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EDUCATION

- **PhD Electrical Engineering (2010)**
Institute of Automatic Control and Complex Systems (AKS)
University of Duisburg-Essen, 47057-Duisburg Germany
Majors: Process monitoring and fault diagnosis
Thesis: Observer-based fault detection in nonlinear systems
- **M.Sc. Systems Engineering (2004)**
Pakistan Institute of Engineering & Applied Sciences (PIEAS),
Islamabad-45650, Pakistan
Majors: Automatic Control Engineering
Thesis: Robust Controller design for nonlinear control systems
- **B.Sc. Electrical Engineering (2002)**
NWFP University of Engineering & Technology (UET), Peshawar, Pakistan
Majors: Communication Engineering
Thesis: Error Control Coding

PROFESSIONAL EXPERIENCE

- **Lecturer/Junior Engineer (September 2004- November 2006)**
Department of Electrical Engineering, PIEAS, Islamabad, Pakistan
- **Assistant Professor/ Senior Engineer (December 2006, Present)**
Department of Electrical Engineering, PIEAS, Islamabad, Pakistan
 - **Teaching (M.Sc. Systems Engineering)**
 - Linear Algebra and Ordinary Differential Equations
 - Basic Transform Mathematics
 - Feedback Control Systems-I
 - Feedback Control Systems-II
 - Optimal Control Engineering
 - Nonlinear Control Systems
 - Electronics Control Systems Lab-I
 - Electronics Control Systems Lab-II
 - Control System design-I
 - Control System Design-II
 - Fault diagnosis and Tolerance
 - **Visiting Lecturer (Spring 2005)**
Iqra University Islamabad Campus
 - **Teaching (B.S. Telecommunication)**
 - Probability and Statistics
 - **Visiting Lecturer (Winter 2006)**

Institute of Space Technology, Islamabad, Pakistan.

- **Teaching (M.S. Guidance and Control)**
 - Modern Control Theory

AWARDS AND HONOR

- Best paper award in 8th IEEE Int. Conf. on Emerging Technologies (IEEE ICET) 2012
- Fellowship (HEC/ DAAD) for Ph.D. in Electrical Engineering (April 2007-February 2011), University of Duisburg-Essen, Germany
- Fellowship for M.Sc. Systems Engineering (October 2002- September 2004), Pakistan Institute of Engineering and Applied Science, Islamabad, Pakistan.
- Frontier Education Foundation Scholarship (2001), NWFP University of Engineering and Technology Peshawar.
- Merit Scholarship (1999-2000), NWFP University of Engineering and Technology Peshawar.

RESEARCH INTERSTS

- Robust Fault diagnosis and Process monitoring
- Linear/Nonlinear Observer Design
- Robust and Optimal Control design
- Nonlinear Systems
- Time-delay Systems and Hybrid Systems

LIST OF PUBLICATION

See appendix-I

THESIS SUPERVISED

1. D. Fan, "Fault Detection Scheme for uncertain systems with application to the Laboratory system-Inverted Pendulum", M. Sc Thesis, AKS, University of Duisburg-Essen, Duisburg, Germany, 2009
2. A. R. Rizvi, "Comparative analysis of different observer based fault detection schemes for Electro Hydraulic servo actuator schemes," M.Sc thesis, AKS, University of Duisburg-Essen, Duisburg, Germany, 2008
3. Naeemullah, *Robust Controller Design for Aerospace Vehicles*, M.Sc. Systems Engineering Thesis, PIEAS, Islamabad, Pakistan, 2006
4. R. T. Ahmad, "Analysis of Control Algorithms for Nonlinear under actuated Mechanical Systems," M.Sc. Systems Engineering Thesis, PIEAS, Pakistan, 2005.
5. R. F. Abbas, "Robust Fault Detection Scheme in uncertain time-delay," M.Sc. Systems Engineering Thesis, PIEAS, Islamabad, Pakistan, 2012
6. K. Iftikhar, "Robust fault detection in Hybrid systems," M.Sc. Systems Engineering Thesis, PIEAS, Islamabad, Pakistan, 2012
7. Usmanullah, "Robust fault detection using Unscented Kalman filter," M.Sc. Systems Engineering Thesis, PIEAS, Islamabad, Pakistan, 2012

8. A. Hussain, “Data-driven techniques for Fault detection in dynamical systems,” M.Sc. Systems Engineering Thesis, PIEAS, Islamabad, Pakistan, 2012
9. M. Nazeer, “Advanced monitoring systems for Wind Turbines,” M.Sc. Systems Engineering Thesis, PIEAS, Islamabad, Pakistan, 2012

PhD THESIS SUPERVISION (In Progress)

- Robust fault diagnosis and fault tolerant control of Dynamical Systems

MS THESIS SUPERVISION (In Progress)

