamic Simulation of a Bipedal Walking Robot by Means of a Passive Model", Proc. Of Complex Systems Intelligence and Modern Technological Applications Conference (CSIMTA'04), Cherbourg – France, September 19-22, 2004.
- 16. Farid Najafi,and Mohammad Reza Homaienejad "Mathematical Modeling of New a Servo-Pneumatic System By Use of Sliding Mode Control Algorithm For Position and Force Control", The 13th International Conf. on Mechanical Engineering, Isfahan – Iran May 2005.
- 17. Ehsan Falsafi, Farid Najafi and Mohammad Teshnelab "Application of Flexible Sigmoid Function in a Walking Robot Neuro Controller", The 13th International Conf. on Mechanical Engineering, Isfahan – Iran, May 2005.
- 18. M. Saadat, R. Sim and **F. Najafi**, "Prediction of Geometrical Variations in Airbus Wingbox Assembly", J. of Automation Assembly, Vol. 27, Issue: 4, 2007.

- 19. Karimi M., Najafi F. And Ghayour M., "Optimal and Collision Free Path Planning of Robot Manipulator Around Ellipsoidal Obstacles by the Genetic Algorithm", The 15th International Conf. on Mechanical Engineering, Tehran – Iran, May 2007.
- 20. Moradinasab M., Nahvi A., and **Najafi F**., "Arc Welding Simulator Design", The 15th International Conf. on Mechanical Engineering, Tehran Iran, May 2007.
- 21. Karami R., **Najafi F.**, and Aliyari Sh. M., "Model Based Identification and Fault Detection of an Active Suspension System ", Fifth IFAC Symposium on Advances in Automotive Control, California, USA, 2007.
- 22. Toufighi, M.H., Sadati, S.H., **Najafi, F**., "Modeling and Analysis of a Mechatronic Actuator System by Using Bond Graph Methodology", IEEE Aerospace Conference, Montana , USA , 2007.
- 23. S. Z. Tabatabaee and **F. Najafi** "Control of an Active Suspension System Using Optimal Controller and Kalman Filter ", The 16th International Conf. on Mechanical Engineering, Kerman– Iran, May 2008.
- 24. **F. Najafi**, A. Zaringhalam, M. Abdolahzadeh and M. Fathi "Fuzzy Position Control System for Servo Pneumatic Actuator Using PWM Algorithm ", The 16th International Conf. on Mechanical Engineering, Kerman Iran, May 2008.
- 25. H. Sazgar and **F. Najafi** "Adaptive Optimal Controller System for Fatigue Testing Equipment ", The 17th International Conf. on Mechanical Engineering, Tehran Iran, May 2009.
- 26. F. Najafi, "Optimized Sliding Mode Controller System for a Pneumatic Servo Hydraulic Actuator Using Genetic Algorithm", The 17th International Conf. on Mechanical Engineering, Tehran – Iran, May 2009.
- 27. H. Sazgar, M.H. Tofighi, F. Najafi and S. H. Sadati "Experimental Identification of Parameters of a Rotary Servo Hydraulic Actuator and Analysis of State Variables on Identification Results", The 18th International Conf. on Mechanical Engineering, Tehran – Iran, May 2010.
- 28. N. Garmsiri and F. Najafi "Application of a Brain Emotional Learning Controller on for Admittance Control of a Rehabilitation Robot ",The 18th International Conf. on Mechanical Engineering, Tehran – Iran, May 2010.
- 29. N. Garmsiri and **F. Najafi** "Fuzzy Tuning of Brain Emotional Learning Based Intelligent Controllers ", Proc. Of the 8th World Congress on Intelligent Control and Automation, Jinan , China , July 6-9 , 2010 (IEEE 2010).