

## Curriculum Vitae

### HENRYK FLASHNER

#### Office

Department of Mechanical Engineering  
University of Southern California  
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#### Education

*Ph.D.* University of California, Berkeley, December 1979.  
*M.S.* Technion-Israel Institute of Technology, Haifa, Israel, August 1974.  
*B.S.* Technion-Israel Institute of Technology, Haifa, Israel, July 1971.

#### Professional Experience

11/98-Present: Professor, Department of Aerospace and Mechanical Engineering, University of Southern California

1/2015-7/2015 Visiting Professor, Department of Aerospace Engineering, Technion-Israel Institute of Technology, Haifa, Israel

9/02-Present Professor. Integrative and Evolutionary Biology (IEB), University of Southern California

8/98-7/99 Visiting Professor, Department of Aerospace Engineering, Technion-Israel Institute of Technology, Haifa, Israel.

9/90-11/98: Associate Professor, Department of Mechanical Engineering, University of Southern California.

8/91-7/92: Visiting Associate Professor, Department of Aerospace Engineering, Technion-Israel Institute of Technology, Haifa, Israel.

9/90-Present: Associate Professor, Department of Aerospace Engineering, University of Southern California.

9/83-8/90: Assistant Professor, Department of Mechanical Engineering, University of Southern California.

2/83-8/83: Staff Engineer, Control Engineering Department, TRW Space Technology Group. Principal Investigator, Large Structures Control Technology

8/81-5/82: Lecturer, Department of Mechanical Engineering, University of Southern California.

1/79-2/83: Member of Technical Staff Control Engineering Department, TRW Space Technology Group, Redondo Beach, California.

4/78-8/79: Research Assistant, Department of Mechanical Engineering, University of California, Berkeley

3/75-4/78 Teaching Assistant, Department of Mechanical Engineering, University of California, Berkeley

10/71-8/74 Teaching Assistant, Department of Mechanical Engineering, Technion-Israel Institute of Technology, Haifa, Israel.

## Professional Activities

### Honors and Awards

NASA Group Achievement Award, Pathfinder Mars Landing, 1997.

Outstanding Poster, first place, 10th Annual Fred S. Grodins' Graduate Research Symposium, USC, 2006. Load distribution in the upper extremities during wheel chair propulsion, S. Raina\*, Advisors: McNitt-Gray, J.L. P. Requejo, Flashner, H.

Finalist- The Delsys Prize Innovation in Electromyography, International Society of Biomechanics, Cleveland, OH, 2005. McNitt-Gray, J.L., Mathiyakom, W., Requejo, P.S., Flashner, H. (2005). Regulation of reaction force direction and angular impulse during jumping tasks via redistribution of knee and hip net joint moments.

Outstanding Presentation, runner up, 8th Annual Fred S. Grodins' Graduate Research Symposium, USC, 2004. Using quaternions to characterize lower extremity alignment in three dimensional movements, L. Held\*, Advisors: McNitt-Gray, J.L., Flashner, H. Outstanding Poster, third place, 7th Annual Fred S. Grodins' Graduate Research Symposium, USC, 2003. Characterizing error in 3-D motion capture, L. Held\* Advisors: McNitt-Gray, J.L., Flashner, H.

### Editorial Duties

*Associate Editor: ASME Journal of Computational and Nonlinear Dynamics. January 2008-January 2014*

*Editor-in-Chief: Dynamics and Control, An International Journal, Kluwer Academic Publishers, 1992-1999*

### Organizing Committee

*First Workshop on Control Mechanics, University of Southern California, January 25-26, 1988.*

*Second Workshop on Control Mechanics, University of Southern California, January 25-27, 1989.*

*Third Workshop on Control Mechanics, University of Southern California, January 22-24, 1990.*

*Fourth Workshop on Control Mechanics, University of Southern California, January 21-23, 1991.*

*Sixth Workshop on Dynamics and Control, Technical University of Vienna, July 5-7, 1993*

*Seventh Workshop on Dynamics and Control, Ulm, Germany, July 17-20, 1994*

*Eighth Workshop on Dynamics and Control, Sopron, Hungary, July 16-20, 1995*

*Ninth Workshop on Dynamics and Control, Rio de Janeiro, Brazil, August 10-13, 1996.*

*Seession Organizer: Controls Theory and Application, ASME 2013 International Mechanical Engineering Congress and Exposition, San Diego, CA, Nov. 15-Nov. 21, 2013.*

### Consulting

TRW Space Technology Group, Redondo Beach, CA

Jet Propulsion Laboratory, Pasadena, CA

Delta Tau, Northridge, CA

### Membership in Professional Societies

American Society of Mechanical Engineers (ASME)

American Institute of Aeronautics and Astronautics (AIAA)

### **Editorial Duties**

*Associate Editor: ASME Journal of Computational and Nonlinear Dynamics.*, January 2008-January 2014.

Editorial Board, *International Journal of Dynamics and Control*, Springer Verlag, 2012-Present.

Editor-in-Chief: *Dynamics and Control: An International Journal*, Kluwer Academic Publishers, 1992-1999

### **Reviewer**

International Journal for Numerical Methods in Engineering

ASME Journal of Applied Mechanics

ASME Journal of Dynamic Systems, Measurement and Control

AIAA Journal Guidance, Control, and Dynamics

Nonlinear Dynamics

IEEE Control Systems Magazine

### **Panels**

NSF Dynamics and Control Review Panel, Wasington, DC, April 1997

NSF Dynamics and Control CAREER Review Panel, Wasington, DC, November 2000

NSF Dynamics and Control Panel, Wasington, DC, November 2008

### **Publications and Presentations**

#### **Chapters in Books**

1. "An Orthogonal Projection Approach to Multi-Body Dynamics", Chapter 3 in *Mechanics and Control of Large Space Structures*, AIAA Progress in Aeronautics and Astronautics Series, J. L. Junkins, Editor, October 1990.

2. "Feedback and Feedforward Mechanisms in Neuromuscular Control of Stepping", with A. Beuter in *Trends in Biological Cybernetics*, J. Menon, Editor, 1992.

3. "Bifurcation and Stability Analysis Using Truncated Point Mappings", with R. S. Guttalu in *Bifurcation and Chaos: Theory and Application*, J. Awrejcewicz, Editor, June 1995.

4. "Global Analysis of Periodic Solutions for Flexible Feedback Systems", with Michael Borre in *Global Analysis of Nonlinear Systems*, J. Sun and A. Luo Editors, Springer-Verlag, June 2012.

5. Landings: "Implications for Performance", with L. Held, and J. L. McNitt-Gray in *Handbook of Human Motion*, B. Müller and S. I. Wolf, Editors, SpringerBook, ISBN 978-3-319-14418-4, 2018, <https://www.springer.com>

6. "3D Kinematics: Using Quaternions for Modeling Orientation and Rotations in Biomechanics", with J. L. McNitt-Gray in *Biomechanical Principles and Applications in Sports*, Pallis, Jani M., McNitt-Gray, Jill L., Hung, George K. (Eds.), SpringerBook 2019, ISBN 978-3-030-13467-9, <https://www.springer.com/gp/book/9783030134679>.

#### **Publications in Refereed Journals**

1. R. Gluck and H. Flashner, "The Self Compensating Flexure Pivot," *Mechanism and Machine Theory*, Vol. 11, No. 4, pp. 267-276, 1976.

