

Resume



Personal information:

Last name: Ali-Akbar Khayyat
First name: Amir
Date of birth: December 12, 1961 (1340 / 09 / 21)
Country of birth: IRAN
Gender: Male
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Academic Background:

Degree	Major	School Name & Location	Date	GPA
B.Sc.	Mechanical Engineering	Iran University of Science and Technology, Tehran, IRAN	1979 - 1988	3.2 out of 4.0
M.Sc.	Mechanical Engineering	Sharif University of Technology, Tehran, IRAN	1989 - 1992	15.83 out of 20
Ph.D.	Mechanical Engineering	The University of Manitoba, Winnipeg, MB, CANADA	1994 - 2000	4.4 out of 4.5

Dissertations:

B.Sc. Thesis: “High Pressure Technology; Stress Analysis of Autofrettaged Cylinders”.
M.Sc. Thesis: “Guidance and Control System Design for a Surface-to-Surface Missile (Classic and Modern Control)”.
Ph.D. Thesis: “Force Tracking of Hydraulic Manipulators within an Impedance Control Framework”.

Academic Publications:

1. Khayyat, A.A., Heinrichs, B., and Sepehri, N., 1996, "A Modified Rate-Varying Integral Controller", *Int. Journal of Mechatronics*, Vol. 6, No. 3, pp. 367-376.
Mechatronics 04/1996; 6(3-6):367-376. DOI: 10.1016/0957-4158(95)00080-1
2. Heinrichs, B., Khayyat, A.A., Sepehri, N., and Thornton-Trump, A.B., 1996, "A Nonlinear PI Controller for Accurate Positioning with Application to Impedance Control", *Proc. World Automation Congress (WAC 96)*, Montpellier, France, pp. 293-300.
3. Sepehri, N., Khayyat, A.A., and Heinrichs, B., September 1997, "Nonlinear Proportional-Integral Controller", US Patent Number 5721477, Canadian Patent Number 2,197,287,1998.
4. Sepehri, N., Khayyat, A.A., and Heinrichs, B., 1997, "Development of a Nonlinear PI Controller for Accurate Positioning of an Industrial Hydraulic Manipulator", *Int. Journal of Mechatronics*, Vol. 7, No. 8, pp. 683-700. DOI: 10.1016/S0957-4158(97)00029-9
5. Ziaei, K., Sepehri, N., and Khayyat, A.A., 1997, "Hardware Implementation and Evaluation of Environmental Effect in Force Control of Hydraulic Manipulators", *Proc. 16th Canadian Congress of Applied Mechanics (CANCAM 97)*, Quebec, Canada, pp. 509-510.
6. Nasiri, M. and Khayyat, A.A., 2003, "Pitch Attitude Hold Mode Autopilot Design Using Fuzzy Control", *Proc. the ISME 11th Annual Conference 2003*, Mashhad, Iran, Vol. 6, pp. 470-476.
7. Khayyat, A.A. and Nasiri, M., 2003, "Roll Attitude Hold Mode Autopilot Design Using Fuzzy Gain Scheduling of a Nonlinear PID", *Proc. the ISME 11th Annual Conference 2003*, Mashhad, Iran, Vol. 6, pp. 490-495.
8. Khayyat A.A. and Kouhestani A., "Modification to PI Controller Leading to a Nonlinear Controller for Position Control of an Electro-Hydraulic Servo System", *Proc. the Iranian Society of Mechanical Engineers (ISME) 11th Annual Conference 2003*, Mashhad, Iran, Ordibehesht 1382, Vol. 4, pp. 1862-1869. (in Persian)

9. Khayyat A.A. and Kouhestani A., “Deadband and Stiction Compensation using a Nonlinear PI Controller for an Electro-Hydraulic Servo System”, *Proc. the 5th Society of Manufacturing Engineering of Iran (SMEI) Conference 2003*, AmirKabir Univ. of Tech., Tehran, Iran, Bahman 1381, pp 333-347. (in Persian)

10. Ghanbarpour H., Khayyat A.A., 2003, “Robust control for a Fighter Using Sensitivity Functions and Robust Filters”, *Proc. the 5th (2nd International) Iranian Aerospace Society Conference 2003*, Bahman 1382. (in Persian)

11. Sadeghi M., Khoshtaghaza M.H., Khayyat A.A., 2004, “Principles of Design for a Laboratory Vibrating Floating Bed Dryer to Study the floating of Moist Substances”, *AmirKabir Journal of Science and Technology*, 15(58-b): 385-397, Spring 1383. (in Persian)

12. Ghapanvari M.A., Khayyat A.A., 2008, “Nonlinear Modeling of a Solid Fuel Cruise Missile Dynamics”, *Proc. the 7th Iranian Aerospace Society Conference 2008*, Esfand 1386. (in Persian)

13. Karimi A., Mehrtash M., Khayyat A.A., 2008, “Shape Optimization of Unguided Projectiles Using a New Multi-objective Evolution Strategy”, *Proc. the 46th AIAA Aerospace Sciences Meeting*, Reno, Nevada, 7-10 January 2008.

