

Hamidreza Modares

Assistant Professor
Missouri University of Science and Technology,
Email:modaresh@mst.edu

RESEARCH INTEREST

- Cooperative Control of Multi-agent Systems
- Security of Cyber-physical Systems
- Autonomous Systems
- Robust Control
- Machine Learning
- Renewable Energy Microgrids

EDUCATION

Ph.D. Electrical Engineering , University of Texas at Arlington, Arlington, Texas, USA Advisor: Dr. Frank L. Lewis	2015
M.Sc. Electrical Engineering , Shahrood University of Technology, Shahrood, Iran	2006
B.S. Electrical Engineering , University of Tehran, Iran	2004

EMPLOYMENT HISTORY

- Assistant Professor, Missouri University of Science and Technology, Rolla, Missouri, August 2016-till now.
- Visiting Research Professor, the University of Texas at Arlington Research Institute, Fort Worth, Texas, August 2015- August 2016.
- Adjunct Professor, Department of Electrical Engineering, the University of Texas at Arlington, Fort Worth, Texas, September 2015- till now.
- Graduate Research and Teaching Assistant, the University of Texas at Arlington, Arlington Texas, August 2012-August 2015.
- Faculty Senior Lecturer, Shahrood University of Technology, Shahrood, Iran, 2006-2009.

PUBLICATIONS

• Book Chapters

1. **H. Modares**, I. Ranatunga, B. AlQaudi, F. L Lewis, and D. O Popa, "Intelligent Human–Robot Interaction Systems Using Reinforcement Learning and Neural Networks," Trends in Control and Decision-Making for Human–Robot Collaboration Systems, pp. 153-176, 2017.
2. B. Kiumarsi, **H. Modares**, and F.L. Lewis, "Optimal Tracking Control of Uncertain Systems: On-Policy and Off-Policy Reinforcement Learning Approaches," Control of Complex Systems: Theory and Applications, pp. 165-186, 2016.
3. **H. Modares**, B. Kiumarsi, K. Vamvoudakis, and F. L Lewis, "Adaptive Optimal Control of Nonlinear Systems using Reinforcement Learning," Adaptive Learning Methods for Nonlinear System Modeling, submitted.

• Published and Accepted Journal Papers

1. **H. Modares**, F. L. Lewis, W. Kang, and A. Davoudi, "Optimal Synchronization of Heterogeneous Nonlinear Systems with Unknown Dynamics Using Reinforcement Learning," conditionally accepted for publication in *IEEE Transactions on Automatic Control*.
2. S. Abhinav, **H. Modares**, F. L. Lewis, F. Ferrese and A. Davoudi, "Synchrony in Networked Microgrids under Attacks," conditionally accepted for publication in *IEEE Transactions on Microgrids*.
3. J. Li, **H. Modares**, T. Chai, F. L. Lewis, and L. Xie, "Off-Policy Reinforcement Learning for Synchronization in Multi-agent Graphical Games," accepted for publication in *IEEE Transactions on Neural Networks and Learning Systems*.
4. K. G. Vamvoudakis, **H. Modares**, B. Kiumarsi, and F. L. Lewis, "Game Theory-Based Control System Algorithms with Real-Time Reinforcement Learning," *IEEE Control Systems Magazine*, vol. 37. No. 1, pp. 33 – 52. 2017.
5. **H. Modares**, S. P. Nagesh Rao, G. A. D. Lopes, R. Babuska, and F. L. Lewis, "Optimal Model-free Output Synchronization of Heterogeneous Systems Using Off-policy Reinforcement Learning," *Automatica*, vol. 71, pp. 334–341, 2016.