2. H. Flashner and C. S. Hsu, "A Study of Nonlinear Periodic Systems via the Point Mapping Method," *International Journal of Numerical Methods in Engineering*, Vol. 19, pp. 185-215, February 1983.
3. H. Flashner, "An Orthogonal Decomposition Approach to Modal Synthesis," *International Journal for Numerical Methods in Engineering*, Vol.23, pp. 471-493, March 1986.
4. A. Beuter, H. Flashner and A. Arabyan, "Phase Plane Modeling of Leg Motion," *Biological Cybernetics*, Vol. 53, pp. 273-284, 1986 .
5. H. Flashner, A. Beuter and A. Arabyan," Modelling of Control and Learning in a Stepping Motion," *Biological Cybernetics*, Vol. 55, 387-396 , 1987.
6. R. Guttalu and H. Flashner," A Method for Computing Domains of Attraction for Dynamical Systems," *International Journal of Numerical Methods in Engineering*, Vol. 26, pp. 875-890,1988.
7. H. Flashner, A. Beuter, and A. Arabyan, "Fitting Mathematical Functions to Joint Kinematic Data: Implications for Motor Control," *Biological Cybernetics*, Vol. 58, pp. 91-99, 1988.
8. H. Flashner and R. Guttalu, "A Computational Approach for Studying Domains of Attractions for Nonlinear Dynamical Systems," *International Journal of Nonlinear Mechanics*, Vol.23, No. 4 , pp. 279-295, 1988.
9. F. Udwadia and H. Flashner," Trade-offs Between Identification and Control for Dynamic Systems," *Journal of Applied Mechanics*, Vol. 55, No. 4, 1988.
10. R. Guttalu and H. Flashner," Periodic Solutions of Nonlinear Autonomous Systems by Approximate Point Mappings," *Journal of Sound and Vibration*, Vol. 128, No. 3, 8 February 1989.
11. H. Flashner, A. Beuter, and C. Boettger, " Parameter Optimization Model of Learning in Stepping Motion, *Biological Cybernetics*, Vol.60, pp. 277-284, 1989.
12. H. Flashner and K. Shamsa, "Stabilizing Discrete Control Laws for Hamiltonian Systems," *Control and Dynamic Systems*, Vol. 35, Part 2, pp. 43-64, June 1990.
13. V. Spector and H. Flashner," Modeling and Design Implications of Non-Collocated Control in Flexible Systems", *ASME Journal of Dynamic Systems Measurement and Control*, Vol. 112, No. 2, pp. 186-193, June 1990.
14. V.A. Spector and H. Flashner," Flexible Manipulator Modeling For Control System Development" , *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 12, pp. 943-945, Nov. -Dec. 1989.
15. H. Flashner and T. F Burns," Spacecraft Momentum Unloading: The Cell Mapping Approach," *AIAA Journal of Guidance, Control, and Dynamics*, Vol. . 13, No. 1, pp. 89-98, 1990.
16. V.A. Spector and H. Flashner, " Sensitivity of Structural Models For Non-Collocated Control Systems," *ASME Journal of Dynamic Systems Measurement and Control*, Vol. 111, No. 4, pp. 646-655, December 1989.
17. H. Flashner and J. M. Skowronski, "Model Tracking Control of Hamiltonian Systems," *ASME Journal of Dynamic Systems Measurement and Control*, Vol. 111, No. 4, pp. 656 -660, December1989.
18. K. Shamsa and H. Flashner, " A Class of Discrete-Time, Multivariable Control Laws for Stabilization of Flexible Systems; *ASME Journal of Dynamic Systems Measurement and Control*, Vol. 112 , No. 1, pp. 55-61, January 1990.
19. H. Flashner and R. Guttalu, " Analysis of Nonlinear Nonautonomous Systems by Truncated Point Mappings," *International Journal of Nonlinear Mechanics*, Vol. 24, No. 4, pp. 327- 344,1990.
20. R. S. Guttalu and H. Flashner, "Analysis of Nonlinear Systems by Truncated Mappings", *Applied*

*Mechanics Reviews*, Vol. 42, No. 1, Part 2, pp. S83-S92, 1990.

21. M.G. Safonov, R. Y. Chiang and H. Flashner, "Robust Control Synthesis for a Large Space Structure", *AIAA Journal of Guidance Control and Dynamics*, Vol. 14, No. 3, May-June 1991, pp. 513-520.

22. T. F. Burns and H. Flashner, "Adaptive Control Applied to Momentum Unloading Utilizing the Low Earth Orbital Environment," *AIAA Journal of Guidance Control and Dynamics*, Vol. 15, No. 2, March-April 1992, pp. 325-333.

23. F. C. Lee, H. Flashner, and M. G. Safonov, "Positivity Embedding for Noncolocated and Nonsquare Flexible Systems," *Journal of Applied Mathematics and Computation*, Vol. 70, No. 2-3, July 1995.

24. R. S. Guttalu and H. Flashner, "Stability Analysis of Periodic Systems By Truncated Point Mappings," *Journal of Sound and Vibration*, Vol. 189, No. 1, 33-54, 1996.

25. A. Ben-Tal, P. Bar-Yoseph, and H. Flashner, "Optimal Maneuver of a Flexible Arm by Space-Time Finite-Element Method," *AIAA Journal of Guidance Control and Dynamics*, Vol. 18, No 6, Nov.-Dec 1995, pp. 1459-1462.

26. S. W. Thurman and H. Flashner, "A New Pulse-Modulation Technique for Guidance and Control of Automated Spacecraft", *AIAA Journal of Guidance Control and Dynamics*, Vol. 19, No. 5, pp. 1007-1016, 1996.

27. S. W. Thurman and H. Flashner, "A Robust Digital Autopilot for Spacecraft Equipped with Pulse-Operated Thrusters," *AIAA Journal of Guidance Control and Dynamics*, Vol. 19, No. 5, pp. 1047-1055, 1996.

28. R. S. Guttalu and H. Flashner, "Stability Analysis of Periodic Systems By A Period To Period Mapping," *Applied Mathematics and Computation*, Vol. 78, no. 2-3, pp. 123-135, Sept. 1996.

29. A. Ben-Tal, P. Bar-Yoseph, and H. Flashner, "Space-Time Spectral Element Method For Optimal Slewing of a Flexible Arm", *International Journal of Numerical Methods in Engineering*, Vol. 39, pp. 3101-3121, 1996.

30. S. W. Thurman and H. Flashner, "Theory of Controlling Spacecraft Motion with Pulsed Thrusters", *NASA Technical Briefs*, Vol 20, No. 3, pp. 103, March 1996.

31. H. Flashner and T. Efrati, "Tracking Control of Mechanical Systems Using Neural Networks", *Journal of the Brazilian Society of Mechanical Sciences*, Vol. XIX, No.2, pp 217-227, 1997.

32. H. Flashner and R. S. Guttalu, "Discrete-Time Stability Analysis of Rotorcraft" *Mathematical Problems in Engineering*, Vol. 3, pp. 329-371, 1998

33. H. Flashner and T. Efrati, "Neural Network Based Tracking Control of Mechanical Systems", *ASME Journal of Dynamic Systems Measurement and Control*, Vol. 121, No. 1, March 1999.

34. S. Kohn-Rich and H. Flashner, "Stable Fuzzy Control of Mechanical Systems", *Fuzzy Sets and Systems*, Vol. 110, pp. 389-411, 2000.

35. S. Kohn-Rich and H. Flashner, "Tracking Control of Mechanical Systems using Fuzzy Control", *Journal of Franklin Institute*, Volume 338, no. 2/3, March/May 2001.

36. S. Kohn-Rich and H. Flashner, "Robust Tracking of Mechanical Systems using Fuzzy Control", *Fuzzy Sets and Systems*, Vol. 133, pp. 77-103, (2003).

37. M. Golat and H. Flashner, "A New Methodology for Analysis of Nonlinear Periodic Systems", *Journal of Nonlinear Dynamics*, Vol. 28, pp. 29-51, (2002)

38. Requejo, P.S., McNitt-Gray, J.L., Flashner, H., "An approach for developing an experimentally

based model for simulating flight phase dynamics”, Vol. 87, pp. 289-300, 2002.

39. M. Golat and H. Flashner, ” Expanded Point Mapping Analysis of Nonlinear Periodic Systems”, to appear in *Advances in Dynamics and Control*

40. J. McNitt-Gray and H. Flashner, Requejo, P.S, ”Analysis and Control of Human Movements that Include Impact”, *Journal of Nonlinear Studies*, Vol. 11, No. 3, pp. 345-361, 2004.

