

Resume

Yuri B. Shtessel



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CITIZENSHIP: USA

EDUCATION:

Ph.D. - (Electrical Engineering) - dissertation title "*Multiple criteria optimal control problems in autonomous systems of electric power supply*," Department of Automation and Remote Control, the South Ural State University, Chelyabinsk, Russia, 1978.

MS - (Electrical Engineering) - thesis title "*Optimization of parameters of automatic control systems interconnected through a common source of power supply*," Department of Automatic Controls, the South Ural State University, Chelyabinsk, Russia, 1971.

EMPLOYMENT:

- 2015-present** *Distinguished Professor*, Department of Electrical & Computer Engineering, the University of Alabama in Huntsville, Huntsville, AL. USA
- 2002-2015** *Professor*, Department of Electrical & Computer Engineering, the University of Alabama in Huntsville, Huntsville, AL. USA
- Fall 2006** *Professor, Interim Chair*, Department of Electrical & Computer Engineering, the University of Alabama in Huntsville, Huntsville, AL USA
- 1993-2002:** *Associate Professor*, Department of Electrical & Computer Engineering, the University of Alabama in Huntsville, Huntsville, AL USA
- 1991-1993:** *Adjunct Professor*, Department of Electrical & Computer Engineering and Department of Mathematics, the University of South Carolina, Columbia, SC.
- 1983-1991:** *Associate Professor, Deputy Department Chair for Research*, Department of Applied Mathematics, the South Ural State University, Chelyabinsk, Russia.
- 1981-1983:** *Associate Professor*, Department of Applied Mathematics, the South Ural State University, Chelyabinsk, Russia.
- 1979-1981:** *Assistant Professor*, Department of Applied Mathematics, the South Ural State University, Chelyabinsk, Russia.
- 1974-1979:** *Researcher*, Department of Automation and Remote Control, the South Ural State University, Chelyabinsk, Russia.
- 1971-1974:** *Engineer*, the Research Institute of Electrical Drives, Chelyabinsk Branch, Chelyabinsk, Russia.

RECENT VISITING APPOINTMENTS (2013-2015):

- 2015 (Sept-Nov)** *Visiting Scholar*, Department of Electrical and Electronic Engineering, University of Cagliari, Italy.
- 2015 (August-Sept)** *Visiting Professor*, South East University of China, School of Automation, China.
- 2015 (May-June)** *Visiting Scholar*, Department of Automatic-Robotics, Ecole Centrale de Nantes, France.
- 2014 (June-July)** *Visiting Scholar*, Department of Automatic-Robotics, Ecole Centrale de Nantes, France.
- 2013 (May-June)** *Visiting Professor*, Centre for Systems, Dynamics and Control, School of Engineering, Mathematics and Physical Sciences, University of Exeter, UK

RECENT SPONSORED RESEARCH (Principal Investigator 2009-2015):

- *Grant* (Co-PI), “Sliding mode adaptive distributed control,” United States - Israel Bi-national Science Foundation (BSF), 10/01/11 – 9/30/15, award \$94,000.
- Contract “Higher Order Sliding Mode Guidance and Control of Hypersonic Missiles,” Eglin Air Force Base, 08/27/12 – 05/27/13, award \$28,960.
- *Contract* “Sliding Mode Controller for Ultra-high Efficiency Power Factor Correction (PFC),” Fairchild Controls Corporation, 06/18/2008 - 08/11/2011, award \$170,000.
- *Contract* “Launch vehicle bending modes control,” NASA/TBE, 2/9/2009 - 9/30/2009, award \$46,107.
- *Grant* (Co-PI), “Adaptive Coordinated Control with VSS/SMC,” United States - Israel Bi-national Science Foundation (BSF), 10/01/07 – 9/30/10, award \$79,500.

