

RAOUF FAREH

Curriculum vitae

Department of Electrical and Computer Engineering

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Researchgate

Short Biography

Raouf Fareh, Associate Professor at University of Sharjah since 2014. He got Ph.D (2013, honor) in Engineering from university of Quebec, Canada under supervision of Professor Maarouf Saad at the Power Electronics and Industrial Control Research Group (GREPCI). He got the specialized graduate diploma (DESS) in electrical engineering from university of Quebec, Canada in 2008. He got MSc degree in Electrical Engineering from the ENIM, Tunisia in 2006 and Bsc degree in Electrical and Automation Engineering from ENIG, Tunisia in 2003. He worked as postdoctoral fellow in the Sensing and Machine Vision for Automation and Robotic Intelligence at university of Ottawa, Canada, 2013-2014. His research interests include (but not limited to): Process Modeling, Control, Robotics, Path planning, machine vision. He is the author of about 38 technical papers in international journals and conferences. He serves as a regular referee for many international journals in the field of electrical engineering. Finally, he is a member of Institute of Electrical and Electronics Engineering (IEEE), and a member in the steering committee for UAE IEEE student's competitions.

Education

- **2013:** Ph.D. degree in Electrical engineering, from the University of Quebec – ETS, Montreal, Quebec, Canada, thesis entitled: "Distributed control strategy for rigid and flexible manipulators ensuring the stability of the tracking errors".
- **2008:** Graduate degree in Electrical Engineering (DESS), from University of Quebec – ETS, Montreal, Quebec, Canada, Master dissertation entitled: "Modeling and adaptive control for one flexible link robot".
- **2006:** Master degree in Automation Engineering, from university of Monastir-National Engineering school (ENIM), Tunisia, Master dissertation entitled: "Modeling and identification of MIMO hydrographic process using Volterra series and neural networks".
- **2003:** Bachelor Degree in Electrical Engineering, from university of Gabes-National Engineering school (ENIG), Tunisia.

Professional experience

- 5/2020–present: Associate Professor, Department of Electrical and Computer Engineering, University of Sharjah.
- 9/14–5/2020: Assistant Professor, Department of Electrical and Computer Engineering, University of Sharjah.
- 2013–2014: Postdoctoral Research Associate, Ottawa University, Canada.
- 2008–2012: Teaching Assistant, University of Quebec – ETS, Montreal, Canada.
- 2011–2013: Robotics Coordinator, Youth Fusion, Montreal, Canada.
- 2004–2006: Industrial & Methods engineer, Tunisia Ouate, Tunisia.
- 2003–2004: Electrical Engineer, Studies and execution Society, Sousse, Tunisia.

Recent courses taught

- Feedback control systems;
- Feedback control systems Lab;
- Signal and control systems;
- Robotics-Graduate course
- Nonlinear Control
- Engineering computation and linear algebra;
- Circuit analysis;
- Senior Design Project

Research interests

- Modern Linear and Nonlinear Control
- Modeling of mobile robotics systems;
- Modeling and control of robot manipulators
- Modeling and control of flexible robots.
- Stability and performance analysis of nonlinear systems;
- Path planning;
- Machine vision: vision, guided robotic;
- Robust control
- Adaptive control
- Numerical Simulation
- Identification

