Amir Aminzadeh Ghavifekr

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Research Interests

Major Focus: Teleoperation and Telesurgery, Nonlinear Control, Robotic Manipulators, Network Control Systems (NCS).

Secondary Interests: Digital Control, Adaptive Control, Multirate Control, Virtual Reality & Haptic, Neural Networks and Optimization Algorithms.

Education

2013 –2018	**UNIVERSITY OF TABRIZ –UNIVERSITY OF VERONA**	Tabriz-Iran
	Ph.D. Degree, Electrical Engineering, Control Systems (GPA: 18.37/20.00)	Verona-Italy
	(Member of the Exceptional Talented Students Organization)	

Thesis Title: *Multirate Control of Discrete Teleoperation systems with Networked Structure*
Thesis Supervisor: *Prof. A.R. Ghiasi - Prof. M.A. Badamchizadeh*
(Thesis mark:19.40/20)

UNIVERSITY OF TABRIZ Tabriz-Iran
Master of Science, Electrical Engineering, Control Systems (GPA: 18.38/20.00)
(Third Honor)

2010 –2012

Thesis Title: *Nonlinear Control of Teleoperation Systems and its Application in Telesurgery*
Thesis Supervisor: *Prof. Ghasem Alizadeh - Prof. M.A. Badamchizadeh*
(Thesis mark:19.50/20)

2005 - 2009 **UNIVERSITY OF TABRIZ** Tabriz, Iran
Bachelor of Science, Electrical Engineering, Control Systems (GPA: 3.33/4)
(Sixth Honor)
Thesis Title: *Analysis of Haptic Feedback in Control Structure of the Telesurgery Systems.*
Thesis Supervisor: *Prof. Iraj Hassanzadeh.*
(Thesis mark:19.50/20)

2001– 2005 **SHAHID MADANI** Tabriz, Iran
Diploma in Mathematics and Physics
National Organization for Development of Exceptional Talents (NODET)
Pre-University Certificate (GPA: 19.89/20.00)

Honors/Awards

2005 Ranked among the top 1 percent of all the examinees in the Iranian nationwide entrance exam of universities for undergraduate studies.

2009 Ranked Among 6 Top Undergraduate Students.
University of Tabriz, Faculty of Electrical and Computer Engineering, Department of Control Engineering

2010	Ranked among the top 5 percent of all the examinees in Iranian nationwide entrance exam of universities for graduate studies in Electrical Eng, and hence, awarded "day admission" to the University of Tabriz which was equal to a tuition waiver award.
2012	Ranked Among 3 Top Graduate Students. *University of Tabriz, Faculty of Electrical and Computer Engineering, Department of Control Engineering*
2016	Accepted as the Member of the Exceptional Talented Students Organization *University of Tabriz, Faculty of Electrical and Computer Engineering, Department of Control Engineering*
2018	Best Teacher Award Achievement *Technical and Vocational University of Tabriz*

