

# Sofiane Khadraoui

## Curriculum vitae

Department of Electrical Engineering  
University of Sharjah  
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### Education

- 2012 **Ph.D degree in Automatic Control**, from the University of Franche-Comté, France.
- 2007 **Magister degree (equivalent to M.Sc) in Automatic Control**, from the University of Abou Bakr Belkaïd, Tlemcen, Algeria.
- 2004 **Engineering degree in Automatic Control**, from the University of Abou Bakr Belkaïd, Tlemcen, Algeria.

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### Working experience

- 9/15–present **Assistant Professor**, Department of Electrical and Computer Engineering, University of Sharjah.
- 2012–2015 **Postdoctoral Research Associate**, Texas A&M University at Qatar.
- 2009/2010 **Teaching Assistant**, University of Franche-Comté, France.
- 2007–2009 **Teaching Assistant**, University of Abou Bekr Belkaïd, Tlemcen, Algeria.

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### Research interests

- Modeling and robust control design methods;
- ADRC control design;
- Model-free and measurement-based controller design;
- Interval computation and optimization methods;
- Parametric uncertainty modeling;
- Robust stability and performance analysis of uncertain systems;
- Control law design using interval techniques;
- Controller and model order reduction;
- Nonlinearities compensation;
- System identification and estimation;
- Controller design for piezoelectric actuators;

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### Computer skills

Programming languages Matlab/Simulink, PIC C, Pascal, Fortran.

Software Proteus 6Professional,  $\LaTeX$ , Labview, Solidworks, Microsoft Office.

Hardware Arduino, dSPACE card (digital Signal Processing And Control Engineering) mainly DS1102, DS1103 and DS1104.

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## Publications

### Book chapters

- [1] **Sofiane Khadraoui**, Micky Rakotondrabe, and Philippe Lutz. *Interval modeling and robust feedback control of piezoelectric-based microactuators*. a chapter in the book *Smart materials-based actuators at the micro/nano-scale: characterization, control and applications*, edited by Micky Rakotondrabe, Springer-Verlag, New York, ISBN 978-1-4614-6683-3, 2013.
- [2] Micky Rakotondrabe and **Sofiane Khadraoui**. *Design of piezoelectric actuators with guaranteed performance using the performance inclusion theorem and interval tools*. a chapter in the book *Smart materials-based actuators at the micro/nano-scale: characterization, control and applications*, edited by Micky Rakotondrabe, Springer-Verlag, New York, ISBN 978-1-4614-6683-3, 2013.

### Journal papers (published, accepted or under review)

- [3] Fouzi Harrou, Farid Kadri, Ying Sun, and **Sofiane Khadraoui**. Monitoring Patient Flow in a Hospital Emergency Department, *Chaos, Solitons and Fractals*, **under review**.
- [4] Fouzi Harrou, Ahmed Saidi, Ying Sun, and **Sofiane Khadraoui**. Monitoring of photovoltaic systems using improved kernel-based learning schemes, *IEEE Journal of Photovoltaics*, **under review**.
- [5] Fouzi Harrou, Ahmed Saidi, Ying Sun, and **Sofiane Khadraoui**. Deep learning-based methods for solar photovoltaic power forecasting: A comparative study, *Applied Energy*, **under review**.
- [6] Fouzi Harrou, Ahmed Saidi, Ying Sun, and **Sofiane Khadraoui**. Improved kernel-based learning schemes for photovoltaic systems monitoring, *Energy Conversion and Management*, **under review**.
- [7] Raouf Fareh, **Sofiane Khadraoui**, Mohammed Baziyad, and Maamar Bettayeb. Fractional active disturbance rejection control for flexible manipulators, *Advanced Robotics*, **under review**.
- [8] **Sofiane Khadraoui**, Raouf Fareh, Hazem N. Nounou and Mohamed N. Nounou. A Control Design Approach for TITO Systems Using Measured Data, *ASME Journal of Dynamic Systems, Measurement, and Control*, vol. 141, no. 6, 2019.
- [9] **Sofiane Khadraoui**, and Hazem Nounou. A Nonparametric Approach to Design Fixed-order Controllers for Systems with Constrained Input, *International Journal of Control, Automation, and Systems*, vol. 16, no. 6, pp.2870–2877, 2018.
- [10] Fouzi Harrou, Muddu Madakyarub, Ying Sun, and **Sofiane Khadraoui**. Improved detection of incipient anomalies via multivariate memory monitoring charts: Application to an air flow heating system, *Applied Thermal Engineering*, 109, 65–74, 2016.
- [11] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. Adaptive controller design for unknown systems using measured data, *Asian Journal of Control*, vol. 18, no. 4, 2016.