Other activities: administrative activities and community service

- Member in the steering committee for UAE IEEE student's competitions
- Member of Institute of Electrical and Electronics Engineering (IEEE)
- Chair of IEEE committee at the electrical and computer engineering department.
- Supervisor of IEEE club.
- Member of the organizing committee of the 1st Engineering Science Clubs Exhibition - 2019
- Serve as judge for undergraduate student's projects competition and IEEE student day 2015, 2016 and 2017.
- Organizing and attending seminars or workshops related to teaching and learning.
- Judge for undergraduate student's projects competition on the sidelines of the 12th Research Forum of University of Sharjah, 2018.
- Judge in medical debate final between dentistry and pharmacy, 2018.
- Judge Head for IEEE SS12: Age of Innovation, University of Sharjah, 2018.
- Served as supervisor in IEEE UAE Student Day in Dubai University, 2018.
- Member of the committee of examination of the Ph.D Student Mhmed Mansur in ETS Canada. 2015
- University of Sharjah open day for high-school students: Working as a college representative during one time slot Visiting public seeking for information about Engineering college, 2018
- Student Affairs college committee, serve as adviser of the IEEE students branch, ensure that information from IEEE Headquarters is transmitted to the student officers. Attend executive committee meeting and participate in regional activities.2017
- Committee for Establishment of Artificial & Robotics Intelligence Laboratory
Establishment of a Laboratory in the area of Artificial Intelligence and Robotics in the Research Institute of Sciences and Engineering, 2018
- Member of committee for Ph.D Program in ECE: Preparing the Self Study Report for the Master degree in Aerospace Engineering. 2018
- Member of the committee for IEEE SS12: Age of Innovation. Preparation for IEEE SS12: Age of Innovation, 2018
- Member of committee for Master in Aerospace Engineering: Preparing the Self Study Report for the Master degree in Aerospace Engineering, from 2016
- Member of committee for "CubeSat Research Laboratory" at SCASS develop the "CubeSat Research Laboratory" at SCASS, from2016
- Member, Control and Power Specialty group. Approve any update or change related to courses in control and power. From 2017.
- Coordinator, Feedback control systems course.
- Coordinator, Feedback control systems Lab course.
- Coordinator, signal and control systems course.

Research Activities:

a. Research Project

- [1] Raouf Fareh, Rahman MH, Sofiane Khadraoui and Maamar Bettayeb, "Development of an Intelligent Robot System to Instruct, Demonstrate and Supervise Upper-Extremity Rehabilitation Session", 2019, university of Sharjah, UAE, (80 000AED).
- [2] Sofiane Khadraoui, Raouf Fareh, Maamar Bettayeb, "Efficient Measurement-Based Control Design for Real Processes", 2019, university of Sharjah, UAE, (80 000AED).
- [3] Raouf Fareh, Maamar Bettayeb, Maarouf Saad and Mohamad Saad, "Control of a space robot with flexible links.", 2017, university of Sharjah, UAE, (80 000AED).
- [4] Naser Khaled Hasan Nawayseh, Raouf Fareh and Mohamed Alshabi, "Biodynamic responses of the seated and standing human body to vibration in the x-y plane", 2016, university of Sharjah, UAE, (200 000AED).
- [5] Raouf Fareh and Pierre Payeur, "Robotic assistance for elderly and disabled people based on visual information and distributed control", 2014, Fonds de la recherche du Québec - Nature et technologies (FRQNT) Canada. (30000CAD)

b. Other research activities:

- Award of best paper and best presentation in three conferences.
 - ✓ International Conference on Robotics and Intelligent Control, Nogoya, Japan, 2018.
 - ✓ International Conference on Control, Dynamic Systems, and Robotics, Ottawa, Canada, 2016.
 - ✓ 5th Arab Robotics Conference 2017.
 - ✓ Best presentation in IEEE Industrial Electronics Society, 2012
- Supervision of undergraduate students (45 students)
- Supervision of graduate students (1 Msc. and 1 Ph.D.).
- Member of Autonomous Robotics and Active Vision Research Group at university of Sharjah.
- Member of Editorial Board for Frontiers in Robotics and AI.
- TPC member for ICCSPA'19 (2019 3rd International Conference on Communications, Signal Processing, and their Applications), AUS, Sharjah.
- Reviewer for many international journals and conferences.

Publications

a. International Journal

- [1] **Fareh, R**, et al. "Enhancing Path Quality of Real-Time Path Planning Algorithms for Mobile Robots: A Sequential Linear Paths Approach." IEEE Access (2020).
- [2] Mahmoud Abdallah, **Fareh R.**," Fractional Order Active Disturbance Rejection Control for

Trajectory Tracking for 4-DOF Serial Link Manipulator”, *Int. J. of Modelling, Identification and Control*, 2020.