41. H. Flashner and M. Golat, ” Expanded Mapping Analysis of Nonlinear Periodic Systems”, *Stability and Control: Theory, Methods and Applications*., Vol.22, *Dynamical Systems and Control*, pp 53-76, 2004.

42. Requejo, P.S., McNitt-Gray, J.L., Flashner, H. “Modification of landing conditions at contact via flight phase control”, , *Biological Cybernetics*, 90, 5, 327-336, 2004.

43. McNitt-Gray, J.L., Requejo, P.S, Flashner, H., & Boni, H.\* Multijoint control of momentum and balance during landings on gymnastics mats, *The Engineering of Sport*, International Society of Engineering and Athletics, U of Sheffield, UK, 5(1), 421-427, 2004.

44. Requejo, P.S, McNitt-Gray, J.L., Flashner, H. & Held, L. \* (2004). Modeling the musculoskeletal behavior of gymnasts during landings on gymnastics mats, *The Engineering of Sport* 5, International Society of Engineering and Athletics, U of Sheffield, UK, 5(2), 402-410, 2004.

45. Requejo, P.S., McNitt-Gray, J.L., Flashner, H., Multijoint control strategies transfer between tasks, *Biological Cybernetics*. 94(6):501-10, (2006).

46. McNitt-Gray, J. L., Requejo, P.\*, Flashner, H., Costa, K., and Mathiyakom, W. Landing performance is dependent on more than initial conditions at contact, accepted to *Journal of Applied Biomechanics*

47. JL McNitt-Gray, L Held, PS Requejo, JM Munaretto, H Flashner, Control of Reaction Forces and System Behavior During Landing, *Nonlinear Studies* 11 (3), 345-361, 2007

48. S. Kalender and H. Flashner, Discrete-Time Control of Linear Periodically Time Varying Systems, *ASME Journal of Dynamic Systems Measurement and Control*, . Vol. 130, July 2008

49. S. Kalender and H. Flashner, Control Design and Robustness Analysis of Linear Periodically Time Varying Systems, *ASME Journal of Computational and Nonlinear Dynamics*, Vol. 3, Oct. 2008.

50. S. Kalender and H. Flashner, Design of Spacecraft Momentum Unloading Using Discrete-Time Formulation, *Proc. of IMechE, Journal of Aerospace Engineering*, Vol. 225, No. 3, 2011.

51. J. Lee, H. Flashner, and J.L, McNitt-Gray, Estimation of Multi-body Kinematics Using Marker Tracking with Application to Biomechanics, *ASME Journal of Computational and Nonlinear Dynamics*, Vol. 6, No. 3, July 2011.

52. M. Borre and H. Flashner, Computation of Periodic Solutions and Their Regions of Attraction for Flexible Structures Under Nonlinear Feedback Control, *Journal of Vibrations and Control*, published online, August 8, 2011

53. Z. Tseng , J. McNitt-Gray, H. Flashner, X. Wang and R. Enciso, Model sensitivity and use of the comparative finite element method in mammalian jaw mechanics: Mandible performance in the Gray *Wolf*, *PLoS ONE*, 6(4), 2011 .

54. Munaretto, J., McNitt-Gray, J.L., Flashner, H., & Requejo, P.S. Effect of reaction force redirection on the upper extremity mechanical demand imposed during manual wheelchair propulsion. *Clinical Biomechanics*, Vol. 27, no. 3, pp. 255-262, 2012.

55. Munaretto, J., McNitt-Gray, J.L. & Flashner, H. Reconfiguration of the upper extremity relative to

the pushrim affects load distribution during manual wheelchair propulsion, *Journal of Medical Engineering & Physics*, 35(8), 1141-9, 2013.

56. McNitt-Gray, J.L., Munaretto, J., Requejo, P.S., Zaferiou, A. & Flashner, H. , Regulation of reaction forces during the golf swing, *Sports Biomechanics*, Vol. 12 (2), 121-31, 2013.

57. D. Koh and H. Flashner, Global Analysis of a Gravity Gradient Satellite in an Elliptic Orbit, *ASME Journal on Computational and Nonlinear Dynamics*, Vol. 10, No. 6, November 2015

58. D. Koh and H. Flashner, Analysis of attitude dynamics of spinning satellites in an elliptical orbit, *Advances in the Astronautical Sciences*, Vol. 156, pp. 1493-1507, 2016

59. D. Ilisar. I. Bucher, and H. Flashner, Modelling and Closed Loop Control of Near-field Acoustically Levitated Objects, *Journal of Mechanical Systems and Signal Processing*, Vol. 85., 367-381, 2017 <https://www.sciencedirect.com/journal/mechanical-systems-and-signal-processing/vol/85/suppl/C>.

60. Antonia M. Zaferiou , Henryk Flashner, Rand R. Wilcox, Jill L. McNitt-Gray, Lower extremity control during turns initiated with and without hip external rotation, *Journal of Biomechanics*, Vol. 52, Dec. 2017.

61. K. Brown, H. Flashner, J. McNitt-Gray, and P. Requejo, Modeling Wheelchair-Users Undergoing Vibrations, *Journal of Biomedical Engineering*, Vol. 139, No.9, 2017.

62. D. Koh and H. Flashner, Periodic Motion Analysis of Spinning Satellites in Elliptic Orbits, submitted to *AIAA Journal of Guidance Control and Dynamics*

### Invited Publications

1. H. Flashner and R. Benhabib, "Issues in the Design of Large Space Structure Control Systems, AIAA Paper 84-1026-CP, *Proceedings of the AIAA Dynamics Conference*, Palm Springs, CA, May 17-18, 1984.

2. R. S. Guttalu and H. Flashner, "Analysis of Dynamical Systems by Truncated Point Mappings and Cell Mappings," *IUTAM Symposium on Nonlinear Dynamics Engineering Systems*, Springer-Verlag, New York, pp. 91-98, 1990.

3. M.G. Safonov and H. Flashner, "Modeling and Robustness Issues in Control Design for Flexible Structures," *Proceedings of American Control Conference*, Pittsburg, PA, June 21-23, 1989.

4. F. E. Udwardia and H. Flashner, "Trade-off Between Identification and Control for Large Space Structures," *Proceedings of American Control Conference*, Pittsburgh, PA, June 21-23, 1989.

5. R. S. Guttalu and H. Flashner, "Review of Analytical Point Mapping Derivation and Its Application in Dynamics", " *Proceedings of Indian National Science Academy*, PINSA-A, S. K. Malik Editor, 1998.

6. H. Flashner and M. Golat, "An Extended Point Mapping Approach to the Analysis of Nonlinear Periodic Systems", *Proceedings of the 9th International Symposium on Dynamic Problems of Mechanics*, IX DINAME, Florianopolis, Brazil, March 5-9, 2001.

### Conference Proceedings Publications

1. H. Flashner and J. Dayan, "Linearization Approach to Model Reference Adaptive Control Systems," *Proceedings of 1976 Joint Automatic Control Conference*, Purdue University, West Lafayette, IN, June 1976.

2. J. H. Decanini, H. Flashner, and H. Schmeichel, "Magnetic Control and the 25KW Power System," *Proceedings of the Annual Guidance and Control Conference*, Keystone, CO, January 31- February 4, 1981.

3. H. Flashner, "An Approach for Control of Robot Manipulators, AIAA Paper 85-1881, *Proceedings*

of the *AIAA Guidance and Control Conference*, Snowmass, CO, August 19-21, 1985.

4. H. Flashner, Y. Guo, G. Shifflett, and V. Spector, "Laboratory Robot for Space Application Research," AIAA Paper 86-2186, *Proceedings of the AIAA Guidance Navigation and Control Conference*, Williamsburg, VA, August 17-19, 1986.

5. V. A. Spector and H. Flashner, "Flexible Modelling for Control System Design," AIAA Paper 87-2264, *Proceedings of the AIAA Guidance and Control Conference*, Monterey, CA, August 17-19, 1987.