- [12] **Sofiane Khadraoui**, Mohamed Fnaiech, Hazem Nounou, Mohamed Nounou, Jaroslaw Guzinski, Haitham Abu-Rub, Aniruddha Datta, and Shankar Bhattacharyya. An approach for tuning PID controllers using measured data: Application to induction machines, *Journal of Control and Decision*, Volume 3, no. 3, 2016.
- [13] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. A measurement-based control design approach for efficient cancer chemotherapy, *Information Sciences*, Volume 333, 10, Pages 108–125, 2016.
- [14] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. A measurement-based approach for designing fixed-order controllers for unknown closed-loop architecture, *Asian Journal of Control*, vol. 18, no. 2, 2016.
- [15] Fouzi Harrou, Ying Sun, and **Sofiane Khadraoui**. Amalgamation of anomaly-detection indices for enhanced process monitoring, *Journal of Loss Prevention in the Process Industries*, 40, 365–377, 2016.
- [16] Fouzi Harrou, Farid Kadri, **Sofiane Khadraoui**, and Ying Sun. Ozone measurements monitoring using data-based approach, *Process Safety and Environmental Protection*, 100, 220–231, 2016.
- [17] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. A nonparametric approach to design robust controllers for uncertain systems: Application to an air flow heating system, *Journal of Process Control*, Vol.36, Pages 1–10, 2015.
- [18] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. A model-free design of reduced-order controllers and application to a DC servomotor, *Automatica*, 50(8):2142–2149, 2014.
- [19] **Sofiane Khadraoui**, Micky Rakotondrabe, and Philippe Lutz. Optimal design of piezoelectric cantilevered actuators with guaranteed performances by using interval techniques. *IEEE/ASME - Transactions on Mechatronics (T-mech)*, 19(5):1660–1668, 2014.
- [20] **Sofiane Khadraoui**, Micky Rakotondrabe, and Philippe Lutz. Interval force/position modeling and control of a microgripper composed of two collaborative piezoelectric actuators and its automation. *Springer - International Journal of Control, Automation and Systems (IJCAS)*, 12(2):358–371, 2014.
- [21] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. A measurement-based approach for designing fixed-order controllers for unknown closed-loop architecture, *Asian Journal of Control*, DOI: 10.1002/asjc.1069, 2014.
- [22] Micky Rakotondrabe, Alexandru Ivan, **Sofiane Khadraoui**, Philippe Lutz, and Nicolas Chaillet. Simultaneous displacement and force self-sensing in piezoelectric actuators and applications to robust control of the displacement. *IEEE/ASME - Transactions on Mechatronics (T-mech)*, 20(2):519–531, 2014.
- [23] Mohamed Fnaiech, **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Jaroslaw Guzinski, Haitham Abu-Rub, Aniruddha Datta, and Shankar Bhattacharyya. A measurement-based approach for speed control of induction machines, *IEEE Journal of Emerging and Selected Topics in Power Electronics*, 2(2):308–318, 2014.

- [24] Mohamed Fnaiech, **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Jaroslaw Guzinski, Haitham Abu-Rub, Aniruddha Datta, and Shankar Bhattacharyya. Model-Free Controller Tuning based on DFT Processing: Application to Induction Motor Drives, *IEEE Journal of Emerging and Selected Topics in Power Electronics*, 2(4):1013–1023, 2014.
- [25] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. A measurement-based technique for designing fixed-order RST controllers and application to a coupled water tank system, *Systems Science and Control Engineering*, 484–492, 2014.
- [26] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. A measurement-based approach for designing reduced-order controllers with guaranteed bounded error. *International Journal of Control (IJC)*, 86(9):1586–1596, 2013.
- [27] **Sofiane Khadraoui**, Micky Rakotondrabe, and Philippe Lutz. Combining  $H_\infty$  approach and interval tools to design a low order and robust controller for systems with parametric uncertainties: application to piezoelectric actuators. *International Journal of Control (IJC)*, 85(3):251–259, 2012.
- [28] **Sofiane Khadraoui**, Micky Rakotondrabe, and Philippe Lutz. Design of RST-structured controller for parametric uncertain system using interval analysis: application to piezocantilever. *Asian Journal of Control (AJC)*, 15(1):1–13, 2012.
- [29] **Sofiane Khadraoui**, Micky Rakotondrabe, and Philippe Lutz. Interval modeling and robust control of piezoelectric microactuators. *IEEE - Transactions on Control Systems Technology (T-CST)*, 20(2):1–9, 2011.