- [3] **Fareh R.**, Baziyad M, Mohammad H. Rahman, Rabie T. and M. Bettayeb, "Investigating Reduced Path Planning Strategy for Differential Wheeled Mobile Robot", *Robotica*. **2020**, vol. 38, no 2, p. 235-255.
- [4] **Fareh R.**, Al Shaabi, M., Bettayeb, M. and Gomman, J. “Robust Active Disturbance Rejection Control for Flexible Link Manipulator”, *Robotica*. **2020**, vol. 38, no 1, p. 118-135.
- [5] **Fareh, R.**, Tamer Rabie, Said Grami and Mohammed Baziyad. " A Vision-Based Kinematic Tracking Control System Using Enhanced-PRM For Differential", *International Journal of Robotics and Automation*. **2019**, vol. 34, no 6.
- [6] **Fareh R.**, Brahmi A., Saad M.R, Saad M. and Bettayeb, M. “Global asymptotic stability of mobile manipulators using decentralized control strategy”, *Robotica*. **2019**, vol. 37, no 10, p. 1732-1749.
- [7] S. Khadraoui, **R. Fareh**, H. N. Nounou, and M. N. Nounou, "A Control Design Approach for TITO Systems Using Measured Data," *Journal of Dynamic Systems, Measurement, and Control*, **2019**, vol. 141, no. 1, p. 011013,
- [8] **Fareh R.** “Sliding Mode Fractional Order Control for a Single Flexible Link Manipulator”, *International Journal of Mechanical Engineering and Robotics Research*. **2019**, vol. 8, no 2.
- [9] Tamer. R, Baziyad M., Bonny, T and **Fareh, R.** “Toward a Unified Performance Metric for Benchmarking Steganography Systems”, *Journal of Circuits, Systems, and Computers*, **2019**.
- [10] **Fareh, R.**, Maamar Bettayeb and Mohammad H. Rahman, "Control of Serial Link Manipulator Using Fractional Order Controller" *International Review of Automatic Control*, **2018**, 11(1):29.
- [11] **Fareh, R.**, Saad M.R., Saad, M. and Bettayeb, M., "Tracking control for nonholonomic mobile manipulator using decentralized control strategy", *International Journal of Modelling, Identification & Control*, **2017**, vol. 28, no 1, p. 58-69.
- [12] Md Rasedul Islam, Christopher Spiewak, Mohammad Rahman and **Fareh, R.**, “A Brief Review on Robotic Exoskeletons for Upper Extremity Rehabilitation to Find the Gap between Research Prototype and Commercial Type”, *Advances in Robotics and Automation*, **2017**, 06(03)
- [13] **Fareh, R.**, Saad M.R., Saad, M. and Bettayeb, M., “Tracking Trajectory in the Workspace of Rigid Manipulators Using Distributed Adaptive Control Strategy”, *Advanced Robotics*, **2016**, vol. 30, no 6, p. 361-373.
- [14] **Fareh, R.**, Maarouf Saad, Sofiane Khadraoui, Tamer Rabie, (2016) ‘Lyapunov-Based Tracking Control for Nonholonomic Wheeled Mobile Robot’, *International Journal of Mechanical and Mechatronics Engineering* Vol:3, No:8, **2016**.
- [15] **Fareh, R.**, Saad M.R., and Saad, M. (2015), "Distributed control strategy for flexible link manipulators", *Robotica*. **2015**, vol. 33, no 4, p. 768-786.
- [16] **Fareh, R.**, Saad M.R., and Saad, M., "Workspace distributed Real-Time control of rigid manipulators", *Journal of Vibration and Control*, vol.20, N.4, pp. 535-547, **2014**.
- [17] **Fareh, R.**, Saad M.R., and Saad, M, "Workspace tracking control of two-flexible link manipulator using hierarchical control strategy", *Journal of Control Science and Engineering*, 2013, vol. 2013, p. 151.
- [18] **Fareh, R.**, Saad M.R., and Saad, M., "Workspace trajectory tracking control for two-flexible links manipulator through output redefinition", *International Journal of Modelling, Identification & Control*,

vol.18, N.2, pp. 119-135, 2013.

