

Vitae

BRIAN DRIESSEN

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TECHNICAL INTERESTS: Dynamics, controls, modeling, optimization, and scalability and robustness aspects of controls implementation (embedding) in distributed (and mobile) systems.

PROFILE: Strong theoretical background in dynamics, optimization, and control. Experienced at control simulation for both analytical/numerical applications and hardware implementation. Interest in theoretical, computational, experimental, and hardware implementation aspects of this field.

EDUCATION:

Ph.D. Mechanical Engineering; Georgia Institute of Technology; 1996
M.S. Mechanical Engineering; Georgia Institute of Technology; 1993
B.S. Mechanical Engineering; Louisiana Tech University; 1991

EXPERIENCE:

2009-present: Associate Professor of Mechanical Engineering, Wichita State University
2004-2009: Assistant Professor of Mechanical Engineering, Wichita State University
2002-2004: Assistant Professor of Mechanical Engineering, University of Alabama in Huntsville
2000-2002: Research Engineer at Sandia National Laboratories
1996-2000: Post Doc, Sandia National Laboratories
1995-1996: Outstanding Summer Student Program, Sandia National Laboratories
1992-1995: Graduate Research Assistant, Georgia Institute of Technology

AWARDS AND FELLOWSHIPS:

2006-2007: Multidisciplinary Research Project Award (MURPA), Wichita State University
2005-2006: University Research Creative Grant (URCA), Wichita State University
1995-1996: Outstanding Summer Student Program (Sandia National Labs)
1992-1995: National Science Foundation Fellowship
1992-1995: President's Fellowship (Georgia Institute of Technology)
1991-1991: Summa Cum Laude (Louisiana Tech University)
1990-1991: Baker Foundation Scholarship (Louisiana Tech University)

PUBLICATIONS:

Peer-Reviewed Accepted Journal Papers (32):

1. Driessen, B.J., "Global Asymptotic Adaptive Robot Tracking With Actuator Dynamics and No Velocity Measurement," *Control and Intelligent Systems*, 2016, Vol. 44, No. 4, pp. 139-152.
2. Driessen, B.J., Sadegh, N., Kwok, K.S., "Bounded-Input Iterative Learning Control: Robust Stabilization Via a Minimax Approach," 2017, *International Journal of Adaptive Control and Signal Processing*, 2017, Vol. 31, No. 3, pp. 417-428.
3. Driessen, B.J., "Observer/Controller With Global Practical Stability for Tracking in Robots Without Velocity Measurement," *Asian Journal of Control*, 2015, Vol. 17, No. 5, pp. 1898-1913.
4. Malagari, S. and Driessen, B.J., "Globally Exponential Controller/Observer for Tracking in Robots with DC Motor Dynamics and Only Link Position Measurement," *International Journal of Modelling, Identification and Control*, 2013, Vol. 19, No. 1, pp. 1-12.