6. V.A. Spector and H. Flashner, "Modeling of Non-Collocated Structural Control Systems," *AIAA Guidance, Navigation and Control Conference*, Minneapolis, MN, August 15-17, 1988.

7. T. F. Burns and H. Flashner, "Spacecraft Momentum Unloading: The Cell Mapping Approach," AIAA Paper 88-4118, *Proceedings of AIAA Guidance, Navigation and Control Conference*, Minneapolis, MN, August 15-17, 1988.

8. M.G. Safonov, R. Y. Chiang, and H. Flashner, "An  $H_\infty$  Control Design for JOSE Structure," *Proceedings of 1988 Automatic Control Conference*, Atlanta, GA, June 21-23, 1988.

9. H. Flashner and R. S. Guttalu, "Point Mapping Studies of Dynamical Systems", *I Pan American Congress of Applied Mechanics (PACAM)*, PUC, Rio de Janeiro, Brazil, Jan. 3-6, 1989.

10. T. F. Burns and H. Flashner, "Adaptive Control Applied to Momentum Unloading Utilizing the Low Earth Orbital Environment", *Proceedings of AIAA Guidance, Navigation and Control Conference*, Boston, MA, August 14-16, 1989.

11. H. Flashner and J. M. Skowronski, "Adaptive Model Tracking Under Uncertainty By Hamiltonian Systems", *Second Workshop on Control Mechanics*, University of Southern California, January, 1989.

12. H. Flashner and J. M. Skowronski, "Adaptive Control Hamiltonian Systems," *Symposium on Theory and Practice of Robots and Manipulators*, Cracow, Poland, July 2 - 6, 1990.

13. H. Flashner, "Large Angle Maneuver of Flexible Systems by Control Space Parametrization", *Proceedings of the 26th Israel Conference on Mechanical Engineering*, May 18-19, 1992.

14. S. W. Thurman and H. Flashner, "Application of Nonlinear Control Techniques to Spacecraft Guidance for Rendezvous and Docking", *AAS/AIAA Spaceflight Mechanics Meeting*, Cocoa Beach, Florida, February 14-16, 1994. ( Appeared in *Advances in the Astronautical Sciences*, Vol. 87, Part II, Univelt, Inc., San Diego, 1994, pp. 813-828) .

15. F. C. Lee and H. Flashner, "Robust Control of Distributed Parameter Systems," Sixth Annual Rockwell International Control/Signal Processing Conference, Anaheim, CA, March 1-2, 1994.

16. F. C. Lee, H. Flashner, and J. K. Cheng, "Space Station Solar Array Beta Gimbal Noncollocated Control Study," *13th International Federation Automatic Control Symposium, Automatic Control in Aerospace*, Palo Alto, CA, September 12-16, 1994.

17. A. Ben-Tal, P. Bar-Yoseph, and H. Flashner, "Optimal Maneuver of a Flexible Arm by Space-Time Finite-Element Method," European Structural Dynamics Conference, Genoa, Italy, September 20-25, 1994.

18. F. C. Lee, H. Flashner, and M. G. Safonov, "Dynamic Positivity Embedding for Noncollocated and Nonsquare Flexible Systems," *American Control Conference*, Baltimore, Maryland, June 29-July 1, 1994.

19. R. S. Guttalu and H. Flashner, "Numerical Study of the Dynamics of A Pendulum Subjected to Parametric Excitation," ASME International Congress and Exposition, Chicago, November 6-11, 1994.

20. F. C. Lee and H. Flashner, "Positivity Control of Discrete-Time Flexible Systems Using Dynamic Embedding," ASME International Congress and Exposition, Chicago, November 6-11, 1994.



21. F. C. Lee, H. Flashner, and M. G. Safonov, "An LMI Approach to Positivity Embedding," *American Control Conference*, Seattle, Washington, June 21-June 23, 1995.
22. F. C. Lee, H. Flashner, and M. G. Safonov, "Positivity-Based Control Synthesis Using Alternating LMI's," *American Control Conference*, Seattle, Washington, June 21-June 23, 1995.
23. S. W. Thurman and H. Flashner, "A Conceptual Automatic Landing System for Spacecraft Using Pulse-Modulated Propulsion," *AAS/AIAA Astrodynamics Specialist Conference*, Halifax, Nova, Scotia, Canada, August 14-17, 1995.
24. R. S. Guttalu and H. Flashner, "An Analytical Study of Stability of Periodic Systems By Poincaré Mappings," Fifteenth Biennial Conference on Mechanical Vibration and Noise, Boston, MA, September 17-21, 1995.
25. R. S. Guttalu and H. Flashner, "A Study of Bifurcations in Periodic Systems," Fifteenth Biennial Conference on Mechanical Vibration and Noise, Boston, MA, September 17-21, 1995.
26. H. Flashner and R. S. Guttalu, "Point Mapping Analysis of Periodic Systems with Applications to Aeroelastic Stability", *2nd European Nonlinear Oscillations, Conference*, Prague, The Czech Republic, September 9-13, 1996.
27. R. S. Guttalu and H. Flashner, "An Analytical Point Mapping Study of Rotorcraft Systems", *Applied Mechanics in the Americas, Proceedings of the V Pan American Congress of Applied Mechanics (PACAM)*, San Juan, Puerto Rico, Jan 1-5, 1997.
28. R. S. Guttalu and H. Flashner, "Point Mapping-Based Analysis of Nonlinear Systems Using Symbolic Algebra, *3rd International IMACS Conference on Applications of Computer Algebra*, Maui, Hawaii, July 2-4, 1997.
29. R. S. Guttalu and H. Flashner, "A Comparison of Analytical Methods for Studying A Single-DOF Nonlinear System", Symposium on Time-Varying Systems, *16th ASME Biennial Conference on Mechanical Vibrations and Noise*, September 14-17, 1997, Sacramento, California.
30. H. Flashner and T. Efrati, "Neural Network Based Tracking Control of Mechanical Systems", *Proceedings of the 1997 Conference on Decision and Control, December 10-12, 1997, San Diego, California*.
31. Y. Wang and H. Flashner, "On Sliding Mode Control of Uncertain Mechanical Systems", 1998 IEEE Aerospace Conference, Snowmass, Colorado, March 21, 1998.
32. G. Li and H. Flashner, "Linear Digital Design and Stability Analysis for Time Delay Systems Without Linear Approximation", 1998 IEEE Aerospace Conference, Snowmass, Colorado, March 21, 1998.
33. S. Kohn-Rich and H. Flashner, "Stable Fuzzy Control of Mechanical Systems", 1998 IEEE World Congress On Computational Intelligence, Fairbanks, Alaska, May 1998.
34. Requejo P.S., McNitt-Gray J.L., Flashner H., "Modeling Multijoint Control in Landing". In Proceedings of the 23rd Annual Meeting of the American Society of Biomechanics, University of Pittsburgh, Pittsburgh, Pennsylvania, 1999.
35. Requejo P.S., McNitt-Gray J.L., Hester D.M.E., & Flashner H., "Modification in Joint Control in Anticipation of Contact" In Proceedings of the XVIIth Congress of the International Society of Biomechanics, 914. University of Calgary, Calgary, Canada, 1999.
36. Requejo P.S., McNitt-Gray J.L., Hester, D.M.E., & Flashner, H. "Validation of A Model to Simulate Joint Control Prior to Landing". In Proceedings of the First Annual Southern California Conference on Biomechanics, 7. California State Polytechnic University at Pomona, Pomona, California, 1999.