- [19] Mahmoud A. and **Fareh, R.**, "Fractional Order Active Disturbance Rejection Control for Trajectory Tracking for 4-DOF Serial Link Manipulator", Int. J. of Modelling, Identification and Control (IJMIC), 2020, accepted.
- [20] Mohammed Baziyad, Mohamed Saad, Raouf Fareh, Tamer Rabie, Kamel Ibrahim., ""Addressing Real-Time Demands for Multi-Robot Path Planning Systems: A Routing Protocol Approach", IEEE Transactions on Control of Network Systems, 2020. Submitted.

b. International conferences

- [21] **Fareh, R.** Sofiane Khadraoui, Mohammed Baziyad and Maamar Bettayeb. "Synergetic Workspace Tracking Control for 4-DOF Robot Manipulator", 12th International Conference on Computer and Automation Engineering (ICCAE 2020), Sydney, Australia , February 14-16, 2020.
- [22] **Fareh, R.** "Control of a Single Flexible Link Manipulator Using Fractional Active Disturbance Rejection Control", International Conference on Control, Decision and Information Technologies, April 23-26, 2019, Paris, France.
- [23] Baziyad, Mohammed and Nassif, Ali Bou and Rabie, Tamer and **Fareh, R.** "Comparative Study on the Performance of Heuristic Optimization Techniques in Robotic Path Planning", Proceedings of the 2019 3rd International Conference on Advances in Artificial Intelligence. Istanbul Turkey. 2019. p. 157-161.
- [24] **Fareh, R.**, "Sliding Mode Fractional Order Control for a Single Flexible Link Manipulator", International Conference on Robotics and Intelligent Control Technologies (ICRIC 2018), Nagoya, Japan on April 27-30, 2018.
- [25] B. BeloboMevo, M. R. Saad, and **Fareh, R.**, "Adaptive Sliding Mode Control of Wheeled Mobile Robot with Nonlinear Model and Uncertainties," in 2018 IEEE Canadian Conference on Electrical & Computer Engineering (CCECE), 2018, pp. 1-5: IEEE.
- [26] M. A. Abdallah, M. S. Baziyed, **Fareh, R.**, and T. Rabie, "Tracking control for robotic manipulator based on FABRIK algorithm," in Advances in Science and Engineering Technology International Conferences (ASET), 2018, 2018, pp. 1-5: IEEE.
- [27] **Fareh, R.**, Mohammed Baziyad and Tamer Rabie, 'Tracking Control for Wheeled Mobile Robot Using RGBD Sensor', International Conference on Control, Decision and Information Technologies (CoDIT'17) Barcelona, Spain – April 5 – 7, 2017.
- [28] Said Grami, **Fareh, R.**, 'Friction Compensation in a 2DOF Robot Manipulator' Seventh International Congress Design and Modelling of Mechanical Systems. 27 - 29 March 2017, Hammamet – Tunisia, 2017.
- [29] Mehiri. A and **Fareh, R.** "Comparison study on advanced control of Two 2DOF Manipulator robots", International Conference on Electrical and Computing Technologies and Applications (ICECTA), RAK, UAE). November 21 - 23, 2017.
- [30] Mehiri. A and **Fareh, R.** "Fractional Order PID controller for Robot Manipulators", The 5Th Arab Robotics Conference" from 3 to 5 October 2017 in Dubai, United Arab Emirates.
- [31] **Fareh, R.**, Sofiane Khadraoui, Maarouf Saad and Maamar Bettayeb, 'Tracking Control of mobile manipulators based on decentralized control', Proceedings of the 3rd International Conference on Control, Dynamic Systems, and Robotics (CDSR'16) Ottawa, Canada – May 9– 10, 2016.