5. Malagari, S. and Driessen, B.J., "Globally Asymptotic Adaptive Observer/Controller for Tracking in Robots Without Velocity Measurement," *International Journal of Adaptive Control and Signal Processing*, 2012, Vol. 26, No. 5, pp. 400-418.
6. Malagari, S. and Driessen, B.J., "Globally Exponential Controller/Observer for Tracking in Robots Without Velocity Measurement," *Asian Journal of Control*, 2012, Vol. 14, No. 2, pp. 309-319.
7. Malagari, S. and Driessen, B.J., "Semi Globally Exponential Tracking Observer/Controller for Robots with Joint Hysteresis and Without Velocity Measurement," *Journal of Intelligent and Robotic Systems*, 2011, Vol. 62, No. 1, pp. 29-58.
8. Malagari, S. and Driessen, B.J., "Adjustable-Rate Semi-Globally Exponential Observer/Controller for Tracking in Robots With Actuator Dynamics and Only Link Position Measurement," *Control and Intelligent Systems*, Vol. 38, No. 1, 2010, pp. 249-262.
9. Malagari, S. and Driessen, B.J., "Globally Exponential Continuous Controller/Observer for Position Tracking in Robot Manipulators with Hysteretic Joint Friction," *Robotica*, Vol. 28, No. 5, 2010, pp. 759-763.
10. Driessen, B. and Kondreddi, S., "Tracking Observer/Controller for a Relatively Large Class of Systems with Hysteresis and Without Velocity Measurement," *Systems and Control Letters*, Vol. 58, No. 1, 2009, pp. 26-30.
11. Driessen, B.J., Duggirala, V.M., "Globally Asymptotic and Locally Exponential Tracking Observer/Controller for a Relatively Large Class of Systems With Hysteresis," *Journal of Intelligent and Robotic Systems*, Vol. 50, No. 2, 2007, pp. 207-215.
12. Driessen, B.J., Sadegh, N., "Global Convergence for Two-Pulse Rest-to-Rest Learning for Single-Degree-of-Freedom Systems With Stick-Slip Coulomb Friction," *Robotica*, Vol. 25, No. 3, 2007, pp. 307-313.
13. Driessen, B.J., "Overlapping-Multi-Layer Deadzone for Alleviating Over Conservativeness in Robot Adaptive Tracking," *Systems and Control Letters*, Vol. 55, No. 3, 2006, pp. 240-246.
14. Driessen, B.J., "Adaptive Global Tracking for Robots With Unknown Link and Actuator Dynamics," *International Journal of Adaptive Control and Signal Processing*, Vol. 20, No. 3, 2006, pp. 123-138.
15. Driessen, B.J., "On-Off Minimum-Time Control With Limited Fuel Usage: Near Global Optima Via Linear Programming," *Optimal Control Applications and Methods*, Vol. 27, No. 3, 2006, pp. 161-168.
16. Driessen, B.J. and Robin, A.L., "A Globally Convergent Tracking Controller for the X4 Flyer Rotor Craft for Reference Trajectories With Positive Thrust," *Robotica*, Vol. 22, No. 4, 2004, pp. 375-388.

