Dr. Hossam Seddik Abbas

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Personal Data

Date of Birth:	January, 13, 1975
Place of Birth:	Sohag, Egypt
Nationality:	Egyptian
Marital Status:	Married
Mother Language:	Arabic

Tertiary Education

Doctor of Philosophy 14/10/2005 - 29/01/2010	Automatic Control Engineering Institute of Control Systems, Hamburg University of Technology, Hamburg, Germany Advisor: Prof. Herbert Werner Thesis: *Linear Parameter-Varying Modeling, Identification and Low-Complexity Controller Synthesis* Degree: Doktor-Ingenieur (Dr.-Ing.), (with **summa cum laude**) January, 29, 2010
Master of Science 1/10/1997 - 7/04/2001	Electrical Engineering (Power Systems) Electrical Engineering Department, Faculty of Engineering Assiut Unversity, Assiut, Egypt Advisor: Prof. Mazen Abdel-Salam Thesis: *Analysis of Integrated AC-DC Power Systems*
Bachelor of Science 9/1992 - 06/1997	Electrical Engineering (Electrical Power and Machines) Electrical Engineering Department, Faculty of Engineering Assiut Unversity, Assiut, Egypt

Research

Principle Research Interests

Control Theory	Linear systems theory, Gain-scheduled control, Linear parameter-varying (LPV) systems, Robust and optimal control, Model Predictive Control, Positive polynomial matrices, , Model order reduction, Nonlinear control
Modeling	Linear/non-linear system identification, Neural network, Modeling of uncertain systems, nonlinear and time-varying systems, Identification of spatially interconnected systems,
Optimization	Convex optimization, Bilinear/Linear matrix inequalities, Linear programming and Stochastic optimization algorithms
Applications	High-precision robotic manipulators, Charge control of spark ignition engines, Landing gear control of aircrafts, Magnetic levitation control, pH Neutralization of Chemical processes, High voltage DC systems analysis and control, Control moment gyroscope for attitude control of spacecrafts

Current Research Interests

Control Theory	Model predictive control (MPC) based LPV control, LPV modeling and identification, LPV control based implicit systems, Optimization of LPV closed-loop stability and performance, Complexity reduction of LPV systems, Fixed structure LPV control, Process control
Applications	Robotics, Distillation column, Polymerization reactors, Utility-scale Wind turbines

Membership

A member of IEEE, Institute of Electrical and Electronics Engineers, New York, USA.

Awards

1 June 2013 - 30 November 2014	Research fellowship, Eindhoven University of Technology, Eindhoven, The Netherlands
1 September 2012 - 31 May 2013	Research fellowship, Egypt-Japan University of Science and Technology, Alexandria, Egypt
15 July 2011 - 15 January 2012	GERSS postdoctoral scholarship award jointly funded by the Ministry of Higher Education and Scientific Research, Egypt and the Deutscher Akademischer Austauschdienst (DAAD), Germany
13 October 2005 - 29 January 2010	PhD scholarship award funded by the Ministry of Higher Education and Scientific Research, Egypt

Professional Experience

Demonstrator 06/1998 - 01/1999	South Vally University, Aswan, Egypt Electrical Engineering Department, Faculty of Engineering
Demonstrator 01/1999 - 04/2001	Assiut University, Assiut, Egypt Electrical Engineering Department, Faculty of Engineering
Assistant Lecturer 04/2001 - 10/2005	Assiut University, Assiut, Egypt Electrical Engineering Department, Faculty of Engineering
Tutor 10/2007 - 04/2008	Hamburg University of Technology, Hamburg, Germany Institute of Control Systems
Assistant Professor 05/2010 - 05/2015	Assiut University, Assiut, Egypt Electrical Engineering Department, Faculty of Engineering
Postdoc 07/2011 - 01/2012	Hamburg University of Technology, Hamburg, Germany Institute of Control Systems
Postdoc 09/2012 - 05/2013	Egypt Japan University of Science and Technology, Alexandria, Egypt Department of Mechatronics and Robotics Engineering
Postdoc 06/2013 - 12/2014	Eindhoven University of Technology, Eindhoven, The Nethrlands Department of Electrical Engineering, Control Systems Group
Associate Professor 06/2015 - present	Assiut University, Assiut, Egypt Electrical Engineering Department, Faculty of Engineering

Teaching Experience

Bachelor Level	Automatic Control Basic Course, Digital Control Systems, Digital Signal Processing, Electric Circuits, Automatic Control Laboratory, Digital Control Laboratory, Electronics Laboratory, Introduction to Neural Networks
Master Level	System Identification, Modern Trends in Automatic Control, Non-linear control, Optimal and Robust Control, Neural Networks for control
Supervision	- Co-supervised 7 master students with Assiut University (Egypt) and Hamburg University of Technology (Germany) - Supervised and Co-supervised 10 bachelor student projects in Assiut University (Egypt) and Hamburg University of Technology (Germany)