37. McNitt-Gray, J.L., Hester, D.M.E., & Flashner, H., "Subject specific muscle activation patterns of one and two joint muscles during landing". Proc. of the XVIIth Congress of the International Society of Biomechanics, 1999.
38. Requejo, P.S., McNitt-Gray J.L., Flashner H. , "Modeling multijoint control during landing", *Proc. of 23rd Annual Meeting of the American Society of Biomechanics*, 76-77, 1999.
39. McNitt-Gray, J.L., Hester, D.M.E., & Flashner, H. "Subject specific muscle activation patterns of one and two joint muscles during landing", *Proceedings. of the XVIIth Congress of the International Society of Biomechanics*, 1999.
40. Requejo, P.\*, McNitt-Gray, J.L., Hester, D.M.E., & Flashner, H., " Modification in joint control in anticipation of contact", Proceedings of the XVIIIth Congress of the International Society of Biomechanics, 914.
41. Requejo P.S., McNitt-Gray J.L, Hester, D.M.E., Flashner, H. . "Validation of a model to simulate joint control prior to landing", *Proc. of First Annual Southern California Conference on Biomechanics*, 11, 1999.
42. M. Choi and H.Flashner, " Neural Network-Based Spacecraft Attitude Control and Momentum Management ", *AIAA Guidance, Navigation and Control Conference*, Denver, Co, 14-19, August, 2000.
43. M. Choi and H.Flashner, " Neural Network-Based Spacecraft Attitude Control", *AIAA Guidance, Navigation and Control Conference*, Denver, Co, 14-19, August, 2000.
44. Requejo P.S., McNitt-Gray J.L, & Flashner, H. , "Modeling and simulation of multijoint control in preparation for impact", *Proceedings of the Second Annual Southern California Conference on Biomechanics*, 21, 2000.
45. Requejo P.S., McNitt-Gray J.L., Flashner H. ,"Determination of model complexity in simulation of flight phase dynamics and joint control prior to landing", *XVIIIth Congress of the International Society of Biomechanics*, Zurich, Switzerland, 2001
46. McNitt-Gray, J.L, Requejo, P.S. and Flashner, H. Conflict between momentum and balance control during landing. Proc. of the IVth World Congress on Biomechanics. Calgary, Alberta, Canada (2002)
47. Requejo P.S., McNitt-Gray J.L., & Flashner, H. Flight phase joint control required for successful gymnastics landings, Proc. of the 6th IOC Congress on Sports Science, (2002).
48. McNitt-Gray, J.L. Mathiyakom, W. & H. Flashner, Multijoint control strategies transfer between tasks. American Society of Biomechanics, Toledo, OH, July 2003.
49. McNitt-Gray, J.L., Requejo, P.S, & Flashner, H. . Momentum control during landings performed in Olympic competition, USA Gymnastics Sports Science Symposium, Anaheim, CA, August 2003.
50. McNitt-Gray, J.L. Mathiyakom, W. & H. Flashner . Multijoint control strategies used to generate impulse during goal directed movements, International Society of Biomechanics, Dunedin, New Zealand, April 2003
51. Held, L., McNitt-Gray, J.L., & Flashner, H. (2004). Characterizing kinematics of 3-D movments using quaternions, American Society of Biomechanics, Portland, OR.
52. Costa, K. \* & McNitt-Gray, J.L. (2004). Horizontal impulse generation characteristics during the sprint start are influenced by shank control, American Society of Biomechanics, Portland, OR, 2004
53. McNitt-Gray, J.L., Requejo, P.S., Flashner, H., & Held, L. . Modeling the influence of flight phase control on the center of mass trajectory and reaction forces during landing, American Society of

Biomechanics, Portland, OR, 2004.

54. Held, L\*, McNitt-Gray, J.L., and Flashner, H. Parameterization of joint kinematics using quaternions, International Society of Biomechanics, Cleveland, OH, August 2005

55. McNitt-Gray, J.L., Mathiyakom, W., Requejo, P.S., Flashner, H. . Regulation of reaction force direction and angular impulse during jumping tasks via redistribution of knee and hip net joint moments, International Society of Biomechanics, Cleveland, OH, August 2005.

56. Munaretto, J.M.\*, \*McNitt-Gray, J.L\*., and Flashner, H., Modeling control and dynamics in activities involving impact. American Society of Biomechanics, Blacksburg, VA, September, 2006

57. Held, L., McNitt-Gray, J.L., and Flashner, H. . Parameterization of joint kinematics using quaternions, American Society of Biomechanics, Blacksburg, VA, September, 2006

58. S. Kalender and H. Flashner, A New Approach for Control of Periodically Time Varying Systems with Application to Spacecraft Momentum Unloading, AIAA-2006-6355

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60. S. Kalender and H. Flashner, Discrete-Time Robust Control of Linear Periodically Time-Varying Systems , Las Vegas, NV, ASME 6th International Conference on Multibody Systems, Nonlinear Dynamics, and Control (MSNDC), September. 4-7, 2007

61. McNitt-Gray, J.L. , Held, L., Requejo, P.S., Munaretto, J.M., Flashner, H. . Control of reaction forces and system behavior during landing. International Society of Biomechanics, Taipei, Taiwan, (2007).

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65. J. Lee, H. Flashner, and McNitt-Gray An Approach Experimentally Based Modeling and Simulation, Proceedings of 2008 ASME International Mechanical Engineering Congress and Exposition, November 2-6, 2008, Boston, Massachusetts.

66. B. Yang and H. Flashner, On Torque-Vibration Coupling in Nonlinear Feedback Control of Flexible Rotating Systems, Proceedings of 2008 ASME International Mechanical Engineering Congress and Exposition, November 2-6, 2008, Boston, Massachusetts.

67. M. C. Hwang H. Flashner, A Computational for Solving Linear Optimal Control Problems The Point-to-Point Control with Fixed Terminal States, IEEE 9th International Conference on Computer Information and Technology, Xiamen, China, Oct. 11-14, 2009.

68. M. Borre and H. Flashner, Computation of Periodic Solutions and Their Regions of Attraction for Flexible Structures Under Nonlinear Feedback Control, Thirteenth Conference On Nonlinear Vibrations, Dynamics, and Multibody Dynamics, Virginia Polytechnic Institute and State University, Blacksburg, VA, May 23-27, 2010

69. M. Borre and H. Flashner, Periodic Solutions and Their Regions of Attraction for Flexible Structures

Under Relay Feedback Control with Nonlinear Control Law, 2010 ASME Dynamic Systems and Control Conference, Boston, Massachusetts, Sept. 12-15, 2010.

70. M. Borre and H. Flashner, Periodic Solutions and Their Regions of Attraction for Flexible Structures Under Relay Feedback with Nonlinear Feedback (PC)Control, Proceedings of the ASME Design Engineering Conferences, IDETC/CIE 2011, August 29-31, 2011, Washington, DC.

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73. B. Jung, H. Flashner and J. McNitt-Gray, Modeling and Control Design for Wheeled Mobile Platform, Proceedings of the ASME 2013 International Mechanical Engineering Congress and Exposition, San Diego, CA, Nov. 15-Nov. 21, 2013.

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75. D. Koh and H. Flashner, Global Analysis of a Gravity Gradient Satellite, Proceedings of the 8th European Nonlinear Dynamics Conference, Vienna, Austria, July 6 - July 11, 2014

76. D. Koh and H. Flashner, Attitude Dynamics of Spinning Satellites in an Elliptical Orbit", Proceedings of the 25th AAS/AIAA Astrodynamics Specialist Conference, August 9-13, 2015, Vail, CO.

77. Wagner, E.V, Flashner, H, & McNitt-Gray, J.L. (2017). Lower Extremity Feedback Control in Multiphase Landings with Impact, 16th International Symposium on Computer Simulation in Biomechanics, Gold Coast, AUS, [http://isbweb.org/~tgcs/iscsb-2017/tgcs2017\\_book\\_of\\_abstracts.pdf](http://isbweb.org/~tgcs/iscsb-2017/tgcs2017_book_of_abstracts.pdf)

78. Wagner, E.V, Flashner, H, & McNitt-Gray, J.L. (2017). Multijoint Impedance Control of Impulse during Impact Phase of Foot-first Landings, 26th Congress of the International Society of Biomechanics, Brisbane, AUS

### **Papers Presented in Conferences (no proceedings)**

1. A. Beuter, H. Flashner, and A. Arabyan, "Phase Plane Modelling of a Stepping Motion," *North American Society for the Psychology of Sport and Physical Activity*, Tucson, AZ, May 1985.

