BEIBEI REN

CONTACT INFORMATION

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RESEARCH INTERESTS

Nonlinear systems, adaptive control, robust control, neural networks, distributed parameter systems, optimization, extremum seeking and their applications to helicopter systems, MEMS, laser systems, marine/offshore systems, smart materials, wind energy systems and smart grid integration.

EDUCATION

Postdoctoral Scholar 09/2010 to 02/2013
Department of Mechanical and Aerospace Engineering
University of California, San Diego
(Advisor: Professor Miroslav Krstic)

Ph.D. in Electrical and Computer Engineering 03/2010
National University of Singapore, Singapore
(Advisors: Professor Shuzhi Sam Ge and Professor Tong Heng Lee)

M.Eng. in Mechatronics Engineering 03/2004
Xidian University, Xi'an, China

B.Eng. in Mechatronics Engineering 07/2001
Xidian University, Xi'an, China

WORK EXPERIENCE

Assistant Professor 02/2013 to present
Department of Mechanical Engineering
Texas Tech University, Lubbock, TX

Adjunct Assistant Professor 12/2013 to present
National Wind Institute
Texas Tech University, Lubbock, TX

Postdoctoral Scholar 09/2010 to 02/2013
Department of Mechanical and Aerospace Engineering
University of California, San Diego
(Advisor: Professor Miroslav Krstic)

Research Fellow 09/2009 to 08/2010
Center for Offshore Research and Engineering (CORE)
National University of Singapore, Singapore
(Advisor: Professor Shuzhi Sam Ge)

Research Assistant 08/2005 to 08/2009
Department of Electrical and Computer Engineering
National University of Singapore, Singapore

Lecturer 03/2004 to 07/2005
Department of Mechatronics Engineering
Xidian University, China

Industrial Experience

Cymer, Inc. San Diego, CA, USA 09/2010 to 01/2013
(Industrial leader in light source systems for photolithography.)
Under a collaborative partnership between the Center for Control Systems and Dynamics (CCS-D) at UCSD and Cymer, Inc.

Academic And Professional Activities

- Associate Editor, the ASME 2014 Dynamic Systems and Control (DSC) Conference, 2014.
- Organizing Committee Member, Texas Systems Day, 2014-.
- Associate Editor, IEEE Control Systems Society Conference Editorial Board, 2013-.
- Session co-Chair, Nonlinear Control, the 2013 ASME Dynamic Systems and Control Conference, Palo Alto, CA , USA, October 21-23, 2013.
- Associate Editor for IEEE Access (IEEE's first open access megajournal), 2013-.
- International Program Committee Member, the 3rd IFAC International Conference on Intelligent Control and Automation Science (ICONS 2013), Chengdu, China, September 2-4, 2013.
- International Program Committee Member, the 12th European Control Conference (ECC), Zurich, Switzerland, July 17-19, 2013.
- International Program Committee Member, the 2012 IEEE/SICE International Symposium on System Integration, Fukuoka, Japan, December 16-18, 2012.
- International Program Committee Member, the 2011 IEEE/SICE International Symposium on System Integration, Kyoto, Japan December 20-22, 2011.
- Session co-Chair, Agents networks, the 48th IEEE Conference on Decision and Control, Shanghai, China, December 16-18, 2009.
- Session Chair, Nonlinear Adaptive Control I, the 7th Asian Control Conference (ASCC09), Hong Kong, August 27-29, 2009.
- Invited Speaker, the 3rd IEEE Control Systems Chapter Graduate Student Workshop on Control and Automation organized by Singapore Control Systems chapter, Singapore, 24 September 2007.
- IEEE Membership since 2006; IEEE Control Systems Society Membership since 2009; IEEE Women in Engineering Membership since 2014.
- ASME Membership since 2010;
- Reviewer for IEEE Transactions on Automatic Control, Automatica, IEEE Transactions on Neural Networks, IEEE Transactions on Control Systems Technology, Systems and Control Letters, Control Engineering Practice, IET Control Theory and Applications.

Publications

Books:

1. B. Ren, S. S. Ge, C. Chen, C.-H. Fua and T. H. Lee. *Modeling, Control and Coordination of Helicopter Systems*, Springer, 2012.

Journal Papers:

1. J.-M. Wang, J. Liu, B. Ren and J. Chen. Sliding Mode Control to Stabilization of Cascaded PDE-ODE Systems Subject to Boundary Control Matched Disturbance. *Automatica*. Accepted. 2014.
2. B. Ren, J.-M. Wang, and M. Krstic. Stabilization of an ODE-Schrodinger Cascade, *Systems and Control Letters*, 62:503-510. 2013.
3. B. Ren, P. Frihauf, R. J. Rafac, and M. Krstic. Laser pulse shaping via extremum seeking. *Control Engineering Practice*, 20:674-683. 2012.
4. J.-M. Wang, B. Ren, M. Krstic. Stabilization and Gevrey Regularity of a Schrodinger Equation in Boundary Feedback with a Heat Equation. *IEEE Transactions on Automatic Control*, 57(1):179-185. 2012.
5. R. Cui, B. Ren, and S. S. Ge. Synchronized Tracking Control of Multi-Agent System with High-Order Dynamics. *IET Control Theory and Applications*, 6(5):603-614, 2012.