17. Driessen, B., Sadegh, N., "Convergence Theory for Multi-Input Discrete-Time Iterative Learning Control With Coulomb Friction, Continuous Outputs, and Input Bounds," Vol. 18, No. 5, 2004, pp. 457-471, *International Journal of Adaptive Control and Signal Processing*.
18. Dohner, J., Eisler, G., Driessen, B., and Hurtado, J., "Cooperative Control of Vehicle Swarms for Acoustic Target Localization by Energy Flows," *ASME Journal of Dynamic Systems, Measurement, and Control*, Vol. 126, No. 4, 2004, pp. 891-895.
19. Feddema, J., Robinett, R., Driessen B., "Designing Stable Finite State Machine Behaviors Using Phase Plane Analysis and Variable Structure Control," *Journal of Intelligent and Robotic Systems*, Vol. 36, No. 4, 2003, p 349-370.
20. Driessen, B., Sadegh, N., "On the Guaranteed Nonsingularity of a Class of Banded Matrices for Optimal Control Generation," *ASME Journal of Dynamic Systems, Measurement and Control*, Vol. 125, No. 4, December, 2003, pp. 672-673.
21. Driessen, B., Sadegh, N., "Inequality/Equality Constrained Optimization: An Analytical Robustness Comparison of a Feasibility Method Versus L1 Sequential Quadratic Programming," *Optimization Methods and Software*, Vol. 17, No. 4, 2002, pp. 701-716.
22. Kwok, K., Driessen, B., Phillips, C., and Tovey, C., "Analyzing the Multiple-target-multiple-agent Scenario Using Optimal Assignment Algorithms," *Journal of Intelligent and Robotic Systems*, Vol. 35, No. 1, 2002, p 111-122.
23. Driessen, B., Sadegh, N. "Multi-Input Square Iterative Learning Control With Bounded Inputs," *ASME Journal of Dynamic Systems, Measurement and Control*, Vol. 124, December, 2002, pp. 582-584.
24. Driessen, B., Sadegh, N., "Multi-Input Square Iterative Learning Control With Input Rate Limits and Bounds," *IEEE Transactions on Systems, Man, and Cybernetics—Part B*, Vol. 32, No. 4, 2002, pp. 545-550.
25. Driessen, B. and Sadegh, N., "On the Discontinuity of the Costates for Optimal Control Problems With Coulomb Friction," *Optimal Control Applications and Methods*, Vol. 22, No. 4, 2001, pp. 197-200.
26. Driessen, B. and Kotulski, J., "Predicting Computer Run-Time for the Barnes-Hut Multipole Method for Electromagnetic Scattering," *Engineering Analysis With Boundary Elements*, Vol. 25, No. 6, June 2001, pp. 461-465.
27. Driessen, B., Sadegh, N., and Kwok, K., "A Robust Line Search for Learning Control," *International Journal of Control*, Vol. 74, No. 7, 2001, pp. 732-736.
28. Driessen, B., and Sadegh, N. "Minimum-Time Control of Systems With Coulomb Friction: Near Global Optima Via Mixed Integer Linear Programming," *Optimal Control Applications and Methods*, Vol. 22, No. 2, 2001, pp. 51-62.
29. Driessen, B., and Dohner, J., "A Finite Element-Boundary Element Method for Advection-Diffusion Problems With Variable Advective Fields and Infinite Domains," *International Journal of Heat and Mass Transfer*, Vol. 44, No. 11, June 2001, pp. 2183-2191.
30. Driessen, B., Feddema, J., and Kwok, K., "Decentralized Fuzzy Control of Multiple Nonholonomic Vehicles," *Journal of Intelligent and Robotic Systems*, Vol. 26, No. 1, September 1999, pp. 65-78.
31. Driessen, B., Sadegh, N., Parker, G. and Eisler, G., "A Fast and Robust Algorithm for General Inequality/Equality Constrained Minimum Time Problems", *ASME Journal of Dynamic Systems, Measurement, and Control*, Vol. 121, September 1999, pp. 337-345.
32. Sadegh, N. and Driessen, B., "Minimum Time Trajectory Optimization and Learning," *ASME Journal of Dynamic Systems, Measurement and Control*, Vol. 121, June 1999, pp. 213-217.