SELECTED SERVICES TO DISCIPLINE

RECENT PROFESSIONAL ACTIVITIES:

- Associate Fellow of American Institute of Aeronautics and Astronautics (AIAA)
- Senior Member of Institute of Electrical and Electronics Engineers (IEEE)
- Guest editor of Special Issues on “Advances in Guidance and Control of Aerospace Vehicles using Sliding Mode Control and Observation Techniques” of *The Journal of the Franklin Institute*, Vol. 349, Issue 2, March 2012; “Advances in Nonlinear Observation and Identification for Dynamic Systems” of *The Journal of the Franklin Institute*, Vol. 347, Issue 6, August 2010; on “Advances in Higher Order Sliding Mode Control” of *International Journal of Robust and Nonlinear Control*, Vol. 18, Issue 4-5, 2008; on “Advances in Sliding Mode Observation and Estimation” of *International Journal of Systems Science*, Vol. 38, Issues 11 and 12, 2007.
- Subject Editor, *The Journal of The Franklin Institute*
- Member of the *IEEE Variable Structure Systems Technical Committee*.
- Member of the *Conference Editorial Board*, the IEEE Control Systems Society

RECENT AWARDS:

- A recipient of the UAH College of Engineering Outstanding Senior Professor Award, 2013.
- A recipient of Distinguished Visiting Fellowship of The Royal Academy of Engineering, UK, 2008.
- A recipient of the UAH Research and Creative Achievement Award, 2004.
- A recipient of the IEEE Third Millennium Medal for the outstanding contribution to control systems engineering, 2000.

LIST OF SELECTED RECENT PUBLICATIONS (2010-2016)

Publish or Perish: Citations: 4598, h-index: 36, g-index: 58, hI,norm: 22, hI,annual: 0.51
Scopus: Citations: 2845, h-index: 29

I. Books

1. Y. Shtessel, C. Edwards, L. Fridman, and A. Levant, *Sliding Mode Control and Observation*, Birkhauser, Springer, New York, 371 pages, 2014.

II. Peer-reviewed journal articles

2. Prathyush P. Menon, Christopher Edwards, and Yuri Shtessel, "An Adaptive Sliding Mode Observer for A Complex Network of Dynamical Systems," *Int. J. Adapt. Control Signal Process*, 2016-published on-line in wileyonlinelibrary.com DOI: 10.1002/acs.2670.
3. Polk Yu, Yuri Shtessel, and Christopher Edwards, "Continuous Higher Order Sliding Mode Control with Adaptation of Air Breathing Hypersonic Missile," *Int. J. Adapt. Control Signal Process*, 2016-published on-line in wileyonlinelibrary.com DOI: 10.1002/acs.2664.
4. C. Edwards and Y. Shtessel "Adaptive Continuous Higher Order Sliding Mode Control," *Automatica*, 65, 2016, pp. 183-190.
5. R. Ashok and Y. Shtessel, "Control of Fuel Cell- based Electric Power System Using Adaptive Sliding Mode Control and Observation Techniques," *The Journal of the Franklin Institute*, Vol. 352, 2015, pp. 4911-4934.
6. P. Lanza, Y. Shtessel, and J. Stensby, "Improved Acquisition in a Phase-Locked Loop Using Sliding Mode Control Techniques," *The Journal of the Franklin Institute*, 352, 2015, pp. 4188-4204.
7. B. Mirkin, P-O. Gutman, and Y. Shtessel, "Decentralized Continuous MRAC with Local Asymptotic Sliding Modes of Nonlinear Delayed Interconnected Systems," *The Journal of the Franklin Institute*, Vol. 351, No. 4, 2014, pp. 2076-2088.
8. A. Gallardo Hernández, L. Fridman, A. Levant, Y. Shtessel, R. Leder, C. R. Monsalve, and S. I. Andrade, "High-Order Sliding-Mode Control for Blood Glucose: Practical Relative Degree Approach" *Control Engineering Practice*," Vol. 21, Issue 5, May 2013, pp. 747-758.
9. F. Plestan, Y. Shtessel, V. Bregeault, and A. Poznyak, "Sliding mode control with gain adaptation - application to an electropneumatic actuator," *Control Engineering Practice*, Vol. 21, Issue 5, May 2013, pp. 679-688.
10. Y. Shtessel, J. Kochalummoottil, C. Edwards, and S. Spurgeon, "Continuous adaptive finite reaching time control and second order sliding modes" *IMA Journal of Mathematical Control and Information*, Vol. 30, Issue 1, March 2013, pp. 97-113.
11. B. Mirkin, P-O. Gutman, and Y. Shtessel, "Asymptotic Sliding Mode Control Approach to Adaptive Distributed Tracking Problem for Multi-Agent Nonlinear Delayed Systems," *International Journal of Control*, Volume 85, Issue 11, November 2012, pages 1671-1682.
12. Y. Shtessel, M. Taleb, and F. Plestan, "A novel adaptive-gain *super-twisting* sliding mode controller: methodology and application," *Automatica*, Vol. 48, Issue 5, May, 2012, pp. 759-769.
13. G. Liu, A. Zinober, Y. Shtessel, and Q. Niu, "Adaptive Twisting Sliding Mode Control for the Output Tracking in Time Delay Systems," *Australian Journal of Electrical and Electronics Engineering*, Vol. 9, No. 3, September-December, 2012, pp. 217-224.
14. J. Stott and Y. Shtessel, "Launch Vehicle Attitude Control Using Sliding Mode Control and Observation Techniques," *The Journal of the Franklin Institute, Special Issue on Advances in Guidance and Control of Aerospace Vehicles using Sliding Mode Control and Observation Techniques*, Vol. 349, Issue 2, March 2012, pp. 397-412.
15. L. Besnard, Y. Shtessel, and B. Landrum, "Quadrotor Vehicle Control via Sliding Mode Controller Driven by Sliding Mode Disturbance Observer," *The Journal of the Franklin Institute, Special Issue on*