Journals

- **A. Aminzadeh Ghavifekr,** S. Pezeshki, A. Arjmandi, "Evaluation of Three Nonlinear Control Methods to Reject the Constant Bounded Disturbance for Robotic Manipulators"*, Majlesi Journal of Mechatronic Systems,*Vol. 1, no.2 , pp. 128-134, 2012.
- **A. Aminzadeh Ghavifekr**, Amir R. Ghiasi, Mohammad Ali Badamchizadeh, and Farzad Hashemzadeh. "Exponential stability of bilateral sampled-data teleoperation systems using multirate approach." *ISA Transactions* (2020).
- **A. Aminzadeh Ghavifekr,** A. Arjmandi, K. Sehat, "Evaluation of Particle Swarm Optimization and Adaptive Genetic Algorithm for Motion Planning in Minimally Invasive Surgery", *Majlesi Journal of Mechatronic Systems,* Vol. 1, no.2 , pp. 67-74, 2012.
- **A. Aminzadeh Ghavifekr,** M. Badamchizadeh, Gh. Alizadeh**,** "Designing a Controller for Optimal Steering of Nonholonomic Laparoscopic Robotic Manipulators", *Journal of Electrical Engineering-University of Tabriz.(In Persian)*
- **A. Aminzadeh Ghavifekr,** S. Ghaemi, R. Behinfaraz , "A Modified Biogeography Based Optimization (BBO) Algorithm for Time Optimal Motion Planning of 5 DOF PC-based Gryphon Robot", *International Journal of Engineering works,* Vol1, Issue 2, pp 38-44.
- **A. Aminzadeh Ghavifekr,** Amir R. Ghiasi, Mohammad A. Badamchizadeh, Farzad Hashemzadeh, and Paolo Fiorini. "Stability analysis of the linear discrete teleoperation systems with stochastic sampling and data dropout." *European Journal of Control* 41 (2018): 63-71.
- **A. Aminzadeh Ghavifekr**, Amir Rikhtehgar Ghiasi, and Mohammad Ali Badamchizadeh. "Discrete-time control of bilateral teleoperation systems: a review." *Robotica* 36, no. 4 (2018): 552-569.
- **A. Aminzadeh Ghavifekr**, Amir Rikhtehgar Ghiasi, and Mohammad Ali Badamchizadeh. F. Hashemzadeh " Exponential Stability Analysis of Discrete Linear Teleoperation Systems with Nonuniform Sampling ." *Iranian Journal of Electrical and Computer Engineering (IJECE), 2017,pp 84-95.(In Persian)*
- **A. Aminzadeh Ghavifekr**, Amir Rikhtehgar Ghiasi, and Mohammad Ali Badamchizadeh. " Evaluation of Three Different Null Space Joint Velocities For a Redundant 5-Bar Linkage Manipulator ." *International Journal of Electrical, Electronics and Data Communication.2016.*
- **A. Aminzadeh Ghavifekr**, Amir Rikhtehgar Ghiasi, and Mohammad Ali Badamchizadeh. F. Hashemzadeh "Passivity Analysis of Discrete-time Counterparts of the Bilateral Controlled Teleoperation Systems." *International Journal of Electrical, Electronics and Data Communication.2018.*
- Orvañanos-Guerrero, María T., Mario Acevedo, Claudia N. Sánchez, Daniel U. Campos-Delgado, **Amir Aminzadeh Ghavifekr**, Paolo Visconti, and Ramiro Velázquez. "Complete Balancing of the Six-Bar Mechanism Using Fully Cartesian Coordinates and Multiobjective Differential Evolution Optimization." *Mathematics 10, no. 11 (2022): 1830.*
- **A. Aminzadeh Ghavifekr**, Roberto De Fazio, Ramiro Velazquez, and Paolo Visconti. "Sensors Allocation and Observer Design for Discrete Bilateral Teleoperation Systems with Multi-Rate Sampling." *Sensors* 22, no. 7 (2022): 2673.