Conference Papers:

1. Driessen, B., Sadegh, N., "Global Convergence for Two-Pulse Rest-to-Rest Learning for Single-Degree-of-Freedom Systems With Stick-Slip Coulomb Friction," Conference on Decision and Control, 2002, Vol. 3, No. 3, pp. 3338-3343.
2. Driessen, B., Sadegh, N., "Convergence Theory for Multi-Input Discrete-Time Iterative Learning Control With Coulomb Friction, Continuous Outputs, and Input Bounds," IEEE SoutheastCon, 2002, pp. 317-321.
3. Driessen, B., Sadegh, N., "Inequality/Equality Constrained Optimization: An Analytical Robustness Comparison of a Feasibility Method Versus L1 Sequential Quadratic Programming," IEEE SoutheastCon, 2002, pp. 317-321.
4. Driessen, B., Sadegh, N., "Multi-Input Square Iterative Learning Control With Input Rate Limits and Bounds," Intelligent Systems and Control Conference, 2001, pp. 305-309.
5. Driessen, B., Sadegh, N., "A Feasibility Method for Suboptimal Learning of Equality Constrained Optimal Trajectories," Intelligent Systems and Control Conference, 2001, pp. 284-289.
6. Driessen, B., Sadegh, N., and Kwok, K., "Robust Stabilization of a Bounded-Input Iterative Learning Controller Via a Minimax Approach," Measurement and Control Conference, 2001.
7. Driessen, B., Sadegh, N., and Kwok, K., "Multi-Input Square Iterative Learning Control With Bounded Inputs," IEEE SoutheastCon, 2001, pp. 62-64.
8. Driessen, B., Sadegh, N., and Kwok, K., "Optimization-Based Drift Prevention for Learning Control of Underdetermined Linear and Weakly Nonlinear Time-Varying Systems," American Control Conference, 2001, Vol. 2, pp. 908-911.
9. Driessen, B. and Sadegh, N., "Minimum-Time Control of Systems With Coulomb Friction: Near Global Optima Via Mixed Integer Linear Programming," Conference on Intelligent Systems and Control, 2000, pp. 102-106.
10. Driessen, B., "A Direct Stiffness-Modification Route to Linear Consistency Between Incompatible Finite Element Meshes," 2000 International Conference on Integral Methods in Science and Engineering.
11. Driessen, B. and Sadegh, N., "On the Discontinuity of the Costates for Optimal Control Problems With Coulomb Friction," Advances in Adaptive and Optimal Control, 2000, ASME -- Dynamic Systems and Control Division, Vol. 69-1, S. Nair (ed.), pp. 237-238, part of the 2000 ASME International Mechanical Engineering Congress and Exposition.
12. Driessen, B., Sadegh, N., and Kwok, K., "A Robust Line Search for Underdetermined Learning Control," IEEE International Conference on Control Applications, 2000, pp. 647-652.
13. Driessen, B. and Sadegh, N., "Minimum-Time Trajectory Tracking of an Under-Actuated System," American Control Conference, 2000, Vol. 4, pp. 2834-2838.
14. Driessen, B., "On-Off Minimum-Time Control With Limited Fuel Usage: Near Global Optima Via Linear Programming," American Control Conference, 2000, Vol. 6, pp. 3875-3877.
15. Driessen, B. and Parker, G., "Experimental Results for Minimum-Time Trajectory Tracking of a Direct-Drive Three-Link Planar Arm," American Control Conference, 2000, Vol. 3, pp. 1998-2002.
16. Driessen, B. and Kotulski, J., "On Practical Modifications to the Barnes-Hut Multipole Method for Electromagnetic Scattering," Boundary Element Technology XIII, 1999, C.S. Chen, C.A. Brebbia, D.W. Pepper (eds.), pp. 237-244.
17. Driessen, B., Kotulski, J., and Kwok, K., "Efficient Control Law Simulation for Multiple Mobile Robots," American Control Conference, 1999, Vol. 5, pp. 3437-3440.
18. Kwok, K. and Driessen, B., "Path Planning for Complex Terrain Navigation Via Dynamic Programming," American Control Conference, 1999, Vol. 4, pp. 2941-2944.