14. Darabi D., Khayyat A.A., Allahverdi B., “Design of a Fuzzy Autopilot for a UAV Using Genetic Algorithm”, *Proc. the 2nd Joint Congress on Fuzzy and Intelligent Systems*, Tehran, Iran, 28-30 October 2008 (in Persian).

15. Eskandari N., Khayyat A.A., "Proposing 'Simultaneous Control and Share Designation Algorithm' Schema for the Purpose of PIO Phenomenon Detection and Compensation", *Proceedings of 8th Iranian Aerospace Society Conference (AERO 2009)*, Isfahan, Iran, February 2009 . . . (in Persian)

16. Zareh, S.H., Jahromi, A.F., Sarafan, A., Khayyat, A.A. , “The Design of LQR and Fuzzy Logic Controller for a Thermal System with Large Time Delay”, *Proceedings of the 2010 International Conference on Mechanical, Industrial, and Manufacturing Technologies, MIMT 2010* , pp. 293-298.

17. Zareh, S.H., Jahromi, A.F., Abbasi, M., Khayyat, A.A. , “The control of a thermal system with large time delay using LQG and lead-compensator”, *2010 IEEE International Conference on Mechatronics and Automation, ICMA 2010* , art. no. 5588796, pp. 1842-1847.

18. Zareh, S.H., Jahromi, A.F., Khayyat, A.A., "The Control of Nonlinear Thermal System with Large Delay Time Using Feedback Linearization Strategy", *Proceedings of the 11th International Conference on Control, Automation and Systems*, October 26-29, 2011, in Kintex, Gyeonggi-do, Korea, pp. 1846-1857.
19. Amin, R., Khayyat, A.A., Osgouie, K.G., "Neural networks modeling of autonomous underwater vehicle", *Proceedings of 2010 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications, MESA 2010* , art. no. 5552027, pp. 14-19.
20. Amin, R., Khayyat, A.A., Osgouie, K.G., "Neural Networks Control of Autonomous Underwater Vehicle", *ICMEE 2010 - 2010 2nd International Conference on Mechanical and Electronics Engineering, Proceedings 2*, art. no. 5558474, pp. V2117-V2121.
21. Fattahi, S.J., Khayyat, A.A. "Direct Torque Control of Brushless Doubly Fed Induction Machine", *SPEEDAM 2010 - International Symposium on Power Electronics, Electrical Drives, Automation and Motion* , Pisa, Italy, art. no. 5545082, pp. 1744-1747.
22. Fattahi, S.J., Khayyat, A.A. "Direct Torque Control of Brushless Doubly Fed Induction Machine", *International Journal of Control and Automation*, Vol. 3, No. 4, December 2010, pp. 21-32.
23. Fattahi, S.J., Khayyat, A.A. "Direct Torque Control of Brushless Doubly-Fed Induction Machines Using Fuzzy Logic", *Proceedings of IEEE Power, Electronics, and Drive Systems (PEDS) 2011*, Singapore, 5-8 December 2011, pp. 619-624.
24. Sarrafan, A., Zareh, S.H., Khayyat, A.A., "Semi-Active Control of Wave-Induced Vibration for Steel Jacket Offshore Platform Using Magnetorheological Dampers", *Proceedings of 2011 International Conference on Computer and Automation (ICCCA 2011)*, Jeju Island, South Korea, May 1-3, 2011, pp. 88-93.
25. Bagheri Ghaleh, P., Khayyat A.A., Farjami, Y., and Abedian, A., " Approximate Analytical Solutions of an Axially Moving Spacecraft Appendage Subjected to Tip Mass", *SAGE Journals, Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering*, July 8, 2013, 0954410013494140.
26. Kharmandar, N., Khayyat, A.A., "Force Impedance Control of a Robot Manipulator Using a Neuro-Fuzzy Controller", *Proceedings of 2011 International Conference on Mechatronics Science, Electric Engineering and Computer*, August 19-22, 2011, Jilin, China, pp. 559-563.