- [32] **Fareh, R.**, Maarouf Saad, Sofiane Khadraoui and Tamer Rabie. "Lyapunov-Based Tracking Control for Nonholonomic Wheeled Mobile Robot", ICCDSR 2016: International Conference on Control, Dynamic Systems, and Robotics. Amsterdam, The Netherlands Aug 04-05, 2016.
- [33] **Fareh, R.**, Tamer Rabie "Tracking trajectory for nonholonomic mobile manipulator using distributed control strategy", 10th International Symposium on Mechatronics and its Applications. UAE, December 8-10. 2015.
- [34] **Fareh, R.**, P. Payeur, D. Nakhaeinia, R. Macknojjia, A. Chávez-Aragón, A.-M. Cretu, P. Laferrière, R. Laganière and R. Toledo "An Integrated Vision-Guided Robotic System for Rapid Vehicle Inspection", IEEE International Systems Conference, march 31- April 3, 2014. Ottawa, Canada.
- [35] Danial Nakhaeinia, **Fareh, R.**, Pierre Payeur, Robert Laganière "Trajectory Planning for Surface Following with a Manipulator under RGB-D Visual Guidance," in IEEE Intl Symposium on Safety, Security, and Rescue Robotics, Linkoping, Sweden, 2013.
- [36] **Fareh, R.**, Saad, M.R. and Saad, M. 'Tracking control of two-flexible-link manipulators using distributed control strategy', International Conference on Control, Decision and Information Technologies (CoDIT'13), May 6-8, 2013, Hammamet, Tunisia.
- [37] **Fareh, R.**, Saad, M.R. and Saad, M. 'Design and experimental validation of a hierarchical control strategy for 7 DOF manipulators', 38th Annual Conference of the IEEE Industrial Electronics Society, October 25-28, 2012, Montreal, Canada.
- [38] **Fareh, R.**, Saad, M.R. and Saad, M. 'Workspace tracking trajectory for 7-DOF ANAT robot using a hierarchical control strategy', 20th Mediterranean Conference on Control and Automation, July 3-6, 2012, Barcelona, Spain.
- [39] **Fareh, R.**, Saad, M.R. and Saad, M. 'Real time hierarchical control for 5 DOF redundant robot using sliding mode technique', 25th Annual Canadian Conference on Electrical & Computer Engineering, April 29–May 2, 2012, Montréal, Canada.
- [40] **Fareh, R.**, Saad, M.R. and Saad, M. 'An Experimental Study on the 7-DOF Robot using Hierarchical Control Strategy', International Conference on Systems and Control, June 20-22, 2012, Marrakech, Morocco.
- [41] **Fareh, R.**, Saad, M.R. and Saad, M. 'Hierarchical Adaptive Control for 3 DOF Manipulator Using Sliding Mode Technique', International Symposium on Intelligent Automation and Control, June 24-28, 2012, Puerto Vallarta, Mexico.
- [42] **Fareh, R.**, Saad, M.R. Saad, M. and Brahmi, A. 'Real Time Tracking Trajectory in Workspace for ANAT Robot Manipulator Using Hierarchical Control', IEEE International Conference on Electronics, Circuits, and System, December 11-14, 2011, Beirut, Lebanon.
- [43] **Fareh, R.**, Saad, M.R. and Saad, M. 'Adaptive control for a single flexible link manipulator using sliding mode technique', 6th International Multi-Conference on Systems, Signals and Devices, March 23-26, 2009, Tunisia.
- [44] **Fareh, R.**, Ben Nasr, N. and M'Sahli, F. 'Modeling of a MIMO system using Volterra series', 12th international conference on Sciences and Techniques of Automatic control & computer engineering, February 10-12, 2006, Tunisia.