6. K. P. Tee, B. Ren, S. S. Ge. Control of Nonlinear Systems with Time-Varying Output Constraints. *Automatica*, 47(11):2511-2516. 2011.
7. P. P. San, B. Ren, S. S. Ge and T. H. Lee. Adaptive Neural Network Control of Hard Disk Drives with Hysteresis Friction Nonlinearity. *IEEE Transactions on Control Systems Technology*, 19(2):351-358. 2011.
8. M. Chen, S. S. Ge and B. Ren. Adaptive Tracking Control of Uncertain MIMO Nonlinear Systems with Input Constraints. *Automatica*, 47(3):452-465. 2011.
9. M. Chen, S. S. Ge and B. Ren. Robust Attitude Control of Helicopters with Actuator Dynamics Using Neural Networks. *IET Control Theory and Applications*, 4(12):2837-2854. 2010.
10. B. Ren, S. S. Ge, K. P. Tee and T. H. Lee. Adaptive Neural Control for Output Feedback Nonlinear Systems Using a Barrier Lyapunov Function. *IEEE Transactions on Neural Networks*, 21(8):1339-1345. 2010.
11. B. Ren, S. S. Ge, T. H. Lee and C.-Y. Su. Adaptive Neural Control for a Class of Nonlinear Systems with Uncertain Hysteresis Inputs and Time-Varying State Delays. *IEEE Transactions on Neural Networks*, 20(7):1148-1164. 2009.
12. B. Ren, S. S. Ge, C.-Y. Su and T. H. Lee. Adaptive Neural Control for a Class of Uncertain Nonlinear Systems in Pure-Feedback Form with Hysteresis Input. *IEEE Transactions on Systems, Man, and Cybernetics-Part B: Cybernetics*, 39(2):431-443. 2009.
13. S. S. Ge, B. Ren, K. P. Tee and T. H. Lee. Approximation Based Control of Uncertain Helicopter Dynamics. *IET Control Theory and Applications*, 3(7):941-956. 2009.
14. F. Hong, S. S. Ge, B. Ren, T. H. Lee. Robust Adaptive Control for a Class of Uncertain Strict-Feedback Nonlinear Systems. *International Journal of Robust and Nonlinear Control*, 19(7):746-767. 2009.
15. S. S. Ge, B. Ren, and T. H. Lee. Hard Disk Drives Control in Mobile Applications. *Journal of Systems Science and Complexity*, 20(2):215-224. 2007.

Conference Papers:

1. J.-M. Wang, L.-L. Wang and J.-J. Liu, and B. Ren. Stabilization of a Cascade System of ODE-PDE Subject to Boundary Control Matched Disturbance. The 11th World Congress on Intelligent Control and Automation (WCICA2014), Shenyang, China, June 29 - July 4, 2014.
2. G. C. Konstantopoulos, Q.-C. Zhong, B. Ren, and M. Krstic. Bounded Droop Controller for Accurate Load Sharing Among Paralleled Inverters. *Proceedings of the 2014 American Control Conference*, Portland, OR, USA, June 4-6, 2014.
3. B. Ren and Q.-C. Zhong. UDE-based Robust Control of Variable-Speed Wind Turbines. *The 39th Annual Conference of the IEEE Industrial Electronics Society (IECON2013)*, Vienna, Austria, November 10-13, 2013.
4. B. Ren and Q.-C. Zhong. UDE-Based Robust Control for a Class of Non-affine nonlinear systems. *2013 ASME Dynamic Systems and Control Conference*, Palo Alto, CA , USA, October 21-23, 2013.
5. B. Ren, S. S. Ge, T. H. Lee and M. Krstic. Region Tracking Control for Multi-Agent Systems with High-Order Dynamics. *Proceedings of the 2013 American Control Conference*, Washington, DC, USA, June 17-June 19, 2013.
6. B. Ren, J.-M. Wang, and M. Krstic. Stabilization of an ODE-Schrodinger Cascade. *Proceedings of the 2012 American Control Conference*, Montreal, Canada, June 27-June 29, 2012.
7. B. Ren, P. Frihauf, M. Krstic, and R. J. Rafac. Laser pulse shaping via iterative learning control and infinite-dimensional extremum seeking. *2011 ASME Dynamic Systems and Control Conference*, Arlington, VA, USA, Oct 31-Nov 2, 2011.