2. A. Beuter, H. Flashner, and A. Arabyan, "Phase Plane Analysis of Stepping, *Neuroscience Conference*, Washington, D. C., November 1985.

3. H. Flashner, "Control of Mechanical Systems Using the Passivity Approach," *20th Israel Conference of Mechanical Engineering*, Tel-Aviv, Israel, June 23-24, 1986.

4. H. Flashner, "Modelling of a Flexible Robot Manipulator", *21st Israel Conference of Mechanical Engineering*, Haifa, Israel, June 21-23, 1987 .

5. A. Beuter, H. Flashner, and A. Arabyan, "Kinematics in Control of Stepping," *Neuroscience Conference*, New Orleans, LA, November 23-26, 1987.

6. F. E. Udvardia and H. Flashner, "Trade-offs Between Identification and Control for Large Structures", *Model Determination for Large Space Structures Workshop*, California Institute of Technology, Pasadena, CA, March 22-24, 1988.

7. H. Flashner and R. S. Guttalu, "A Study of Domains of Attraction for Nonlinear Systems," *Applied Mechanics and Engineering Sciences Conference*, University of California, Berkeley, CA, June 20-22, 1988.
8. H. Flashner and J. M. Skowronski, "Adaptive Model Tracking Under Uncertainty By Hamiltonian Systems", *AIAA Guidance, Navigation and Control Conference*, Minneapolis, MN, August 15-17, 1988.
9. K. Shamsa and H. Flashner, "Stabilizing Discrete Control Laws for Hamiltonian Systems", *Second Workshop on Control Mechanics*, University of Southern California, Los Angeles, CA, January 25-27, 1989.
10. H. Flashner and Francis Lee, "Positivity Embedding for Noncolocated and Nonsquare Flexible Systems," *Sixth Workshop on Dynamics and Control*, Technical University of Vienna, July 5-7, 1993.
11. H. Flashner and R. S. Guttalu, "Global Analysis of a Pendulum with Moving Support," *Sixth Workshop on Dynamics and Control*, Technical University of Vienna, July 5-7, 1993.
12. H. Flashner and R. S. Guttalu, "Analysis of Parametrically Excited Systems By Truncated Point Mappings," *Seventh Workshop on Dynamics and Control*, Ulm, Germany, July 17-20, 1994.
13. S. W. Thurman and H. Flashner, "Spacecraft Guidance for Rendezvous and Docking Using Lyapunov Theory," *Seventh Workshop on Dynamics and Control*, Ulm, Germany, July 17-20, 1994.
14. S. W. Thurman and H. Flashner, "Robust Attitude Control and Guidance of Spacecraft", *The George Leitmann 70th Birthday Symposium*, University of California at Berkeley, June 16, 1995.
15. H. Flashner and Francis Lee, "Robust Control of Flexible Systems Using A Positivity-Based Approach," *Eighth Workshop on Dynamics and Control*, Sopron, Hungary, July 16-20, 1995.
16. H. Flashner and R. S. Guttalu, "Discrete-Time Stability Analysis of Rotorcraft", *Sixth International Workshop on Dynamics and Aeroelastic Stability of Rotorcraft Systems*, University of California at Los Angeles, November 8-10, 1995.
17. H. Flashner and T. Efrati, "Tracking Control of Mechanical Systems Using Neural Networks", *Ninth Workshop on Dynamics and Control*, Rio de Janeiro, Brazil, August 10-13, 1996.
18. S. Kohn-Rich and H. Flashner, "Stable Fuzzy Logic Design of Point to Point Control for Mechanical Systems", *Tenth Workshop on Dynamics and Control*, Lambrecht, Germany, August 16-19, 1998.
19. Henryk Flashner and Michael C. Golat, "Bifurcation Analysis of Nonlinear Periodic Systems Using Expanded Point Mapping", *12th Workshop on Dynamics and Control*, Los Angeles, August 19-21, 2002.
20. Held, L., McNitt-Gray, J.L., and Flashner, H. Center of pressure trajectories during landings with a secondary horizontal redirection task, *International Foot and Ankle Biomechanics*, Seattle, WA, June 2010.
21. J. Lee, Flashner, H. and McNitt-Gray, J.L. . Estimation of 3D human body kinematics using marker tracking, *International Society of Biomechanics-3D Group*, San Francisco, CA, July 2010
22. Munaretto, J., McNitt-Gray, J.L., Flashner, H. and Requejo, P.S. Effect of reaction force direction and elbow position on mechanical load distribution in wheelchair propulsion, *International Society of Biomechanics-3D Group*, San Francisco, CA, July 2010
23. McNitt-Gray, J.L., Requejo, P.S. and Flashner, H. (2010). Regulation of angular impulse during golf swings with different clubs, *American Society of Biomechanics*, Providence, RI, August 2010..
24. Held, L., McNitt-Gray, J.L., and Flashner, H. , Whole body biomechanical modifications during landings with a secondary horizontal momentum redirection task, *American Society of Biomechanics*, Providence, RI, August 2010.
25. Munaretto, J.M., McNitt-Gray, J. L., Flashner, H., & Requejo, R.S. (2009). Effect of force redirec-

tion on upper limb net joint moments during wheelchair propulsion, American Society of Biomechanics, State College, PA.

26. Munaretto, J., McNitt-Gray, J.L., Requejo, P.S., and Flashner, H. , Reconfiguration of the upper extremity in relation to the pushrim affects load distribution in manual wheelchair propulsion, American Society of Biomechanics, Long Beach, CA, August 2011.

27. Held, L., Mathiyakom, W. Flashner, H. & McNitt-Gray, J.L., Frontal plane knee kinematics in land-and-go tasks with whole body rotation requirements. American Society of Biomechanics, Long Beach, CA, August 2011.

28. McNitt-Gray, J.L., Zaferiou, A., Munaretto, J., Requejo, P.S., and Flashner, H. Neuromuscular regulation of reaction forces during the golf swing, American Society of Biomechanics, Long Beach, CA, August 2011.

29. Peterson, T.J.\*, Requejo, P.S., Flashner, H., McNitt-Gray, J.L., (2013). Neuromuscular control of shot distance using the driver, 37th Annual Meeting of the American Society of Biomechanics, Omaha, NE.

30. Peterson, T.J.\*, Requejo, P.S., Flashner, H., McNitt-Gray, J.L. (2013). Modification in neuromuscular control of golf swings with different clubs, 24th Congress of the International Society of Biomechanics, August 2013, Natal, Brazil.

31. Muller-Karger, C., Wagner, E.V., Maneeakomkunwong, S., Brown, K., Flashner, H., Russell, I.M.\*, Requejo, P.S., & McNitt-Gray, J.L. (2013). Representation of shoulder kinematics during multiplane tasks performed by manual wheelchair users, 24th Congress of the International Society of Biomechanics, August 2013, Natal, Brazil.