1. Robust fault detection in stochastically uncertain systems, PIEAS, Islamabad, Pakistan, 2012-2013
2. Fault detection in nonlinear systems using Kalman filter, PIEAS, Islamabad, Pakistan, 2012-2013
3. Subspace aided data-driven techniques for robust fault detection, PIEAS, Islamabad, Pakistan, 2012-2013
4. Robust fault detection for switched systems, PIEAS, Islamabad, Pakistan, 2012-2013
5. Observer based fault detection for uncertain time delays systems, PIEAS, Islamabad, Pakistan, 2012-2013
6. Robust fault detection for Linear parameter varying systems, PIEAS, Islamabad, Pakistan, 2012-2013
7. Robust fault detection for Linear time varying systems, PIEAS, Islamabad, Pakistan, 2012-2013

PROFESSIONAL ASSOCIATION

- Member of Pakistan Engineering Council
- Member IEEE
- Member IEEE Control Systems (IEEE CS) Society
- Chair of Robust Control and Fault diagnosis chapter of IEEE CS Islamabad-Karachi section

Appendix-I

LIST OF PUBLICATION

Journal papers

- [1]. **A. Q. Khan** and S. X. Ding, "Threshold Computation for Fault Detection in a Class of discrete-time nonlinear Systems", *Int. J. Adap. Contr. Sig. Process.* 2011, Vol 25(5), pages 407-429
- [2]. W. Chen, **A. Q. Khan**, M. Abid, and S. X. Ding, "Integrated design of observer-based fault detection for a class of uncertain nonlinear systems with Lipschitz nonlinearities," *Int. J. Appl. Math. Comput. Sci.*, 2011, Vol. 21(3)
- [3]. M. Abid, W. Chen, S. X. Ding, and **A. Q. Khan**, "Integrated design of nonlinear fault detection systems using factorization approach" *Int. J. Control*, 2011, Vol 84(3), 526-539
- [4]. **A. Q. Khan**, M. Abid, W. Chen, and S. X. Ding, "Mixed H_2/H_∞ fault detection filter for discrete-time nonlinear systems," (under review)
- [5]. M. Rehan, **A. Q. Khan**, and M. Abid, "Anti-windup-based H_∞ controller synthesis for Lipschitz nonlinear systems under input saturation," (Under review)
- [6]. S. Farooq, A.A. Khattak, M. Abid, and **A. Q. Khan**, Delay Range dependent robust passification for singular neutral uncertain systems with time varying delays and actuator saturation, (In preparation)
- [7]. M. Nazeer, **A. Q. Khan**, M. Abid, "LMI based robust fault detection for wind turbines," (In preparation)

Refereed Conference paper

- [1]. S. Farooq, A. Ahmed Khattak, M. Abid and A. Q. Khan, " Delay Range Dependent Robust Passification for Singular Neutral Uncertain Systems with Time Varying Delays and Actuator Saturation," *IEEE FIT 2012 (Accepted)*,
- [2]. K.Iftikhar, **A. Q. Khan**, M.Abid, Robust Fault Detection Filter Design for Discrete Switched Linear Systems, *IEEE FIT 2012 (Accepted)*,
- [3]. S. Farooq, **A. Q. Khan**, M. Abid and A. Ahmed Khattak, "Passivity-based Sliding Mode Control of Neutral Singular Uncertain Systems with Time Varying Delays and Bounded Matched Disturbances", *IEEE FIT 2012 (Accepted)*,
- [4]. F. Kausar, M. Abid, and A. Q. Khan, "Sensor fault detection in coupled liquid tank system," *IEEE FIT 2012 (Accepted)*,
- [5]. A. Ahmed, S. Farooq, **A. Q. Khan**, M.Abid, "An LMI Based Approach to Passivity Analysis and Robust Passification of Uncertain Linear Systems with Time Varying Delays," *51st CDC 2012 (Accepted)*
- [6]. M. Abid, **A. Q. Khan**, "Sensor fault reconstruction for one-sided Lipschitz nonlinear systems", *10th IBCAST 2013 (Accepted)*
- [7]. R. F. Abbas, **A. Q. Khan**, M. Abid, and A. Ahmed "Fault Detection for Uncertain Linear Systems Using Parity Space Approach," *8th IEEE International Conference on Emerging Technologies (ICET2012)*, October 8-9, 2012, Islamabad, Pakistan
- [8]. A. Hussain, **A. Q. Khan**, M. Abid, and M. Tufail "On fault detection in coupled liquid three tank system using subspace aided data driven design," *8th IEEE International Conference on Emerging Technologies (ICET2012)*, October 8-9, 2012, Islamabad, Pakistan
- [9]. S Farooq, A.Ahmad, M. Abid, and **A. Q. Khan** "Passivity Analysis of Uncertain Singular Neutral Systems with Arbitrary Time Varying Delays," *8th IEEE International Conference on Emerging Technologies (ICET2012)*, October 8-9, 2012, Islamabad, Pakistan
- [10]. M.S. Afzal, M. Abid, **A. Q. Khan**, and A. Ahmad, "A Hybrid and Decentralized approach for fault diagnosis and fault tolerant control of wind turbines,"