6. Q. Jiao, **H. Modares**, S. Xu, F. L. Lewis, and K. Vamvoudakis, "Multi-Agent Zero-Sum Differential Graphical Games for Disturbance Rejection in Distributed Control," *Automatica*, vol. 69, pp. 24-34, 2016.
7. Q. Jiao, **H. Modares**, S. Xu, F. L. Lewis, and L. Xie " L_2 -gain Synchronization of Heterogeneous Leader-Follower Multi-Agent Systems with Distributed Output-Feedback control," *Automatica*, vol. 71, pp. 361–368, 2016.
8. L. Fan, V. Nasirian, **H. Modares**, A. Davoudi, and F. L. Lewis, "Game-theoretic Control of Active Loads in DC Systems," *IEEE Transactions on Energy conversion*, vol. 31. No. 3, pp. 882-895, 2016.
9. C. Rani, **H. Modares**, R. Sriram, D. Mikulski, and F. L. Lewis "Security of UAV Systems under Cyber-physical Attacks," *Journal of Defense Modeling and Simulation: Applications, Methodology, and Technology*, vol. 13, no. 3, pp. 331-342, 2016.
10. **H. Modares**, F. L. Lewis, and Z.P. Jiang, "Optimal Output-feedback Control of Unknown Continuous-time Linear Systems using Reinforcement Learning," *IEEE Transactions on Cybernetics*, vol. 6, no.11, pp. 2401-2410, 2016.
11. **H. Modares**, F. L. Lewis, and D. Popa, "Optimized Assistive Human-robot Interaction using Reinforcement Learning," accepted in *IEEE Transaction on Cybernetics*, vol. 46, no. 3, pp. 655-667, 2016.
12. **H. Modares**, F. L. Lewis, and Z.P. Jiang, " H_∞ Tracking Control of Completely-unknown Continuous-time Systems," *IEEE Transactions on Neural Networks and Learning Systems*, Vol. 26, no. 10, pp. 2550-2562, 2015.
13. **H. Modares**, and F. L. Lewis, "Linear Quadratic Tracking Control of Partially-Unknown Continuous-time Systems using Reinforcement Learning," *IEEE Transactions on Automatic control*, vol. 59, pp.3051-3056, 2014.
14. **H. Modares**, F. L. Lewis, and M. B. Naghibi-Sistani, "Integral Reinforcement Learning and Experience Replay for Adaptive Optimal Control of Partially-unknown Constrained-input Continuous-time Systems," *Automatica*, vol. 50, pp. 193-202, 2014.
15. **H. Modares**, and F. L. Lewis, "Optimal Tracking Control of Nonlinear Partially-unknown Constrained-input Systems using Integral Reinforcement Learning," *Automatica*, vol. 50, no. 7, pp. 1780-1792, 2014.
16. **H. Modares**, F. L. Lewis, and M. B. Naghibi, "Adaptive Optimal Control of Unknown Constrained-Input Systems using Policy Iteration and Neural Networks," *IEEE Transactions on Neural Networks and Learning systems*, vol. 24, no. 10, pp. 1513-1525, 2013.
17. M. Palanisamy, **H. Modares**, F. L. Lewis, and M. Aurangzeb, "Continuous-time Q-learning for Infinite-horizon Discounted Cost Linear Quadratic Regulator Problems," *IEEE Transactions on Cybernetics*, vol. 45, no. 2, pp. 165-176, 2014.
18. L. Zhu, **H. Modares**, G.O. Peen, F. L. Lewis, and B. Yue, "Adaptive Suboptimal Output-Feedback Control for Linear Systems Using Integral Reinforcement Learning," *IEEE Transactions on Control Systems Technology*, vol. 23, no. 1, pp. 264-273, 2015.
19. J. Ding, **H. Modares**, F. L. Lewis, and T. Chai, "Data-based Multi-objective Plant-wide Performance Optimization of Industrial Processes under Dynamic Environments," *IEEE Transactions on Industrial Informatics*, vol. 12, no.2, pp 454-465, 2016.
20. B. Kiumarsi, F. L. Lewis, **H. Modares**, A. Karimpur, and M. B. Naghibi-Sistani, "Reinforcement Q-Learning for Optimal Tracking Control of Linear Discrete-time Systems with Unknown Dynamics," *Automatica*, vol. 50, no. 4, pp. 1167-1175, 2014.

