Dr. Eng.
Shirin Valilou

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Summary

As a Ph.D. Mechatronic Engineer from Università degli Studi di Bergamo and M.Sc.-Eng. graduate from Sahand University, I bring a mix of academic and industrial experiences.

My academic background includes expertise in physical modeling, controller design, and system identification. I've developed an accurate physical model for hydraulic fluid's Bulk modulus and designed a feedforward nonlinear control for hydraulic systems. With five years in the automotive industry, I've honed skills in controller design, brake performance, and actuator testing on HIL and MIL systems, along with hydraulic modelling and project management.

Proficient in MATLAB, Python, and C++, I enjoy mathematical challenges and designing optimized controllers. My academic and industry experience suits me for roles in control systems and mechatronics, and I'm eager to expand my expertise.

Highlights

- Robust controller design for mechatronic systems
- Simulation of mechatronic systems
- Observer and estimator design for mechatronic systems
- Actuator control design for Electronic Stability Control (ESC) brake systems
- dSPACE Hardware-In-the-Loop (HIL) test system
- Robustness testing, atomization and analyzing of brake actuator performance on dSPACE HIL
- LV 124 testing and analyzing the data
- Technical project management of integrated brake system

Experience

Hyundai Mobis Parts Europe N.V.: 07/2018- present

- Robust controller design for ESC Brake Actuator
- Robustness testing, automization and analysis of brake actuator performance
- MIL/HIL simulation and development
- Hydraulic model and simulation
- Technical project management for next generation of integrated brake system
- Measurement Analysis and Calibration

University of Bergamo: 12/2014 to 06/2018

- Research assistance for developing hydraulic model and control for shaking table

Azad university of Urmia: 02/2014 to 09/2014

- Electronic laboratory lecturer

Sedna fidar Payeh: 2012 to 2013

- Controller design for Mobile robots
- Kinematic and dynamic model Simulation of manipulators.

Education

PhD- university of Bergamo (Italy): Mechatronics, Robotics, and Automation Engineering - 2014 to 2018

In the first year of my PhD, I designed a robust sliding mode control for multi-DOF manipulator tracking, contributing to the development of a MATLAB toolbox "ADROMS" for symbolic modeling of manipulator kinematics and dynamics.

This included a sophisticated path planning tool using constrained optimization. I developed an accurate physical model for the Bulk modulus of hydraulic fluid to enhance the acceleration behavior modeling of hydraulic actuators. This model has used for designing optimized model-based controls and practically tested on a hydraulic shaking table simulating earthquake signals.

Master of Science- Sahand university of Technology (Iran): Control Engineering -2010 to 2012

During first year of my master degree, I have done an investigation on "Output feedback sliding mode control with application to fault tolerant control ".

For my master thesis, I developed a new model-based controller based on sliding mode control with H_2 / H_∞ performance in order to control a complex nonlinear system without any transformation matrix. The stability properties of the controller are proved by the Lyapunov method. This control law was applied to a non-holonomic mobile robot and the result was compared with other robust controller and the results shows that the sliding mode control with H_2 / H_∞ performance provides smaller errors and better performance to deal with the slipping of the wheels and parameters uncertainty.

Bachelor of science- Urmia university (Iran): Electrical, Electronics and Communications Engineering – 2005 to 2009

Average 14.52 out of 20
Thesis: "Design and Implementation Intelligent Control of Electro Pomp by AVR"
Advisor: Prof. Behruz Tusi
Main subject of study

- Linear Control
- Communication
- Electronic

Certificates

- ADAC driving training
- Driving training on high and low mu- Level 2
- SCALAXIO d-Space: control desk, Automation desk and Configuration desk training
- High voltage training - Level 1 and 2
- Carmaker training
- Siemens AMESim training
- NVH training

Languages

Persian- Azeri: Native
English: Full professional proficiency
Deutsch: Elementary proficiency
Turkish: Limited working proficiency

Publications

Peer-reviewed Journal:

1. S. Valiloo, M.J. Khosrowjerdi, M. Salari, "LMI based Sliding Mode Surface Design with Mixed H_2 / H_∞ Optimization" ASME Journal of Dynamic Systems, Measurement and Control, IF: 1.01, vol. 136, 2014, Doi: 10.1115/1.4025553
2. S. Valilou, M.J. Khosrowjerdi, "Robust Sliding Mode Control Design for Mismatched Uncertain Systems with a GH_2 / H_∞ Performance" John Wiley and Sons Asian journal of control , IF: 1.45, Vol. 17, No. 5, pp. 1848–1856, September 2015, Doi: 10.1002/asjc.1073
3. P. Righettini, R. Strada, E. Khademolama, & S. Valilou, "Online Wavelet Complementary velocity Estimator". ISA transactions, Elsevier, 2018. Doi:10.1016/j.isatra.2017.12.013
4. P. Righettini, R. Strada, S. Valilou, E. Khademolama, "Nonlinear Model of a Servo-Hydraulic Shaking Table with Dynamic Model of Effective Bulk Modulus" Mechanical Systems and Signal Processing, Elsevier,2018.

Peer-reviewed Conference:

- E. Khademolama, S. Valiloo, "A fast wavelet denoising method," IEEE Conference in Computer Research and Development (ICCRD), 2011 3rd International Conference on, pp. 492-494, 11-13 March 2011. Doi: 10.1109/ICCRD.2011.5764065
- S. Valiloo, E. Khademolama, A. Khademolama, "A sliding mode controller with generalized H2 performance for dynamic of nonholonomic mobile robot " IEEE Conference in AI & Robotics and 5th RoboCup Iran Open International Symposium (RIOS), 2013 3rd Joint Conference of , pp. 1-7, 8-8 April 2013, Doi: 10.1109/RIOS.2013.6595329
- P. Righettini, R. Strada, S. Valilou, E. Khademolama, "Output feedback sliding mode controller with H2 performance for robot manipulator" IEEE International Conference on Automation and Computing (ICAC), 2015 21st, pp. 1-6, 11-12 September 2015, Doi: 10.1109/IConAC.2015.7313943
- P. Righettini, R. Strada, E. Khademolama, S. Valilou, "Symbolic kinematic and dynamic modelling toolbox for Multi-DOF robotic manipulators" IEEE International Conference on Automation and Computing (ICAC), pp. 1-7, 11-12 September 2015, Doi: 10.1109/IConAC.2015.7313939
- P. Righettini, R. Strada, S. Valilou, E. Khademolama, "Nonlinear modeling and experimental validation of uni-axial servo hydraulic shaking table" International Conference of Bath/ASME on Fluid Power and Motion Control, 2016, 7-9 September. Doi: 10.1115/FPMC2016-1773
- P. Righettini, R. Strada, S. Valilou, E. Khademolama, "Gray-box acceleration modeling of an electro hydraulic servo shaking table with Neural Network" IEEE International Conference on Advanced Intelligent Mechatronics, Munich, 2017, 3-7 July. Doi: 10.1109/AIM.2017.8014212

REWARDS

- Full top student scholarship of university of Bergamo for 3years PhD degree.
- Full grant for summer school on mechanism design for applications - MDA 2016.
- Full grant of DAAD organization for summer school on robot operating system at FH Aachen University.
- Winning the research grant of university of Bergamo for the project with title "Dynamic modelling and control structures for high performance mechanical systems driven by hydraulic actuators".

This CV was a purpose for me to make you know me better and I hope that I could make it happen.

Dr.-Eng. Shirin Valilou

July 2022