Advances in Guidance and Control of Aerospace Vehicles using Sliding Mode Control and Observation Techniques, Vol. 349, Issue 2, March 2012, pp. 658-684.

16. B. Mirkin, P.-O. Gutman and Y. Shtessel, "Robust Adaptive Sliding Mode Tracking of State Delayed Nonlinear Plants with Actuator Failures," *International Journal of Robust and Nonlinear Control*, Vol. 21, No. 17, 2011, pp. 2009-2026.
17. J. M. Olm, X. R. Oton, and Y. Shtessel "Stable inversion-based robust tracking control in DC-DC nonminimum phase switched converters", *Automatica*, Vol. 47, No.1, pp. 221-226, 2011.
18. Y. Shtessel, S. Baev, C. Edwards, and S. Spurgeon, "Output feedback tracking in causal nonminimum-phase nonlinear systems using higher order sliding modes," *International Journal of Robust and Nonlinear Control*, Vol. 20, Issue 16, November 2010, pp. 1866-1878.
19. F. Plestan, Y. Shtessel, V. Brégeault, and A. Poznyak, "New methodologies for adaptive sliding mode control," *International Journal of Control*, Vol. 83, No. 9, 2010, pp. 1907-1919.
20. B. Mirkin, P. O. Gutman, and Y. Shtessel, "Tracking for nonlinear plants with multiple unknown time-varying state delays using sliding mode with adaptation," *International Journal of Robust and Nonlinear Control*, Vol. 20, Issue 13, September 2010, pp. 1455-1464.
21. Y. Shtessel, S. Baev, C. Edwards, and S. Spurgeon, "HOSM observer for a class of non-minimum phase causal nonlinear MIMO systems," *IEEE Transactions on Automatic Control*, Vol. 55, No. 2, 2010, pp. 543-548.