Conference Papers

- **A. Aminzadeh Ghavifekr,** M.A. Badamchizadeh, G. Alizadeh, A. Arjmandi,"Designing Inverse Dynamic Controller with Integral Action for Motion Planning of Surgical Robot in the Presence of Measurable Disturbances" ,*21th IEEE International Conference on Electrical Engineering, ICEE2013.*
- **A. Aminzadeh Ghavifekr,** S. Pezeshki, A. Arjmandi, "Evaluation of Three Nonlinear Control Methods to Reject the Constant Bounded Disturbance for Robotic Manipulators"*,* 2th *Isfahan's Electrical Engineering National Conference.*
- **A. Aminzadeh Ghavifekr,** A. Arjmandi, K. Sehat, "Evaluation of Particle Swarm Optimization and Adaptive Genetic Algorithm for Motion Planning in Minimally Invasive Surgery", 2th *Isfahan's Electrical Engineering National Conference.*
- S.M. Sajadi, S.H. Mahdioun, **A. Aminzadeh Ghavifekr** , "Design of Mechanical Structure and Tracking Control System for 5 DOF Surgical Robot ", *21th IEEE International Conference on Electrical Engineering, ICEE2013.*
- S. Pezeshki, **A. Aminzadeh Ghavifekr,** S. Badalkhani, "An Improved Fuzzy Algorithm Using Sliding Mode Concept in Controlling Overhead Crane System"*,* 2th *Isfahan's Electrical Engineering National Conference.*
- Ghiasi, A. R., **A. A. Ghavifekr**, Y. Shabbouei Hagh, and H. SeyedGholami. "Designing adaptive robust extended Kalman filter based on Lyapunov-based controller for robotics manipulators." *In Modeling, Simulation, and Applied Optimization (ICMSAO), 2015 6th International Conference on*, pp. 1-6. IEEE, 2015.
- **A. Aminzadeh Ghavifekr,** A. R. Ghiasi, Y. Shabbouyi, M. Golmohammadi "Design of Tracking Control System for Motion Planning of 5 DOF PC-based Gryphon Robot*, 2nd International Conference on Mathematical Sciences (ICMS 2014), 9 -11 July 2014, Istanbul, Turkey.*
- **A. Aminzadeh Ghavifekr,** A. R. Ghiasi, M. Kankashvar "System Identification of Practical Rotary Inverted Pendulum based on Hybrid Algorithm of PSO and Adaptive Genetic Operation *, 2nd International Conference on Mathematical Sciences (ICMS 2014), 9 -11 July 2014, Istanbul, Turkey*
- **A. Aminzadeh Ghavifekr**, Seyedshahab Chehraghi, and Giacomo De Rossi. "An Analysis of Sampling Effect on the Absolute Stability of Discrete-time Bilateral Teleoperation Systems." *2019 IEEE East-West Design & Test Symposium (EWDTS)*. IEEE, 2019.
- Velázquez, Ramiro, Claudia L. Garzón-Castro, Mario Acevedo, María T. Orvañanos-Guerrero, and Amir **A. Aminzadeh Ghavifekr**. "Design and Characterization of a Miniature Bio-Inspired Mobile Robot." *In 2021 12th International Symposium on Advanced Topics in Electrical Engineering (ATEE), pp. 1-5. IEEE, 2021.*
- Safari, Ashkan, and **A. Aminzadeh Ghavifekr**. "International Stock Index Prediction Using Artificial Neural Network (ANN) and Python Programming." *In 2021 7th International Conference on Control, Instrumentation and Automation (ICCIA), pp. 1-7. IEEE, 2021.*
- Mohammadzadeh, Ardashir, and **A. Aminzadeh Ghavifekr**. "Converter switching mechanism scheduling by type-2 fuzzy approach for PV/battery/Fuel systems." *In 2021 12th Power Electronics, Drive Systems, and Technologies Conference (PEDSTC), pp. 1-5. IEEE, 2021.*
- Harati, Morteza, **A. Aminzadeh Ghavifekr**, and Amir Rikhtehgar Ghiasi. "Model Identification of Single Rotary Inverted Pendulum Using Modified Practical Swarm Optimization Algorithm." *In 2020 28th Iranian Conference on Electrical Engineering (ICEE), pp. 1-5. IEEE, 2020.*
- **A. Aminzadeh Ghavifekr**, Ardashir Mohammadzadeh, Maryam Memar, and Amir Rikhtehgar Ghiasi. "Designing Multirate Controller for Optimal Tracking of Nonholonomic Laparoscopic Robotic Arm in a Telesurgery System." *In 2021 7th International Conference on Control, Instrumentation and Automation (ICCIA), pp. 1-6. IEEE, 2021.*
- Mohammadzadeh, Ardashir, and **A. Aminzadeh Ghavifekr**. "A Simple Matlab Simulink Model for Adaptive General Type-2 Fuzzy Logic Systems." *In 2021 7th International Conference on Control, Instrumentation and Automation (ICCIA), pp. 1-4. IEEE, 2021.*
- Rashid, Sara Mahmoudi, Amir Rikhtehgar Ghiasi, and **A. Aminzadeh Ghavifekr**. "Distributed H∞ filtering for interconnected large-scale systems with time-varying delays." *In 2021 7th International Conference on Control, Instrumentation and Automation (ICCIA), pp. 1-5. IEEE, 2021.*
- Memar, Maryam, Amin Mokaribolhassan, and **A. Aminzadeh Ghavifekr**. "Review on Machine Learning Frameworks in Drivers' Physiological Signal Analysis to Detect Stress." *In 2021 7th International Conference on Control, Instrumentation and Automation (ICCIA), pp. 1-6. IEEE, 2021.*

- **A. Aminzadeh Ghavifekr**, Ardashir Mohammadzadeh, and Jaber Fallah Ardashir. "Optimal Placement and Sizing of Energy-related Devices in Microgrids Using Grasshopper Optimization Algorithm." *In 2021 12th Power Electronics, Drive Systems, and Technologies Conference (PEDSTC), pp. 1-4. IEEE, 2021.*

- Ardashir, Jaber Fallah, Behrouz Rozmeh, Mahdi Gasemi, Amin Mohammadpour Shotorbani, and **A. Aminzadeh Ghavifekr**. "A Novel Boost Fifteen-Level Asymmetrical Flying-Capacitor Inverter with Natural Balancing of Capacitor Voltages." *In 2021 12th Power Electronics, Drive Systems, and Technologies Conference (PEDSTC), pp. 1-5. IEEE, 2021.*

- Sasamoto, H., Velázquez, R., Gutiérrez, S., Cardona, M., **Ghavifekr, A. A.,** & Visconti, P. (2021, December). Modeling and Prototype Implementation of an Automated Guided Vehicle for Smart Factories. *In 2021 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT) (pp. 1-6). IEEE.*

- Salimi, Hadi, **Amir Aminzadeh Ghavifekr**, Ardashir Mohammadzadeh, Sam Ziamanesh, Ahmad Tavaana, and Sahand Hallaji Dizaji. "Modified Grey Wolf Optimization Method for Voltage and Frequency Control of an Islanded Microgrids." In *2021 11th Smart Grid Conference (SGC)*, pp. 1-5. IEEE, 2021.