27. Zareh, S.H., Fellahjahromi,A., Hayeri R., Khayyat, A.A., Zabihollah, A., "LQR and Fuzzy Controller Application with Bingham Modified Model in Semi-Active Vibration Control of 11-DOFs Full Car Suspension System", *GSTF International Journal on Computing*, Vol. 1, No. 3, pp. 39-44, August 2011.
28. Zareh, S.H., Sarrafan, A., Khayyat, A.A., "Clipped Optimal Control of 11-DOFs of a Passenger Car Using Magneto-Rheological Damper", *Proceedings of 2011 International Conference on Computer, Control and Automation (ICCCA 2011)*, Jeju Island, South Korea, May 1-3, 2011, pp. 162-167.
29. Zareh, S.H., Sarrafan, A., Jahromi, A.F., Khayyat, A.A., "Linear Quadratic Gaussian Application and Clipped Optimal Algorithm for Semi-Active Vibration of Passenger Car ", *Proceedings of the 2011 IEEE International Conference on Mechatronics*, Istanbul, Turkey, April 13-15, 2011, pp. 162-167.
30. Sarrafan, A., Zareh, S.H. , Zabihollah, A., Khayyat, A.A., "Intelligent Vibration Control of Micro-Cantilever Beam in MEMS", *Proceedings of the 2011 IEEE International Conference on Mechatronics*, April 13-15, 2011, Istanbul, Turkey, pp. 336-341.
31. Sarrafan, A., Zareh, S.H. , Khayyat, A.A., Zabihollah, A., "Performance of an Offshore Platform with MR Dampers Subjected to Wave", *Proceedings of the 2011 IEEE International Conference on Mechatronics*, April 13-15, 2011, Istanbul, Turkey, pp. 242-247.
32. Zareh, S.H., Sarrafan, A., Abbasi M., Khayyat, A.A., "Intelligent Neuro-Fuzzy Application in Semi-Active Suspension System", *Fuzzy Logic: Controllers, Concepts, Theories and Applications*, Edited by Elmer P. Dadios, **Book Chapter** 12, pp. 237-252, INTECH Publications, 2012.
33. Zareh, S.H., Sarrafan, Khayyat, A.A., "Intelligent Semi-Active Vibration Control of Eleven Degree of Freedom Suspension System Using Magneto-Rheological Dampers", *Journal of Mechanical Science and Technology*, February 2012, Vol. 26, Issue 2, pp. 323-334.
34. KolbadiNejad, M., Zabihollah, A., Khayyat, A.A., MohammadPour, M., "An Equivalent Electrical Circuit Design for Pipeline Corrosion Monitoring Based on Piezoelectric Elements", *Journal of Mechanical Science and Technology*, Vol. 27, Issue 3, 2013, pp. 799-804.
35. Zareh, S.H., Khayyat, A.A., "Fuzzy Inverse Model of Magneto-Rheological Dampers for Semi-Active Vibration Control of an Eleven-Degree of Freedom Suspension System", *Journal of System Design and Dynamics*, Vol. 5, No. 7, pp. 1485-1497, 2011. DOI: 10.1299/jsdd.5.1485

36. Sarrafan, A., Zareh, S.H., Khayyat, A.A., Zabihollah, A., "Neuro-Fuzzy Control Strategy for an Offshore Steel Jacket Platform Subjected to Wave-Induced Forces Using Magnetorheological Dampers", *Journal of Mechanical Science and Technology*, April 2012, Vol. 26, Issue 4, pp. 1179-1196.
37. Shahriari, M.A., Osgouie, K., Khayyat, A.A., "Modular Framework and Fuzzy Reward Reinforcement Learning Analysis of a Radially Symmetric Six-Legged Robot", *Life Science Journal*, 2013; 10(8s): 120-129.
38. Shahriari, M.A., Khayyat, A.A., "Gait Analysis of a Six-Legged Walking Robot Using Fuzzy Reward Reinforcement Learning", *Proceedings of the 13th Iranian Conference on Fuzzy Systems (IFSC)*, Qazvin, Iran, 978-1-4799-1228-5/13 2013 IEEE.
39. Javaherchi, H., Osgouie, K., Khayyat, A.A., "Optimal Balancing of a 3-RPS Robot Manipulator Using Genetic Algorithm", *Journal of Applied Mechanics and Materials*, Vol. 390 (August 2013), pp 377-382. DOI: 10.4028/www.scientific.net/AMM.390.377
40. Jalil-Mozhdehi, R., Selk-Ghafari, A., Khayyat, A.A., "Design of Electrostatic Actuators for Suppressing Vertical Disturbances of CMOS-MEMS Capacitive Force Sensors in Bio Applications", *Journal of Mechanics and Industry*, 16, 306 (2015) pp. 1-9.
41. Zareh, S.H., Matbou F., Khayyat, A.A.A., "Experiment of new Laboratory Prototyped Magneto-Rheological Dampers on a Light Commercial Vehicle Using Neuro-Fuzzy Algorithm", *Journal of Vibration and Control*, 01/2014; 21(15). DOI: 10.1177/1077546313519284