III. Peer-reviewed chapters in scholarly books

22. Roshini S. Ashok and Y. B. Shtessel, "Sliding Mode Control of A Fuel Cell Based Electric Power System: Multiple-Modular Configurations," *Advances in Variable Structure and Sliding Mode Control*, F. Plestan, L. Fridman, and J-P. Barbot (Eds.), Springer, 2016-to appear.
23. M. Weiss and Y. Shtessel, "An impulsive input approach to short time convergent control for linear systems," *Advances in Aerospace Guidance, Navigation and Control*, Q. Chu, B. Mulder, D. Choukroun, E. van Kampen, C. de Visser, and G. Looye (Eds.), Springer, July 2013, pp. 99-119.
24. Y. Shtessel and C. Tournes, "Higher Order Sliding Modes for Missile Guidance and Control," *Advances in Missile Guidance, Control and Estimation*, S. Balakrishnan, A. Truordos, and B. White (eds.), CRC Press, Taylor & Francis, 2012 pp. 195-240.
25. Y. Shtessel, S. Baev, C. Edwards, S. Spurgeon, and A. Zinober, "Output Tracking and Observation in Nonminimum Phase Systems via Classical and Higher Order Sliding Modes," *Lecture Notes in Control and Information Science: Sliding Modes after the first Decade of the 21st Century*, Vol. 412, L. Fridman, J. Moreno, and R. Iriarte (eds.), Springer-Verlag, pp. 351-381, 2011.
26. F. Plestan, V. Brégeault, A. Glumineau, Y. Shtessel, and E. Moulay, "Advanced sliding mode control: high order and adaptive solutions - theory and applications," *Lecture Notes in Control and Information Science: Sliding Modes after the first Decade of the 21st Century*, Vol. 412, L. Fridman, J. Moreno, and R. Iriarte (Eds), Springer-Verlag, pp. 465-493, 2011.

IV. Papers published in peer-reviewed proceedings from major scholarly meetings

27. M. Basin, C. B. Panathula, Y. Shtessel, "Adaptive Fixed-Time Convergent Super-Twisting-like Control," *Proceedings of American Control Conference*, 2016 - accepted.
28. Roshini S. Ashok, Yuri Shtessel, "Adaptive Sliding Mode Control of a Fuel Cell-based Electric Power System for Electric Vehicles: Servomotor Application," *Proceedings of American Control Conference*, 2016 - accepted.
29. Fathi Muhammad Aldukali, Yuri Shtessel, Alain Glumineau, and Franck Plestan, "Impulsive-Super-Twisting Control in Reduced Information Environments," *Proceedings of American Control Conference*, 2016 - accepted.
30. M. Basin, C. B. Panathula, Y. Shtessel, and P. C. Rodriguez-Ramirez, "Continuous Finite-Time Output-Feedback Control for Systems with Unmatched Unbounded Disturbances," *Proceedings of American Control Conference*, 2016 - accepted.