- Mohammadzadeh, Ardashir, **Amir Aminzadeh Ghavifekr**, and Jafar Tavoosi. "A generalized type-2 fuzzy approach for demand response and uncertainty problems in MGs." In *2021 11th Smart Grid Conference (SGC)*, pp. 1-5. IEEE, 2021.

- **Amir Aminzadeh Ghavifekr,** Ramiro Velázquez, and Ashkan Safari. "Multirate adaptive inverse dynamics control of 5 DOF industrial gryphon robot." In *2021 9th RSI International Conference on Robotics and Mechatronics (ICRoM)*, pp. 255-260. IEEE, 2021.

- Safari, Ashkan, and **Amir Aminzadeh Ghavifekr**. "Quantum Neural Networks (QNN) Application in Weather Prediction of Smart Grids." In *2021 11th Smart Grid Conference (SGC)*, pp. 1-6. IEEE, 2021.

- Emami, Parvin, Amir Rikhtehgar Ghiasi, and **Amir Aminzadeh Ghavifekr.** "Survey of Multi-Agent Reinforcement Learning to Solve Inverse Kinematic Problems of Redundant Robotic Manipulators." *In 2022 8th International Conference on Control, Instrumentation and Automation (ICCIA), pp. 1-6. IEEE, 2022.*

- Visconti, Paolo, Roberto de Fazio, Ramiro Velazquez, Bassam Al-Naami, and **Amir Aminzadeh Ghavifekr.** "Self-powered WiFi-connected monitoring stations for environmental pollution app-based control in urban and industrial areas." In *2022 8th International Conference on Control, Instrumentation and Automation (ICCIA)*, pp. 1-6. IEEE, 2022.

- Visconti, Paolo, Roberto de Fazio, Ramiro Velazquez, Bassam Al-Naami, and **Amir Aminzadeh Ghavifekr.** "Wearable sensing smart solutions for workers' remote control in health-risk activities." In *2022 8th International Conference on Control, Instrumentation and Automation (ICCIA)*, pp. 1-5. IEEE, 2022.

- Safari, Ashkan, and **Amir Aminzadeh Ghavifekr.** "Quantum Technology & Quantum Neural Networks in Smart Grids Control: Premier Perspectives." In *2022 8th International Conference on Control, Instrumentation and Automation (ICCIA)*, pp. 1-6. IEEE, 2022.

Workshops

- Workshop has presented on Design and Developmental of Surgical Robots and Telesurgery Systems at ICCIA 2011.
- Workshop has presented on Design and Developmental of Telesurgery Systems at 5th Iranian Conference on E-Health and ICT Application in Medical Science, 2012.
- Workshop has presented on Haptic and Virtual Reality at IEEC 2012.
- Workshop has presented on Virtual Reality at University of Tabriz 2014.
- Workshop has presented on Application of the Virtual Realty in the Control Engineering at University of Tabriz 2019.
- Workshop has presented on Introduction to the research indices and open access to the scientific resources engineering at University of Tabriz 2019.
- Workshop has presented on Game Theory and its Application in Robotics at University of Tabriz 2020.

Books

- "Introduction to Teleoperation Systems" (in Persian)
- "Fundamental and Principles of Nonlinear Control"(in Persian)
- "A Systematic Approach to Solving Nonlinear Control Problems"(in Persian)
- "Social Scientific Networks for Academics and Researchers" (in Persian)
- "Application of Heuristic Techniques and Evolutionary Algorithms in Microgrids Optimization Problems." Microgrids: Advances in Operation, Control, and Protection. Springer, (2021): 219-251. (Book Chapter)
- "Designing Adaptive Nonlinear Controller for Optimal Tracking of Laparoscopic Robotic Arm with Nonholonomic Constraints'. 97-107. Springer, Cham, 2020. (Book Chapter)
- "Optimizing PID Controller Coefficients Using an Improved Biogeography-Based Optimization to Stabilize Movements of Quadcopters." In Control, Instrumentation and Mechatronics: Theory and Practice, pp. 118-131. Springer, Singapore, 2022.