32. McNitt-Gray, J.L., Requejo, P.S., Ramos, C., Munaretto, J., Flashner, H., “Are all landings alike?” Sports Medicine Australia Conference, Canberra, Australia, October 2014

33. McNitt-Gray, J.L., Russell, I.M, Munaretto, J., Flashner, H, Requejo, P.S., Invited Symposium Speaker, “Factors contributing to mechanical demand imposed on the upper extremity during manual wheelchair propulsion,” Sports Medicine Australia Conference, Canberra, Australia, October, 2014

34. McNitt-Gray, J.L., Mathiyakom, W., Requejo, P.S., Munaretto, J., Flashner, H., “Improving the biomechanics of aerial skills performed by Olympic athletes,” 3rd Annual Tsukuba Global Science Week Conference, Health and Sport Science Session, University of Tsukuba, Tsukuba, Japan, September, 2014

35. McNitt-Gray, J.L., Mathiyakom, W., Requejo, P.S., Munaretto, J., Ramos, C., Flashner, H., “How does sport science and technology enhance athlete performance?” International Sports Science Conference, Performance Enhancement and Technology Session, University of Oregon, Eugene, Oregon, July, 2014

36. Improving Sport Performance using Biomechanics, Invited Symposium Coordinator and Speaker, McNitt-Gray, J.L., Mathiyakom, W., Requejo, P.S., Munaretto, J., Ramos, C., Flashner, H. Improving Performance: Identifying control strategies involved in regulating linear and angular momentum,” World Congress of Biomechanics, Boston, MA, July, 2014

37. Wagner, E.V, Brown, K., Muller-Karger, C, Flashner, H, & McNitt-Gray, J.L. (2014). Motion of the shoulder and upper extremities characterized by dual-quaternion and helical axis for calculation of angular velocity joint axis, World Congress of Biomechanics, Boston, MA.

38. McNitt-Gray, J.L., Mathiyakom, W., Requejo, P.S., Munaretto, J., Ramos, C., & Flashner, H. (2014). Improving performance by identifying control strategies involved in regulation of linear and angular

momentum in goal-directed tasks, World Congress of Biomechanics, Boston, MA.

39. Brown, K., Flashner, H., McNitt-Gray, J.L., & Requejo, P.S. (2014) Simulating vibrations experienced by wheelchair users using experimental-based modeling, World Congress of Biomechanics, Boston, MA.

40. Peterson, T.P., Requejo, P.S., Flashner, H., and McNitt-Gray, J.L. (2015). Detecting control priorities when regulating angular impulse and balance in well-practiced goal- directed activities. International Society of Biomechanics, Glasgow, Scotland.

41. Wagner, E.V., Flashner, H., Eliasson, V., and McNitt-Gray J.L. (2015). Modeling multijoint control for regulation of reaction forces during impact phase of landings, Glasgow, Scotland.

42. Peterson, T.J. & McNitt-Gray, J.L. (2016). Modulation of horizontal reaction forces when increasing golf shot distance within the driver, 40th Annual Meeting of the American Society of Biomechanics, Raleigh, NC.

43. Peterson, T.J., Requejo, P.S., Flashner, H., Wilcox, R.R., McNitt-Gray, J.L. (2016). Regulation of Angular Impulse to Control Golf Shot Distance Between the 9-Iron and Driver. World Scientific Congress of Golf VII, St. Andrews, Scotland.

44. Wagner E.V., Russell I.M., Muller-Karger C., Requejo P.S., Rodgers M.M., Flashner H., & McNitt-Gray J.L. (2016). An Approach for Characterizing Multiplanar Upper Extremity Motion Through Parsed Angular Velocity Vector Components, 40th Annual Meeting of the American Society of Biomechanics, Raleigh, NC.

### Technical Research Reports

1. R. Gluck and H. Flashner, "The Self Compensating Flexure Pivot," *TME 230, Technion-Israel Institute of Technology*, September 1974.

2. H. Flashner and J. Dayan, "A Method for Model Reference Adaptive Control Systems Design," *TME 232, Technion-Israel Institute of Technology*, October 1974.

3. H. Flashner and J. Dayan, "An Approach to Model-Reference Adaptive Control Systems Using Lyapunov's Second Method," *TME 243, Technion Israel Institute of Technology*, December 1974.

4. H. Flashner, "Design Study of a Pointing Control System for the Power Extension Package (PEP) of the Shuttle Orbiter", *TRW Internal Research and Development Report*, IRAD/80. 5-10, April 1980.

5. H. Flashner, "A Procedure to Combine Modal Data of Two Flexible Bodies", *TRW Internal Research and Development Report*, IRAD/80. 5-018, July 1980.

6. H. Flashner, "An Algorithm to Compute a Linear Dynamic Representation of Interconnected Flexible and Rigid Bodies," *TRW Internal Research and Development Report*, IRAD 81.5-014, October 19 81.

7. H. Flashner, "A Method for Finding Mass Properties of a Flexible Body from Modal Data," *TRW Internal Research and Development Report*, IRAD/82. 5-018, February 1982.

8. H. Flashner, "Dynamic Representation of Linearly Constrained Dynamic Systems and Its Application to Modal Synthesis," *TRW Internal Research and Development Report*, IRAD/82. 5-018, February 1982.

9. H. Flashner, "A Computer Model of the Digital Autopilot of the Shuttle", *TRW Internal Research and Development Report*, IRAD/ 82. 5-024, August 1982.

10. H. Flashner, "Fast TDRSS Control Simulation," *TRW Report TDRSS-83-411-047T*, June 1983.

11. H. Flashner, "Program MASS for Computation of Mass Properties of Flexible Bodies", *TRW Internal*

*Research and Development Report*, IRAD/83.1-001, August 1983.

12. H. Flashner, "Modal Synthesis Program KOMBINE," TRW Internal Research and Development Report, IRAD/83, 1-005, October 1983.

13. H. Flashner, "Non collocated Control of Large Space Structures, *TRW Internal Research and Development Report*, IRAD/83, 1-006, November 1983.

14. H. Flashner, "Large Angle Maneuver of Flexible Systems Using Control Space Parametrization," Report to TRW Space Technology Group, January 1992.

15. H. Flashner, "Linear Dynamic Analysis of *Pathfinder*", Report to Jet Propulsion Laboratory, December 1995.

16. H. Flashner, "Mars Surveyor 98 Simulation Model and EDL Verification", Report to Jet Propulsion Laboratory, June 1998.

### Seminars

1. "Linearization Approach to Model Reference Adaptive Control", Technion-Israel Institute of Technology, Haifa, Israel, 20 June 1974.

2. "A Point Mapping Study of Mechanical Systems", University of California, Berkeley, April, 1979.

3. "Point Mapping Approach to Dynamical System Analysis", University of Southern California, Los Angeles, CA, 10 February, 1983.

4. "Positivity Approach to Control of Large Space Structures", Technion-Israel Institute of Technology, Haifa, Israel, 2 January 1984.

5. "Modal Synthesis Using Orthogonal Decompositions", Technion-Israel Institute of Technology, Haifa, Israel, 5 January 1985.

6. "Passivity Approach to Control of Mechanical Systems", University of California, Santa, Barbara, 7 March 1986.

7. "Input-Output Control of Mechanical Systems", Stanford University, Palo Alto, CA, 24 April 1986.

8. Modelling of Human Motion", Université de Quebec à Montreal, Montreal, Canada, 12 June, 1987.

9. "Analytical Methods in Robotics", A series of seminars for *Petrobras Brasil*, Rio de Janeiro, January 29-February 9, 1990.

10. "Modelling and Control of Flexible Systems", Technion-Israel Institute of Technology, Haifa, Israel, October 23, 1991.

11. "Modelling and Control of Flexible Systems", RAFAEI, Haifa, Israel, January 5, 1992.

12. "Large Angle Maneuver of Flexible Systems", Technion-Israel Institute of Technology, Haifa, Israel, January 22, 1992.

13. "Methods of Momentum Unloading for Spacecraft", Technion-Israel Institute of Technology, Haifa, Israel, May 21, 1992.

14. "Control of Flexible Structure by Positivity Embedding", Technion-Israel Institute of Technology, Haifa, Israel, January 27, 1993.

15. "Positivity Embedding For Noncollocated Flexible Systems", Department of Mechanical and Aerospace Engineering, University of California, Irvine, May 13, 1994.

16. "Point Mapping Analysis of Dynamical Systems", Technion-Israel Institute of Technology, Haifa, Israel, January 8, 1996.

17. "Guidance and Control of Spacecraft with Application to Mars Mission", Technical University of



Denamark, September 12, 1996, Lyngby, Denmark.

18. "Attitude Control and Guidance of Spacecraft with Application to Mars Mission, Technical University of Denmark, Technion-Israel Institute of Technology, Haifa, Israel, January 1, 1997.