19. Driessen, B. and Dohner, J., "A Finite Element-Boundary Element Method for Advection-Diffusion Problems With Variable Advective Fields and Infinite Domains," *Boundary Element Technology XIII*, 1999, C.S. Chen, C.A. Brebbia, D.W. Pepper (eds.), pp. 99-118.
20. Driessen, B., Sadegh, N., and Kwok, K., "A Robust Line Search for Learning Control," *IEEE Conference on Decision and Control*, 1998, Vol. 4, pp. 3888-3892.
21. Driessen, B., Womble, D., and Sadegh, N., "Order(Log(Number of Time Steps)) Implicit Integration of Differential Equations on Massively Parallel Computers," *International Conference on Parallel and Distributed Processing Techniques and Applications*, 1998, Vol. 4, pp. 1559-1566.
22. Driessen, B., Sadegh, N., and Parker, G., "Toward Linear Complexity Optimal Control of Sparsely Interconnected Dynamic Systems," *American Control Conference*, 1998, Vol. 5, pp. 3118-3120.
23. Driessen, B., Feddema, J., and Kwok, K., "Decentralized Fuzzy Control of Multiple Nonholonomic Vehicles," *American Control Conference*, 1998, Vol. 1, pp. 404-410.
24. Driessen, B. and Kwok, K., "A Multi-Objective Dynamic Programming Approach to Constrained Discrete-Time Optimal Control," *American Control Conference*, 1998, Vol. 5, pp. 3077-3083.
25. Feddema, J.T., Robinett, R.D., and Driessen, B.J., "Designing Stable Finite State Machine Behaviors Using Phase Plane Analysis and Variable Structure Control," *IEEE International Conference on Robotics and Automation*, 1998, Vol. 2, pp. 1134-1141.
26. Kwok, K.S., Loucks, C.S., and Driessen, B.J., "Rapid 3-D Digitizing and Tool Path Generation for Complex Shapes," *IEEE International Conference on Robotics and Automation*, 1998, Vol. 4, pp. 2789-2794.
27. Lewis, D., Parker, G., Driessen, B., and Robinett, R., "Command Shaping Control of an Operator-in-the-loop Boom Crane," *American Control Conference*, 1998, Vol. 5, pp. 2643-2647.
28. Kwok, K. and Driessen B., "Cooperative Target Convergence Using Multiple Agents," *Proceedings of the SPIE, Sensor Fusion and Decentralized Control in Autonomous Robotic Systems*, Vol. 3209, 1997, pp. 67-75.
29. Kwok, K., Loucks, C., and Driessen, B., "Automatic Tool Path Generation for Finish Machining," *IEEE International Conference on Robotics and Automation*, 1997, Vol. 2, pp. 1229-1234.
30. Kwok, K., Driessen, B., Tovey, C., and Phillips, C., "Analyzing the Multiple-target-multiple-agent Scenario Using Optimal Assignment Algorithms," *Proceedings of the SPIE, Sensor Fusion and Decentralized Control in Autonomous Robotic Systems*, Vol. 3209, 1997, pp. 111-122.
31. Parker, G., Robinett, R., Driessen, B., and Dohrmann, C., "Operator In-The-Loop Control of Rotary Cranes," *Proceedings of the SPIE*, 1996, Vol. 2721, pp. 364-367.
32. Driessen, B. and Sadegh, N., "A Fast and Robust Algorithm for General Inequality/Equality Constrained Minimum Time Problems," *Space96, The Fifth International Conference and Exposition on Engineering, Construction, and Operations in Space*, pp. 1215-1224.
33. Sadegh, N. and Driessen, B., "Minimum Time Trajectory Learning," *American Control Conference*, 1995, Vol. 2, pp. 1350-1354.

PATENTS:

1. Feddema, J.T., Kwok, K.S., and Driessen, B.J., "Convergent Method of and Apparatus for Distributed Control of Robotic Systems Using Fuzzy Logic," patent number 6377878.

TECHNICAL SERVICE:

Technical reviewer for the following journals:

- 1) *IEEE Control Systems Technology*
- 2) *ASME Journal of Dynamic Systems, Measurement, and Control*
- 3) *IEEE Transactions on Systems, Man, and Cybernetics*
- 4) *Robotica*
- 5) *Automatica*
- 6) *Control and Intelligent Systems*
- 7) *Optimal Control Applications and Methods*
- 8) *Control Engineering Practice*
- 9) *Journal of Robotic Systems*
- 10) *IEE Proceedings: Control Theory and Applications*
- 11) *International Journal of Robust and Nonlinear Control*
- 12) *IEEE Transactions on Automatic Control*
- 13) *IEEE Transactions on Aerospace and Electronic Systems*
- 14) *Journal of Intelligent and Robotic Systems*
- 15) *AIAA Journal of Guidance, Control, and Dynamics*
- 16) *Asian Journal of Control*
- 17) *International Journal of Control, Automation and Systems*
- 18) *International Journal of Control*
- 19) *International Journal of Systems Science*
- 20) *IEEE Transactions on Neural Networks and Learning Systems*
- 21) *Proceedings of the Institution of Mechanical Engineers, Part I: Journal of Systems and Control Engineering*