31. Y. Shtessel, B. Chava, and C. Edwards, "Second Order Sliding Mode Control using Nonlinear Dynamic Sliding Manifold: Lyapunov Approach," *Proceedings of the Conference on Decision and Control*, Osaka, Japan, December 2015.
32. F. M. Aldukali, and Y. B. Shtessel, "Continuous Higher Order Sliding Mode Control with Impulsive Action," *Proceedings of the Conference on Decision and Control*, Osaka, Japan, December 2015.
33. A. Rosales, Y. Shtessel, L. Fridman, and C. B. Panathula, "Frequency Domain Analysis of HOSM Systems," *Proceedings of the Conference on Decision and Control*, Osaka, Japan, December 2015.
34. M. Basin, C. B. Panathula, and Y. Shtessel, "Continuous second-order sliding mode control: convergence time estimation," *Proceedings of the Conference on Decision and Control*, Osaka, Japan, December 2015.
35. C. Edwards, Y. Shtessel, "Adaptive Dual Layer Second-Order Sliding Mode Control and Observation," *Proceedings of American Control Conference*, 2015.
36. A. Palosz, Y. Shtessel, and R. Fork, "Laser Pointing for Orbital Debris Mitigation Using Higher Order Sliding Mode Control and Observation Techniques," *Proceedings of the Conference on Guidance, Navigation and Control*, January 2015.
37. Polk Yu, Yuri Shtessel, Christopher Edwards, "Adaptive Continuous Higher Order Sliding Mode Control of Air Breathing Hypersonic Missile for Maximum Target Penetration," *Proceedings of the Conference on Guidance, Navigation and Control*, January 2015.
38. C. Edwards, Y. Shtessel, "Dual-Layer Adaptive Sliding Mode Control," *Proceedings of American Control Conference*, Seattle, June 2014.
39. C. Edwards, Y. Shtessel, "Adaptive Continuous Higher Order Sliding Mode Control," *Proceedings of IFAC World Congress*, Cape Town, South Africa, 24-29 August 2014.
40. Y. Shtessel, A. Glumineau, F. Plestan, and M. Weiss, "Output Feedback Hybrid-Impulsive Second Order Sliding Mode Control: Lyapunov Approach," *Proceedings of the Variable Structure Workshop*, Nantes, France, July 2014.
41. A. Pisano, S. Baev, D. Salimbeni, Y. Shtessel, E. Usai, "A New Approach to Causal Output Tracking for Non-Minimum Phase Nonlinear Systems Via Combined First/second Order Sliding Mode Control," *Proceedings of European Control Conference*, Zurich, Switzerland July 17-19, 2013.
42. C. Edwards, P. Menon Prathyush, Y. Shtessel, and A. Bordetsky, "On Connectivity Preservation in Mobile Wireless Multi-Agent/Node Mesh Networks," *Proceedings of American Control Conference*, Washington DC, June 2013.
43. Y. Shtessel, A. Glumineau, F. Plestan, and M. Weiss, "Hybrid-Impulsive Second Order Sliding Mode Control: Lyapunov Approach," *Proceedings IFAC 5th Symposium on System Structure and Control*, Grenoble, France, February, 2013.
44. A. Glumineau, Y. Shtessel, and F. Plestan, "Lyapunov stability of a Hybrid Impulsive-sliding mode adaptive controller for second order system," *Proceedings of the Conference on Decision and Control*, Hawaii, December 2012.
45. Y. Shtessel, C. Edwards, P. Menon, A. Cosby, and A. Bordetsky, "Predictive modeling and retaining connectivity for mobile wireless communication network," *Proceedings of the IEEE Conference on Technologies for Homeland Security 2012*, 13-15 November, 2012.
46. Jose Kochalummoottil, Yuri B. Shtessel, Jaime A. Moreno, and Leonid Fridman, "Output Feedback Adaptive Twisting Control: A Lyapunov Design," *Proceedings of the American Control Conference*, Montreal, Canada, June 27-29, 2012, pp. 6172-6177.
47. A. Glumineau, Y. Shtessel, and F. Plestan, "Impulsive-sliding mode adaptive control of second order system," *Proceedings of IFAC World Congress*, Milan, Italy, August 2011.
48. Y. Shtessel, F. Plestan, and M. Taleb, "Lyapunov design of adaptive super-twisting controller applied to a pneumatic actuator," *Proceedings of IFAC World Congress*, Milan, Italy, August 2011.
49. Y. Shtessel, C. Edwards, S. Spurgeon, and J. Kochalummoottil, "Adaptive Finite Reaching Time Control and Continuous Second Order Sliding Modes," *Proceedings of the Conference on Decision and Control*, Atlanta, GA, December 2010.

50. Y. Shtessel, J. Moreno, F. Plestan, L. Fridman, and A. Poznyak, "Super-twisting Adaptive Sliding Mode Control: a Lyapunov Design," *Proceedings of the Conference on Decision and Control*, Atlanta, GA, December 2010.
51. Y. Shtessel, C. Hall, S. Baev, and J. Orr, "Flexible Modes Control Using Sliding Mode Observers: Application to Ares I," *Proceedings of the Conference on Guidance, Navigation and Control*, Toronto, Canada, August 2010.
52. V. Bregeault, F. Plestan, Y. Shtessel, and A. Poznyak, "Adaptive sliding mode control for an electropneumatic actuator," *Proceedings of 11th International Workshop on Variable Structure Systems*, Mexico City, Mexico, June, 2010.
53. Y. Shtessel, C. Edwards, S. Spurgeon, and J. Kochalummoottil, "Adaptive Continuous Finite Reaching Time Control and Second Order Sliding Modes," *Proceedings of 11th International Workshop on Variable Structure Systems*, Mexico City, Mexico, June, 2010.

V. Patents

54. C. Tournes, Y. Shtessel, "System and Method for Guiding and Controlling a Missile Using High Order Sliding Mode Control," *Patent of USA: #12/501,395*, April 18, 2013.

RECENT STUDENT ADVISEMENT:

10 PhD students and 33 MSE students graduated under my supervision during 1995-2015.