Awards:

- Iran Ministry of Culture and Higher Education Scholarship.
- The University of Manitoba Graduate Studies Fellowship (Canadian \$10,000 per annum for 2 years).
- Canadian Institute for Robotics and Intelligent Systems (IRIS-PREARN) Research Grant (Canadian \$11,000 per annum for 4 years).
- Manitoba Hydro Company Research Grant (Canadian \$25,000 for 1996).

Teaching, Research and Job Experiences:

- **Ministry of Sepaah, Tehran, Iran.**
Analysis and troubleshooting the problem with Mortar and Cannon Balls accuracy hitting the targets.
- **Jahaad Sazandegi Engineering Research Center, Tehran, Iran.**
Guidance and control system design for a surface to surface missile.
- **Iran National Railway, Tehran, Iran.**
Analysis and troubleshooting Diesel Turbochargers problems and malfunctions.
- **Manitoba Hydro Company, Winnipeg, MB, Canada.**
Power plant tasks that can be improved by robotics technology (project defining)
- **Mechanical and Industrial Engineering Department, The University of MANITOBA, Winnipeg, MB, Canada.**
Being number one Teaching Assistant (for Measurement and Control, Automatic Control, Process Control, Machine Dynamics, and Stress Analysis courses) in the department of Mechanical and Industrial Engineering **for 6 years**; and teaching the course “Measurement and Control” while the professor was on a sabbatical leave.
- **Aerospace Organization, Ministry of Defense**
Adopting our *patented Nonlinear PI controller* (refer to the 3rd Academic Publication) in autopilot design.
- **Department of Aerospace Engineering, SHARIF University of Technology, Tehran, Iran. (Jan. 2001 to Jan. 2009)**
Teaching Vibrations, Automatic Control, Flight Dynamics II, Advanced/Modern Control, Digital Control, Neural Networks, Fuzzy Systems, Nonlinear System Analysis, etc; and doing research in the field of system control
- **Department of Mechanical Engineering, International Campus of SHARIF University of Technology, Kish Island, Iran. (Jan. 2009 to now)**
Teaching Vibrations, Automatic Control, Dynamics, Mechanisms Analysis and Design, Mechatronics Fundamentals, Advanced/Modern Control, Digital Control, Neural Networks, Fuzzy Systems, Nonlinear System Analysis, etc; and doing research in the field of control theory and artificial intelligent control

Undergraduate Level Courses Already Offered:

- Flight Dynamics II
- Theory of Vibrations
- Dynamical Systems
- Automatic Control
- Fundamentals of Mechatronics
- Statics
- Dynamics
- Kinematics & Dynamics of Machines and Mechanisms
- Mechanisms Analysis & Design

Undergraduate Level Courses Ready to Offer:

- Control Systems Design (or Automatic Control II)
- Measurement and Control Systems
- Robotics
- Strength of Materials

Graduate Level Courses Already Offered:

- Advanced/Modern Control
- Digital Control
- Nonlinear Systems Analysis (Nonlinear Control)
- Neural Networks
- Fuzzy Systems and Control

Graduate Level Courses Ready to Offer:

- Robotics
- Advanced Dynamics
- Multivariable Control
- Robust Control
- Adaptive Control
- Optimal Control

Research Interests:

- Control Theory
- Robotics & Automation
- Simulations, Dynamic Systems Modeling and Identification
- Artificial Intelligence, Neural Networks, and Fuzzy Systems
- Computer Controlled Systems
- Fluid Power & Hydraulic Systems
- Nonlinear and Optimal Control
- Guidance and Navigation Systems
- Machines and Mechanisms

M.Sc. Theses supervised:

1. “Roll and Pitch Attitude Hold Mode Autopilot Design Using Fuzzy Control”, Mostafa Nassiri Deh-Sorkhi, Bahman 1381.
2. “Hydraulic Actuators Compensation”, Afshin Kouhestani Rizi, Bahman 1381.
3. “Optimization of Timed Climb Trajectories of an Airplane”, Saeed Karimian Ali-Abadi, Esfand 1382.
4. “Autopilot Design for a Homing Missile Using Neural Networks”, Ali Osaji, Aban 1383.
5. “Position Control of a 2 Degree-of-Freedom Robot”, Mohammad Ali Baharloo, Dey 1383.
6. “Mission Planning for a Moon-Rover Optimal Landing”, Sohrab Haghighat, Teer 1384.
7. “Design of a Neuro-Fuzzy Controller for Automatic Landing of an Aircraft at the Presence of a Lateral Gust”, Mona Saneie Ghalibaf, Dey 1384.
8. “ Angular Velocity Control in Wing Rock Phenomenon for MAV’s”, Tahereh MirMohammadi Ghouzhd, Dey 1384.
9. “Path Planning (Selection and Simulation) for UAVs” Amir Tavakkoli Kashi, Bahman 1384.
10. “Vibration Analysis of Rotary . . .”, Abdolreza Asgarianpour , Dey 1385.
11. “Warhead Control Using Moving masses . . .”, Vahid Hassani , Dey 1385.
12. “Fault Tolerant Controller . . .”, Moein Mehrtash , Khordad 1386.
13. “Autopilot Design Using Neuro-Fuzzy Controllers . . .”, Yashar Kazemi Sabour , Khordad 1386.
14. “On-line Airplane Location and Area Mapping Using Ground Landscapes”, Mohammad-Hossein Jafari , Dey 1386.
15. “Adaptive Control Autopilot Design for a Cruise Missile”, Mohammad-Adib Ghapanvari , Dey 1386.
16. “Design of a Multivariable Controller for a Quadrotor”, Reza Hatami Nouje-Deh , Bahman 1386.
17. “Design of a Controller to Prevent Pilot Induced Oscillations (PIO) in an Aircraft”, Neda Eskandari Naddaf, Dey 1387.
18. “Implication of Linear Parameter Variation (LPV) Based Adaptive Control in Aerospace Vehicles”, Sahar Dabiri, Dey 1387.
19. “Modeling and Control of an Autonomous Underwater Vehicle Using Computational Intelligence”, Reza Amin, 1389
20. Seyed Hamid Zareh,
21. Atabak Sarrafan,

22. Seyed Javad Fattahi, Direct Torque Control of Brushless Doubly Fed Induction Machine Using Fuzzy Logic, 1391?
23. Negar Kharmandar,
24. Mohaddeseh KolbadiNejad,
25. Yasser Emami Meibodi,
26. Mohammad-Ali Shahriari,
27. Ali-Reza Golmohammadi,
28. Assila Ahmadi Aras,
29. Hossein Javaherchi,
30. Amir Saeian,
31. Reza Khorramdel,
32. Paria Moshaver,
33. Payam Gerami,
34. Shahed Masoudian,
35. Adel Hassani,
36. Mostafa Mortazavi-Bak,
37. Aida Rostamza,
38. Mohammad-Mohsen Delavari,

B.Sc. Theses supervised:

- “Design of Autopilot for a Model Helicopter via Quadratic Programming”,
(Vahid Marefat Khalil-Abad) – Azar 1383
- “On-line Adaptive Control of an Electro-Hydraulic Servo System Using Neural Networks”,
(Ali Hosseini) – Mordad 1384
- “Position Control of a Two Degree of Freedom Manipulator”,
(Parisa PurShahid Saeed-Abadi) – Shahrivar 1385
- “Position Control of a Two Degree of Freedom Robot Using Neural Networks”,
(Hamed Mohammad-Karimi) – Shahrivar 1386
- “Position Control of an Inverted Pendulum Using Neural Networks”,
(Ali Ghasemian Sahebi) - Azar 1386
- “Position Control of an Inverted Pendulum Using a Fuzzy Controller”,
(Mohsen Gilani-far) - 1386
- “Design and Fabrication of a Line-Follower Robot”,
(Mohammad-Ali Adl) - 1389
- “Design and Fabrication of a Firefighter Robot”,
(Ali Alavi Tabatabaei) - 1389
- “Design and Fabrication of a 6 DOF Robot Manipulator”,
(Hamid Enayatollahi) - 1389
- “Introduction to PLC Controllers”,
(Anoush Garjani), Teer 1390