Services Rendered to Professional Societies

- Served as Reviewer for the following journals

    - Automatica
    - International Journal of Adaptive Control and Signal Processing
    - European Journal of Control
    - Dirasat, Engineering Sciences, University of Jordan Journals
    - International Journal of Control, Automation and Systems

- Served as reviewer for the following conferences

    - IFAC World Congress 2008, 2011, 2014
    - IFAC Symposium on Information Control 2009
    - IFAC Symposium on System Identification 2012
    - IEEE conference on Decision and Control 2007-2015
    - American Control Conference 2009-2015
    - European Control Conference 2009, 2011, 2012
    - Mediterranean Conference on Control and Automation 2010
    - IEEE Multi-conference on Systems and Control 2011
    - IEEE International Conference on Innovative Engineering, 2012
    - IFAC Workshop on LPV Systems , 2015

- Organized with other colleagues two invited sessions
  "Recent Developments in Control of Linear Parameter-Varying Systems I, II"
  for the American Control Conference, Portland, USA, June 2014

Other Qualifications

Computer Skills

Development Software:	MatLab, Simulink, Maple, SciLab, C, Fortran
Office/Publication:	LaTeX, Beamer (LaTeX), Powerdot (LaTeX), Adobe Acrobat, Microsoft Office

Speaking Languages

English and German

Referees

- Professor Herbert Werner, Institute of Control Systems, Department of Electrical Engineering and Information Technology, Hamburg University of Technology, Hamburg, Germany, +49 40 42878 3015, Email: `h.werner@tu-harburg.de`

- Professor Abdel-Fatah Mohamed, Electrical Engineering Department, Faculty of Engineering, Assiut University, Assiut, Egypt, +2 088 2334688,
Email: `afm@aun.edu.eg, afm52@yahoo.com`

- Professor Mazen Abdel-Salam, Electrical Engineering Department, Faculty of Engineering, Assiut University, Assiut, Egypt, +2 088 2334688,
Email: `mazen2000as@yahoo.com`

- Dr. Roland Tóth, Control Systems Group, Department of Electrical Engineering, Eindhoven University of Technology, Delft, The Netherlands, +36 6 3831 2635,
Email: `r.toth@tue.nl`

Publications

About 42 refereed publications at various international journals and international conferences.

Refereed Publications

Journal Publications

1. M. Abdel-Salam and **H. Seddik Abbas**: Linear-Programming-Based Method for Optimum Schedule Reactive Power Sources in Integrated AC-DC Power Systems, European Transactions on Electrical Power, Vol. 13, No. 1, 2003, pp. 5-13.

2. M. Abdel-Salam and **H. Seddik Abbas**: Transient analysis of HVDC power transmission systems, European Transactions on Electrical Power, Vol. 14, No. 3, 2004, pp. 131-149.

3. **H. S. Abbas** and H. Werner: Frequency-Weighted Discrete-Time LPV Model Reduction Using Structurally Balanced Truncation, IEEE Transactions on Control Systems Technology, Vol. 19, No. 1, 2011, pp 140-147. (Special issue on applied LPV modeling and identification)

4. M. A. Darwish, **H. S. Abbas**, A. I. Saleh and M. M. Hassan: FLC Implementation on A 8-Bit Microcontroller for DC Motor Speed and Position Control, Journal of Engineering Sciences, Assiut University, Faculty of Engineering, Vol. 39, No. 2, 2011, pp. 405-423.

5. R. Tóth, **H. S. Abbas** and H. Werner: On the State-Space Realization of LPV Input-Output Models: Practical Approaches, IEEE Transactions on Control Systems Technology, Vol. 20, No. 1, 2012, pp. 139-153.

6. S. M. Hashemi, **H. S. Abbas**, and H. Werner: Low-Complexity Linear Parameter-Varying Modeling, and Control of a Robotic Manipulator, Control Engineering Practice, Vol. 20, issue 3, 2012, pp 248-257.

7. M. Rabeei, **H. S. Abbas** and M. M. Hassan: LPVIOID- A LPV Identification Toolbox for MATLAB: Recent and Novel Techniques, Journal of Engineering Sciences, Assiut University, Faculty of Engineering, Vol. 41, No. 4, 2013, pp.1637 - 16593.

8. **H. S. Abbas**, A. Ali, S. M. Hashemi, and H. Werner: LPV State-Feedback Control of a Control Moment Gyroscope, Control Engineering Practice, Vol. 24, issue 3, 2014, pp 129 - 137.

9. C. Hoffmann, S. M. Hashemi, **H. S. Abbas**, and H. Werner: Synthesis of LPV Controllers with Low Implementation Complexity Based on a Reduced Parameter Set, IEEE Transactions on Control Systems Technology, Vol. 22, No. 6, 2014, pp. 2393 2398.