8. J.-M. Wang, B. Ren, and M. Krstic. Stabilization of coupled Schrodinger and heat equations with boundary coupling. The 30th Chinese Control Conference, Yantai, China, July 22-24, 2011.
9. S. S. Ge, W. He, B. Ren and Y. S. Choo. Boundary Control of a Flexible Marine Installation System. In: *Proceedings of the 49th IEEE Conference on Decision and Control*, Atlanta, GA, USA, December 15-17, 2010.
10. R.Cui, S. S. Ge and B. Ren. Synchronized Tracking Control of Multi-Agent System with Limited Information. In: *Proceedings of the 49th IEEE Conference on Decision and Control*, Atlanta, GA, USA, December 15-17, 2010.
11. R.Cui, S. S. Ge and B. Ren. Synchronized Altitude Tracking of Multiple Unmanned Helicopters. In: *Proceedings of the 2010 American Control Conference*, Baltimore, MD, USA, June 30-July 02, 2010.
12. B. Ren, H. Pei, Z. Sun, S. S. Ge and T. H. Lee. Decentralized Cooperative Control for Swarm Agents with High-Order Dynamics. In: *Proceedings of the 2009 IEEE International Conference on Automation and Logistics*, Shenyang, China, August 5-7, 2009.
13. B. Ren, S. S. Ge, Y. Li, Z. X. Jiao, J. K. Liu and T. H. Lee. Target Region Tracking for Multi-Agent Systems. In: *Proceedings of the 7th Asian Control Conference*, Hong Kong, China, August 27-29, 2009.
14. K. P. Tee, S. S. Ge, H. Li and B. Ren. Control of Nonlinear Systems with Time-Varying Output Constraints. In: *Proceedings of the 7th IEEE International Conference on Control & Automation*, Christchurch, New Zealand, December 9-11, 2009.
15. B. Ren, S. S. Ge, K. P. Tee and T. H. Lee. Adaptive Control for Parametric Output Feedback Systems with Output Constraint. In: *Proceedings of the Joint 48th IEEE Conference on Decision and Control and 28th Chinese Control Conference*, Shanghai, P.R. China, December 16-18, 2009.
16. B. Ren, P. P. San, S. S. Ge and T. H. Lee. Adaptive Dynamic Surface Control for a Class of Strict-Feedback Nonlinear Systems with Unknown Backlash-Like Hysteresis. In: *Proceedings of the 2009 American Control Conference*, St. Louis, MO, USA, June 10-12,2009.
17. B. Ren, S. S. Ge, T. H. Lee, and C.-Y. Su. Adaptive Neural Control for Uncertain Nonlinear Systems in Pure-feedback Form with Hysteresis Input. In: *Proceedings of the 47th IEEE Conference on Decision and Control*, Cancun, Mexico, December 9-11, 2008.
18. B. Ren, P. P. San, S. S. Ge and T. H. Lee. Robust Adaptive NN Control of Hard Disk Drives with Hysteresis Friction Nonlinearity. In: *Proceedings of the 17th IFAC World Congress*, Seoul, Korea, July 6-11, 2008.
19. T. H. Lee, B. Ren and S. S. Ge. Adaptive Neural Control of SISO Time-Delay Nonlinear Systems with Unknown Hysteresis Input. In: *Proceedings of the 17th IFAC World Congress*, Seoul, Korea, July 6-11, 2008.
20. S. S. Ge, B. Ren, T. H. Lee, C.-Y. Su. Adaptive Neural Control of SISO Non-Affine Nonlinear Time-Delay Systems with Unknown Hysteresis Input. In: *Proceedings of the 2008 American Control Conference*, Seattle, Washington, USA, June 11-13, 2008.
21. B. Ren, S. S. Ge, T. H. Lee. Adaptive NN Control of Strict-feedback Systems Using ISS-modular Approach. In: *Proceedings of the 46th IEEE Conference on Decision and Control*, New Orleans, Louisiana USA, December 12-14, 2007.
22. B. Ren, S. S. Ge, T. H. Lee. Adaptive Neural Network Control for a Class of Nonlinear Systems with Unknown Control Gain. In: *Proceedings of the Advanced Fuzzy and Neural Control Workshop*, Valenciennes, France, October 29-30, 2007.
23. S. S. Ge, B. Ren. Neural Network Control for Non-affine Nonlinear Systems. In: *Proceedings of the European Control Conference 2007*, Valenciennes, Kos, Greece, July 2-5, 2007.

24. S. S. Ge, B. Ren and K. P. Tee. Adaptive Neural Network Control of Helicopters with Unknown Dynamics. In: *Proceedings of the 45th IEEE Conference on Decision and Control*, San Diego, CA, USA, December 13-15, 2006.

Abstracts:

1. S. Parameswaran, B. Ren, S. Yadav and J. Jegatheesan. Dynamic Analysis of a Gyroscopic Variable Transmission (GVT) System for a 1 MW Wind Turbine. The 4th New Energy Forum, Qingdao, China, September 21-23, 2014.

Invited Talks

1. B. Ren. "Control of Systems with Hysteresis". Western Digital Corp., August 25, 2014.
2. B. Ren. "UDE-Based Robust Control for a Class of Nonlinear Non-Affine Systems". Texas Systems Day 2014, College Station, TX, March 28, 2014.
3. B. Ren. "A Short Journey in Control Engineering". Follow Me: Your Future in Engineering Speaker Series sponsored by Halliburton. College of Engineering, Texas Tech, TX, February 27, 2014.