Submitted Journal Papers

21. **H. Modares**, A. Davoudi, F. L. Lewis, "Robust and Resilient Cooperative Control of Multi-agent systems Under Attacks on Sensors and Actuators" *IEEE Transactions on Cybernetics*.
22. **H. Modares**, R. Moghadam, A. Davoudi, F. L. Lewis, "Static Output-feedback Synchronization of Multi-agent Systems: A Secure and Unified Approach" *IEEE Transactions on Systems Control Theory*.
23. R. Moghadam, **H. Modares**, "Optimal Distributed Control Protocols in Contested Environments using Reinforcement Learning," *IEEE Transactions on Neural Networks*.
24. S. Zuo, Y. Song, **H. Modares**, F. L. Lewis, and A. Davoudi, "Output Synchronization of Heterogeneous Systems via H_∞ Output-Feedback Control," *Automatica*.
25. M. Mazouchi, M.B. Naghibi-Sistani, S. Hosseini-Sani, and **H. Modares**, "Optimal Output Containment Control of Heterogeneous Systems Using Relative Output Feedback," *IEEE Transactions on Cybernetics*.
26. Y. Yang, **H. Modares**, D. Wunsch, and Y. Yin, "Leader-Follower Output Synchronization of Heterogeneous Systems with Active Leader Using Reinforcement Learning," *IEEE Transactions on Neural Networks and Learning systems*.
27. Y. Yang, **H. Modares**, D. Wunsch, and Y. Yin, "Optimal Model-Free Containment Control of Heterogeneous Systems with Active Leaders," *IEEE Transactions on Control Systems Theory*.
28. C. Chen, F. L. Lewis, S. Xie, **H. Modares**, Z. Liu, A. Davoudi, and S. Zuo, "Adaptive and H_∞ Resilient Designs for Cooperative Control of Multi-Agent Systems with Sensor and Actuator Attacks," *Automatica*.

29. N. Vignesh, **H. Modares**, S. Jagannathan, and F. Lewis, "Approximate Optimal Control of Interconnected System Using Event-Based Off-policy Reinforcement Learning," to be submitted.

• **Peer-reviewed Conference Papers (Published in proceedings)**

1. **H. Modares**, F. L. Lewis, M. B. Naghibi, G. Chowdhary, & T. Yucelen, "Adaptive Optimal Control of Partially-unknown Constrained-input Systems using Policy Iteration with Experience Replay," AIAA Guidance, Navigation, and Control (GNC) Conference, 2013 (**Invited paper**).
2. **H. Modares**, F. L. Lewis and A. Davoudi, "Optimal Output Synchronization of Nonlinear Multi-agent Systems using Approximate Dynamic Programming," International Joint Conference on Neural Networks, 2016.
3. **H. Modares**, & F. L. Lewis, "Online Solution to the Linear Quadratic Tracking Problem of Continuous-time Systems using Reinforcement Learning," the 52nd IEEE Conference on Decision and Control, 2013.
4. **H. Modares**, L. Zhu, & F. L. Lewis, "Data-Driven Optimization Control with Reduced Output Measurements," 11th World Congress on Intelligent Control and Automation, 2014 (**Invited paper**).
5. **Q. Jiao**, **H. Modares**, S. Xu, F. L. Lewis, and K. G. Vamvoudakis, "Disturbance rejection of multi-agent systems: A reinforcement learning differential game approach," American Control Conference, 2015.
6. F. L. Lewis, **H. Modares**, B. Kiumarsi, "Reinforcement learning for optimal tracking and regulation: A unified framework," American Control Conference, 2015.
7. K. G. Vamvoudakis, P. J. Antsaklis, W. E. Dixon, J. P. Hespanha, F. L. Lewis, **H. Modares**, and B. Kiumarsi "Autonomy and machine intelligence in complex systems: A tutorial," American Control Conference, 2015.
8. B. Kiumarsi, **H. Modares**, F. L. Lewis, Z. P. Jiang, "H-infinity Optimal Control of Unknown Linear Discrete-time Systems: An Off-policy Reinforcement Learning Approach," 7th IEEE Conference on Cybernetics and Intelligent Systems, 2015.
9. V. Nasirian, **H. Modares**, F.L. Lewis, A. Davoudi, "Active Loads of a Microgrid as Players in a Differential Game," International Symposium on Resilient Control Systems, 2015 (**Best paper award**).

HONORS AND AWARDS

- Stelmakh Outstanding Student Research Award, Department of Electrical Engineering, UTA, 2015.
- Summer Dissertation Fellowship, UTA, 2015.
- Best Paper Award, International Symposium on Resilient Control Systems, 2015.

SERVICE TO SOCIETY

- Associate Editor for IEEE Transactions on Neural Networks and Learning Systems
- Reviewer for
 - IEEE Transactions on Automatic Control,
 - Automatica,
 - IEEE Transaction on Neural Networks and Learning systems,
 - IEEE Transactions on Cybernetics,
 - IEEE Transactions on Automation, Science and engineering,
 - IEEE Transactions on Industrial Electronics,
 - IEEE Transactions on Control of Networked Systems,
 - IET Control Theory and Applications,
 - International Journal of Robust and Nonlinear Control,
 - International Journal of Adaptive Control and Signal Processing,
 - Applied Soft Computing,
 - Neurocomputing
 - ISA Transaction,
 - American Control Conference,
 - IEEE Conference on Decision and Control.