#### International conferences

- [30] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. A model-free control design approach for input-constrained systems, **under review**.
- [31] Raouf Fareh, **Sofiane Khadraoui**, Mohammed Baziyad, and Maamar Bettayeb. Synergetic Workspace Tracking Control for 4-DOF Robot Manipulator. *The 12<sup>th</sup> International Conference on Computer and Automation Engineering, (ICCAE 2020)*, Sydney, Australia, 2020.
- [32] Raouf Fareh, **Sofiane Khadraoui**, Maarouf Saad, and Maamar Bettayeb. Tracking Control of mobile manipulators based on decentralized control. *The 3<sup>th</sup> International Conference on Control Dynamic Systems, and Robotics (CDSR'16)*, Ottawa, Canada, 2016.
- [33] Raouf Fareh, Maarouf Saad, **Sofiane Khadraoui**, Tamer Rabie . Lyapunov-based Tracking Control for Non-holonomic Wheeled Mobile Robot. *The 18<sup>th</sup> International Conference on Control, Dynamic Systems, and Robotics (ICCDSP'16)*, Amsterdam, The Netherlands, 2016.
- [34] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, and Aniruddha Datta. A data-based approach for designing adaptive controllers for unknown systems. *The 6<sup>th</sup> International Symposium on Communications, Control, and Signal Processing (ISCCSP)*, pages 44–47, Athens, 2014.

- [35] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. A model-free technique for designing fixed-order controllers. *IEEE-CDC Conference on Decision and Control*, pages 6130–6135, Florence, Italy, 2013.
- [36] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. A measurement-based approach for tuning of reduced-order controllers. *American Control Conference (ACC)*, pages 3876–3881, Washington, DC, 2013.
- [37] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. Robust control design method for uncertain system using a set of measurements. *American Control Conference (ACC)*, pages 4325–4330, Washington, DC, 2013.
- [38] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. Design of reduced-order controllers using a set of measurements: Application to a DC servomotor. *American Control Conference (ACC)*, pages 4331–4336, Washington, DC, 2013.
- [39] **Sofiane Khadraoui**, Hazem Nounou, Mohamed Nounou, Aniruddha Datta, and Shankar Bhattacharyya. A control design method for unknown systems using frequency domain data. *Asian Control Conference (ASCC)*, pages 1–6, 2013.
- [40] Muhammed R. Pac, Micky Rakotondrabe, **Sofiane Khadraoui**, Dan O. Popa, and Philippe Lutz. Guaranteed manipulator precision via interval analysis of inverse kinematics. *Proceedings of the ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, doi:10.1115/DETC2013-13033, Portland, Oregon, August, 2013.
- [41] **Sofiane Khadraoui**, Micky Rakotondrabe, and Philippe Lutz. Combining  $H_\infty$  and interval techniques to design robust low order controllers: application to piezoelectric actuators. *American Control Conference (ACC)*, pages 104–110, Montréal Canada, June, 2012.
- [42] **Sofiane Khadraoui**, Micky Rakotondrabe, and Philippe Lutz. Robust automated pick-and-place tasks using piezoelectric microgripper with force/position interval control. *talk at the workshop Automation of assembly and packaging at the micro/nano-scale, IEEE-CASE International Conference on Automation Science and Engineering*, Trieste Italy, August, 2011.
- [43] **Sofiane Khadraoui**, Micky Rakotondrabe, and Philippe Lutz. Modeling and robust deflection control of piezoelectric microactuators modeled by zero-order numerator interval system. *IFAC-World Congress*, pages 9763–9768, Milano Italy, August, 2011.
- [44] **Sofiane Khadraoui**, Micky Rakotondrabe, and Philippe Lutz. PID-structured controller design for interval systems: Application to piezoelectric microactuators. *American Control Conference (ACC)*, pages 3477–3482, San Francisco CA USA, June–July, 2011.
- [45] **Sofiane Khadraoui**, Micky Rakotondrabe, and Philippe Lutz. Robust control for a class of interval model: application to the force control of piezoelectric cantilevers. *IEEE-CDC Conference on Decision and Control*, pages 4257–4262, Atlanta Georgia USA, December, 2010.

- [46] Micky Rakotondrabe, Ioan Alexandru Ivan, **Sofiane Khadraoui**, Cédric Clévy, Philippe Lutz, and Nicolas Chaillet. Dynamic displacement self-sensing and robust control of cantilevered piezoelectric actuators dedicated to microassembly tasks. *International Conference on Intelligent Materials (IEEE/ASME-AIM)*, pages 557–562, Montreal Canada, July, 2010.