Selective Research Experiences

- Dynamic Modeling and Nonlinear Control of Bicycle Robot.
- Mechanical Design, Fabrication and Tracking Control of 5 DOF Surgical Robot.
- Design, Simulation and Modeling of Robots and Control Algorithms Using Software such as Matlab Simulink/SimMechanics.
- Practical Experience in Electronic Circuit Design and Embedded Systems.
- Designing Motion Controller for Practical Spherical Mobile Robot by Feedback Linearization.
- Practical Grasper Design for Laparoscopic Robot.
- Designing Control System for Overhead Gantry Crane .
- Designing and Implementing a Color Sensor Using AVR.

Teaching Experience

- **Computer Programming**, from 2019, University of Tabriz.
- **Engineering Mathematics**, from 2019, University of Tabriz.
- **Optimal Control**, from 2020, University of Tabriz.
- **Modern Control**, from 2020, University of Tabriz.
- **Advanced Numerical Analysis**, from 2020, University of Tabriz.
- **Robotics**, from 2021, University of Tabriz.
- **Differential Equations**, from 2019, University of Tabriz.
- **Engineering Economics**, from 2019, University of Tabriz.
- **Electrical Installations,** from 2019, University of Tabriz.
- **Engineering Statistics and Probability,** from 2019, University of Tabriz
- **Servomechanism**, from 2019, Technical and Vocational University of Tabriz
- **Digital Control Lab**, from 2019, University of Tabriz.
- **Linear Control Lab**, from 2019, University of Tabriz.
- **Linear Control Systems – Signal &System Analysis,** from 2016, University of Roshdieh.
- **Digital Control-Nonlinear Control-Modern Control**, 2015-2017, Payame Noor University.
- **Electrical Circuits- Special Instruments-General Electronic**, from 2015, University of Roshdieh..
- **Mechatronics 1 &2**, 2015-2017, Nabi Akram University.
- **Intelligent Control Systems – Industrial Control** - 2013-2016, University of Shahryaran

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Industrial Experience

Apr 2009 - Apr 2011	**Tabriz Power Station, Tabriz, Iran.** *Special Instrumentation.*
Jan 2007- June 2009	**Sannat Sazan Company, Tabriz, Iran.** *Robotic and Mechatronic.*

Skills

Language

Persian: Native.
Azeri: Native.
Turkish: Beginner
English: Fluent.
Dutch: Beginner.
Arabic: Fair.

Computer and Programming Skill

Programming & Scripting: Extensive programming experience with wide array of languages including C/C++, MATLAB, LATEX, C#, Basic(Q-Basic), Assembly, Python, R.
Microcontrollers & Embedded Systems: 8051, AVR, ARM(ARM7), Siemens PLC S7-400, Arduino, Raspberry Pi,
Technical Applications: Simulink, Proteus, ADAMS, LabVIEW, AutoCAD, SimMechanics.
Softwares: MS Office, Blender, Autodesk 3Ds Max, Adobe Photoshop.

Administrative and Management Background-Professional Services

- IEEE Member
- Member of Membership development Committee of IEEE Iran Section.
- Member of Student Activities Committee of IEEE Iran Section
- Executive Publication chair of the Forth International Congress on Electric Industry Automation-2015
- Executive Coordination chair of the first National Conference on Novel Achievements on Electrical Engineering in Mines and Mineral Industry-2017
- Chair of IEEE Student Section at University of Tabriz (2015-2017)
- International Relations Chair of 28th Iranian Conference on Electrical Engineering (ICEE 2020)-2020
- Informatics and International relation chairs of the 7th international conference on Control, Instrumentation and Automation (ICCIA 2020)-2020
- Executive Committee Chair of 12th Annual Power Electronics, Drive Systems, and Technologies Conference (PEDSTC2021)-2021
- Advisor of Talented Students of Marand Technical Faculty-University of Tabriz-2020
- Member of Technology, Innovation and Entrepreneurship Committee- Marand Technical Faculty-University of Tabriz-2020
- International Relations Chair of 11th Smart Grid Conference (SGC).2021.
- International relation chairs of the 8th international conference on Control, Instrumentation and Automation (ICCIA 2021)-2021
- IEEE affairs chair of the 4th West Asian Symposium on Optical and Millimeter-wave Wireless Communications (WASOWC2022)
- IEEE Young Professionals Member.
- IEEE Consultants Network Member.
- IEEE Control Systems Society Member.
- IEEE Robotics and Automation Society Member
- IEEE Nanotechnology Council Member

- IEEE Life Sciences Community Member
- IEEE Quantum Community Member

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