International conferences

1. **H. S. Abbas** and H. Werner: LPV design of charge control for an SI engine based on LFT neural state-space models, In Proc. of the 17th IFAC World Congress, Seoul, South Korea, 2008, pp. 7427-7432.

2. **H. S. Abbas** and H. Werner: Polytopic quasi-LPV model based on neural state-space models and application to air charge control of a SI engine, In Proc. of the 17th IFAC World Congress, Seoul, South Korea, 2008, pp. 6466-6471.

3. B. Sahhary and **H. S. Abbas**: On-line speed estimation based on ANN for PMSM sensorless speed control, In Proc. of the 27th International Conference Modeling, Identification and Control, Innsbruck, Austria, 2008, pp. 178-183.

4. **H. S. Abbas**, S. S. Chughtai, and H. Werner: A hybrid gradient-LMI algorithm for solving BMIs in control design problems, In Proc. of the 17th IFAC World Congress, Seoul, South Korea, 2008, pp. 14319-14323.

5. N. Lachhab, **H. S. Abbas**, and H. Werner: A neural-network based technique for modeling and LPV control of an arm-driven inverted pendulum," in Proc. of the 47th IEEE Conference on Decision and Control, Cancun, Mexico, 2008, pp. 3860-3865.

6. **H. S. Abbas**, S. S. Chughtai, and H. Werner: A hybrid gradient-LMI algorithm for the synthesis of LPV gain-scheduled controllers, In Proc. of the European Control Conference, Budapest, Hungary, 2009, pp. 3407-3412.

7. **H. S. Abbas** and H. Werner: An instrumental variable technique for open-loop and closed-loop identification of input-output LPV models, In Proc. of the European Control Conference, Budapest, Hungary, 2009, pp. 2646-2651.

8. **H. S. Abbas**, S. M. Hashemi, and H. Werner; Decentralized LPV gain-scheduled PD controller of a Robotic manipulator, In Proc. of the ASME Dynamic Systems and Control Conference, Hollywood, California, USA, 2009.

9. **H. S. Abbas**, R. Tóth, and H. Werner: State-space realization of LPV input-output models: practical methods for the user, Invited paper, Best presentation in session award, In the Proc. of the American Control Conference Baltimore, Maryland, USA, 2010 pp. 3883-3888.

10. H. P. Läudders, **H. S. Abbas**, D. Doberstein, F. Thielecke, H. Werner: LPV gain-scheduling control of an electromechanically driven landing gear for a commercial aircraft, Invited paper, Best presentation in session award, In the Proc. of the American Control Conference Baltimore, Maryland, USA, 2010 pp. 4659-4664.

11. **H. S. Abbas** and H. Werner: Frequency weighted discrete-time LPV model reduction using structurally balanced truncation, In Proc. of the 48th IEEE Conference on Decision and Control, Shanghai, China, 2009, pp. 4298-4303.

12. S. M. Hashemi, **H. S. Abbas**, and H. Werner: LPV modelling and control of a 2-DOF robotic manipulator using PCA-based parameter set mapping, In Proc. of the 48th IEEE Conference on Decision and Control, Shanghai, China, 2009, pp. 7418-7423.

13. **H. S. Abbas**, M. Ali, H. Werner: Linear recurrent neural networks for open- and closed Loop consistent identification of LPV models, in Proc. of the 49th IEEE Conference on Decision and Control, Atlanta, Georgia, USA, December, 2010, pp. 6851-6856.

14. M. Ali, **H. S. Abbas**, H. Werner: Controller Synthesis for Input-Output LPV Models, in Proc. of the 49th IEEE Conference on Decision and Control, Atlanta, Georgia, USA, December, 2010, pp. 7694-7699.

15. I. Wior, S. Boonto, **H. S. Abbas** and H. Werner: Modeling and Control of an Experimental pH Neutralization Plant using Neural Networks based Approximate Predictive Control, in Proc. of the 1st Virtual Control Conference, Aalborg, Denmark, September, 2010.

16. M. Ali, **H. S. Abbas**, S. S. Chughtai and H. Werner: Identification of Spatially Interconnected Systems Using Neural Networks, in Proc. of the 49th IEEE Conference on Decision and Control, Atlanta, Georgia, USA, December, 2010, pp. 6938-6943.

17. **H. S. Abbas**: Closed-Loop Identification of Input-Output LPV Models Using Refined Instrumental Variable Methods, in Proc. of the IASTED International Conference, Intelligent Systems and Control, Cambridge, UK, 2011, pp. 55-61.

18. M. Ali, A. Ali, **H. S. Abbas** and H. Werner: Identification of Box-Jenkins Models for Parameter-Varying Spatially Interconnected Systems, in proceedings of the American Control Conference, San Francisco, California, USA, pp. 145-150, June-July 2011.