- 15th IEEE International Multitopic Conference (INMIC2012), December 13-15, 2012, Islamabad, Pakistan (submitted)
- [11]. M. Abid, **A. Q. Khan**, M. Rehan, "Robust Observer for one sided Lipschitz nonlinear systems," 15th IEEE International Multitopic Conference (INMIC2012), December 13-15, 2012, Islamabad, Pakistan (submitted)
- [12]. W. Chen, S. X. Ding, A. H. Abandan Sari, A. Naik, **A. Q. Khan**, and S. Yin, "Observer-based FDI Schemes for Wind Turbine Benchmark," In Proc. of 18th IFAC World Congress, pp: 7073-7078, Milano, Italy, August 28-September 2, 2011
- [13]. **A. Q. Khan**, S. X. Ding, C. I. Chihaiia, M. Abid, and W. Chen, "Robust fault detection in nonlinear systems: A three-tank benchmark application," Conf. on Control and Fault-tolerant systems (SystTol'10), October 6-8, 2010, Nice, France
- [14]. W. Chen, S. X. Ding, **A. Q. Khan**, and M. Abid, "Energy-based fault detection for dissipative systems," Conf. on Control and Fault-tolerant systems (SystTol'10), October 6-8, 2010, Nice, France
- [15]. **A. Q. Khan**, M. Abid, W. Chen and S. X. Ding, "On optimal Fault detection of Nonlinear Systems," In Proc. Of Conference on Decision and Control (CDC'09), Shinghai China, Dec. 16-18, 2009
- [16]. W. Chen, **A. Q. Khan**, M. Abid and S. X. Ding, "Integrated Design of fault detection for a class of uncertain nonlinear systems with Lipschitz nonlinearities," Proc. 7th workshop on ACD'2009 November 19-20, 2009, Poland.
- [17]. **A. Q. Khan** and S. X. Ding, "Threshold Computation for Robust Fault Detection in a Class of nonlinear Systems", In Proc. Of ECC'09 Budapest, Hungary, Aug. 23-26, 2009
- [18]. M. Abid, S. X. Ding and **A. Q. Khan**, "Dynamic Threshold for fault detection in Lipschitz nonlinear Systems," 7th IFAC Safe Process, pp: 36-40, Barcelona, Spain, June 30-July 3, 2009.
- [19]. **A. Q. Khan**, S. X. Ding and M. Abid, "Residual Generation and Evaluation Scheme for Detection of Faults in Nonlinear Systems using Convex Optimization," 23rd IAR Workshop on Advanced Control and Diagnosis, 27-28 November 2008, Coventry University, UK.
- [20]. S.X. Ding, **A. Q. Khan**, Y.Q. Wang, M. Abid, "A Note on Unknown Input Fault Detection filter Design," 17th IFAC08 World Congress, Seul, S. Korea, July 6-11, 2008.
- [21]. Naeemullah, **A. Q. Khan**, G. Mustafa and M. Yousaf, "High Gain Observer Design for ETH Helicopter," *Proceeding of IEEE ICET 2006 Int. Conf. pp: 330:333, November 13-14, 2006, Peshawar, Pakistan*
- [22]. **A. Q. Khan**, G. Mustafa and N. Iqbal, "LQG/LTR based Controller Design for Three Degree of Freedom Helicopter/Twin Rotor Control System," *Proc. of 9th IEEE INMIC Int. Conf. pp: 110:114, Karachi, Pakistan, 2005.*
- [23]. G. Mustafa, N. Iqbal and **A. Q. Khan**, "On Passivity based Output Feedback Stabilization of Two Degrees of Freedom Twin Rotor Control System," *Proc. of 4th IBCAST Int. Conf., Muree, Pakistan, 2005.*
- [24]. **A. Q. Khan** and N. Iqbal, "Modeling and Design of an Optimal Regulator for Three Degree of Freedom Helicopter/Twin Rotor Control System," *Proc. of IEEE SCONEST 2004 Int. Conf. pp: 45-50, 30-31 December, 2004 Karachi, Pakistan.*
- [25]. **A. Q. Khan**, "Robust Controller design for Nonlinear Control System," M.Sc. Systems Engineering Thesis PIEAS, Islamabad, Pakistan, 2004.