19. M. Ali, **H. S. Abbas**, and H. Werner: MIMO Controller Synthesis for LTI and LPV Systems Using Input-Output Models, In Proc. of the 18th IFAC World Congress, Milan, Italy, 2011, pp. 11338-11343.

20. M. Ali, A. Popov, H. Werner, and **H. S. Abbas**: Identification of Distributed Systems with Identical Subsystems, In Proc. of the 18th IFAC World Congress, Milano, Italy, 2011, pp. 5633-5638.

21. **H. S. Abbas**, and H. Werner: Stability and Induced L2-Gain of MIMO Input-Output LPV Systems, in the proceedings of the American Control Conference, Montreal, Canada, June 2012, pp. 781-786.

22. C. Hofmann, S. M. Hashemi, **H. S. Abbas** and H. Werner: Closed-Loop Stability and Performance in LPV Control Based on a Reduced Parameter Set, in the proceedings of the 51st IEEE Conference on Decision and Control, Maui, Hawaii, USA, December, 2012, pp. 5146-5151.

23. M. A. Darwish and **H. S. Abbas**: DC Motor Position Control Using Discrete-Time Fixed-Order $\mathcal{H}_\infty$ Controllers, in the proceedings of the 1st IEEE International Conference on Innovative Engineering, Alexandria, Egypt, December, 2012.

24. **H. S. Abbas**, A. Ali, S. M. Hashemi, and H. Werner: LPV Gain-Scheduled Control of a Control Moment Gyroscope, in the proceedings of the American Control Conference, Washington, DC, USA, June 2013, pp. 6841-6846.

25. O. Mehrez, Z. Zyada, **H. S. Abbas** and A. Aboismail: Modeling and Static Analysis of a Three-Rigid-Link Object for Nonprehensile Manipulation Planning, in the proceedings of the IEEE International Conference on Mechatronics and Automotion, Takamatsu, Kagawa, Japan, August, 2013.

26. M H. Merzban, M. Abdellatif, **H. S. Abbas** and S. Sessa: Toward Multi-Stage Decoupled Visual SLAM System, in the proceedings of the 2013 IEEE International Symposium on Robotic and Sensors Environments, Washington, DC, USA, October 2013.

27. M. Heshmat, M. Abdellatif and **H. S. Abbas**: Improving Visual SLAM Accuracy Through Deliberate Camera Oscillations, in the proceedings of the 2013 IEEE International Symposium on Robotic and Sensors Environments, Washington, DC, USA, October 2013.

28. S. Wollnack, **H. S. Abbas**, H. Werner and R. Tóth: Fixed-Structure LPV Controller Synthesis Based on Implicit Input Output Representations, in the proceedings of the 52nd IEEE Conference on Decision and Control, Florence, Italy, December, 2013, pp. 2103-2108.

29. C. Hofmann, S. M. Hashemi, **H. S. Abbas** and H. Werner: Benchmark Problem Nonlinear Control of a 3-DOF Robotic Manipulator, in the proceedings of the 52nd IEEE Conference on Decision and Control, Florence, Italy, December, 2013, pp. 5534-5539.

30. C. Hofmann, S. M. Hashemi, **H. S. Abbas** and H. Werner: Synthesis of LPV Controllers with Reduced Implementation Complexity, to appear in the proceedings of the American Control Conference, Portland, USA, June 2014.

31. **H. S. Abbas**, R. Tóth, M. Petreczky, N. Meskin and J. Mohammadpour: Embedding of Nonlinear Systems in a Linear Parameter-Varying Representation, to appear in the proceedings of the the 19th IFAC World Congress, Cape Town, South Africa, August 2014.

32. O. Elshazly, **H. S. Abbas**, Z. Zyada and A. Abo-Ismail: Skid Steering Mobile Robot Modeling and Control, to appear in the proceedings 2014 UKACC 10th International Conference on Control, Loughborough University, U.K., July 2014.

33. M. Lashin, A. Ramadan, **H. S. Abbass** and Ahmed Abo-Ismail: Design of an Optimized Sliding Mode Control for Loaded Double Inverted Pendulum with Mismatched Uncertainties, in proceedings of the 2014 19th International Conference On Methods and Models in Automation and Robotics (MMAR), Miedzyzdroje, Poland, pp. 270-275, September 2014.

Peer-reviewed research submitted journal papers

1. S. Wollnack, **H. S. Abbas**, H. Werner and R. Tóth: Fixed-Structure LPV Controller Synthesis Based on Implicit Input Output Representations, submitted to Automatica, 2015

2. **H S. Abbas**, R. Toth, N. Meskin, J. Mohammadpour, and J. Hanema: A Model Predictive Control Design for Linear Parameter-Varying Systems in Input-Output Form, submitted to IEEE Transactions on Automatic Control, 2015