19. "Neural Network Based Tracking Control of Mechanical Systems", University of California, San Diego, January 16, 1997.

20. "Attitude Control and Guidance of Spacecraft with Application to Mars Mission", Technical, University of British Columbia, Vancouver, Canada, February 24, 1997.

21. "Neural Network Based Tracking Control of Multi-Degree of Freedom Mechanical Systems", RAFAEL, Haifa, Israel, July 10, 1997.

22. "Modeling and Control of Mechanical Systems", Workshop given in RAFAEL, Haifa, Israel, September-October, 1998

23. "Dynamic and Control Modeling for Mars Landing", RAFAEL, Haifa, Israel, December 7, 1998.

24. "Structural Modeling for Mars Landing", Department of Materials and Structures, University of Tel-Aviv, February 22, 1999.

25. "Spacecraft Control Modeling for Mars Landing", Technion-Israel Institute of Technology, Haifa, Israel, March 15, 1999

26. "Robust Tracking Control of Mechanical Systems", Robotics and Control Colloquium, University of Washington, Seattle, February 21, 2000

27. "Discrete-Time Control of Periodic Systems", Technion-Israel Institute of Technology, Haifa, Israel, May 8, 2007

28. "Modeling of Dynamics and Control of Whole Body Human Motion", Technion-Israel Institute of Technology, Haifa, Israel, March 9, 2009

29. "Dynamics and Control of Spacecraft Entry Descent and Landing for Mars Missions", Auburn University, AL, September 24, 2010.

30. (SE) "Experimentally Basen Modeling of Human Movement", Technion-Israel Institute of Technology, Haifa, Israel, June 29, 2015

### **Edited Works**

1. J. M. Skowronski, and H. Flashner (GUEST EDITORS) . *First Workshop on Dynamics and Control in ASME Journal of Dynamic Systems Measurement and Control, Vol 111, No. 4, Dec. 1989.*

2. J. M. Skowronski, H. Flashner, and R. S. Guttalu (EDITORS), *Advances in Control and Dynamic Systems*, Vols. 34 and 35, Parts 1 and 2, *Proceedings of the Second Workshop on Control Mechanics*, University of Southern California, January 25-27, 1989, Academic Press, New York.

3. J. M. Skowronski, H. Flashner, and R. S. Guttalu (EDITORS), *Mechanics and Control, Proceedings of the Third Workshop on Control Mechanics, Lecture Notes in Control and Information Sciences, Vol. 151, Springer-Verlag, Berlin, 1991.*

4. J. M. Skowronski, H. Flashner, and R. S. Guttalu (Editors), *Mechanics and Control, Proceedings of the Fourth Workshop on Control Mechanics, Lecture Notes in Control and Information Sciences, Vol. 170, Springer-Verlag, Berlin, 1992.*

### **Research Grants**

1. A Novel Approach to Modeling and Control of Spinning Space Structures, H. Flashner PI, B. Yang Co-PI, JPL Strategic University Research Partnership, \$67,000 (pending)

2. "Development of a Robotic Platform for Teaching Model-Based Design Techniques in Dynamics and Control Program", Co-PI with Bingen Yang (PI); MathWorks July 1, 2010 to August 31, 2011, \$66,000
3. Modeling and Closed Loop Control Flexible Rotating Systems Operating at Variable Speeds, H. Flashner PI, B. Yang Co-PI,, NSF, June 1, 2011 to May 31, 2014, \$383,662 (pending)
4. Computation of loads on the musculoskeletal system of humans and animals using three dimensional modeling, Zumberge Interdisciplinary Fund, December 2006-January 2008, \$10,000.
5. "Thrust Area 1: Human Movement Representation" with Jill McNitt-Grey, Intel Corporation Equipment Grant, \$500,000 for years 1997- 2000. Funding for September 1997- June 1998 \$ 295,548.
6. "A Methodology for the Analysis of Rotating Machinery," with R. S. Guttalu, NSF Grant CMS-9700467, June 1, 1997-May 31, 1999, \$151,244
7. USC Zumberge Research and Innovation Fund, 2000-2001, Co-Investigator, Human movement representation using subject specific models, with J.L. McNitt-Gray, Kinesiology and Biomedical Engineering, C. Powers, Biokinesiology and Physical Therapy, R. Flick, Fine Arts, Award: \$49,847.
8. USC Zumberge Research and Innovation Fund, 1998-99, Co-Principal Investigator, Human Movement: An Interdisciplinary Approach, with J.L. McNitt-Gray USC, Award: \$8,000.
9. USC Zumberge Research and Innovation Fund, Interdisciplinary Award, 1997-8, Co-Principal Investigator with J.L. McNitt-Gray, Department of Kinesiology and Biomedical Engineering, Modeling musculoskeletal injury mechanisms during activities involving impact, Award: \$9860
10. "Modeling of musculoskeletal injury mechanisms during activities involving impact" with J. McNitt-Gray, Interdisciplinary Seed Grant, James H. Zumberge Fund, \$9,866, July 1, 1997-June 30, 1998.
11. "Sixth Workshop of Dynamics and Control", with F. E. Udawadia, NSF Grant 53-4519-1284, July 93-June 94, \$14,250.
12. "Development of Maneuver Strategy for Flexible Spacecraft", TRW Space Technology Group, \$10,000, May 1989 - December 1989.
13. Powell Foundation Equipment Grant, \$4,700, 1989.
14. "Development of Flexible Manipulator Systems", TRW Space Technology Group, \$5,000, June 1988 - August 1988.
15. Powell Foundation Equipment Grant, \$18,000, 1988.
16. "Equipment Grant for Laboratory Robot Development", TRW Space Technology Group, \$5,000, 1987.
17. "Joint Optics Structures Experiment" (JOSE), with M. G. Safonov, TRW Space Technology Group, \$93,316, 1986-1987.
18. "Control Design for Automated Mechanical Systems", NSF Grant MSM 8505331, \$60,000, 1985-1987.
19. "Development of Laboratory for Modeling and Control", with P. Ioannou, and G. Shiflett, 1984 Faculty Collaborative and Innovation Fund, \$20, 847.
20. "Research in Dynamical Systems", with R. S. Guttalu, 1984 Faculty Collaborative and Innovation Fund, \$35,000.
21. "Acquisition of Hardware and Software Tools for Robot Development", 1983-84 Faculty Research and Innovation Fund, \$18,000.

## Teaching Activities

### Ph. D. Students

1. K. Shamsa: "Control of Mechanical Systems Using Energy Concepts", completed June 1988.
2. T. F. Burns: "Spacecraft Momentum Unloading Using Earth Environment", completed August 1988.
3. V. A. Spector: "Modeling of Flexible Systems for Control System Development", completed in December 1988.
4. Y. Wang: "Sliding Mode Control of Hamiltonian Systems", completed January 1993.
5. G. Li: "Estimation and Control of Discrete Time Delay Systems", completed October 1993.
6. F. C. Lee: "Positivity Based Robust Control of Flexible Systems", completed December 1994.
7. S. Thurman: "Robust Control Laws for Guidance and Attitude Control of Spacecraft", completed August 1995.
8. M. C. Hwang: "Piecewise Control of Flexible Systems" completed May 1996.
9. T. Efrati: "Neural Network Control of Mechanical Systems", completed September 1997
10. M. Golat: "Analysis of Dynamical Systems Using Interpolated Cell Mapping" completed 2003 .
11. M. Choi: "Momentum Unloading of Spacecraft", completed April 2000.
12. S. Kohn-Rich, "Fuzzy Control of Mechanical Systems", completed April 2000.
13. S. Kalender, "Discrete-Time Control of Periodic Systems", April 2007.
14. J. Lee, "Three dimensional modeling and control of multi-body systems", Completed September, 2009.
15. M. Borre, "Discontinuous Control of Flexible Systems", Completed, May 2011.
16. B. Jung, "Autonomous Control of Wheelchairs", completed May 2012
17. S. Reddy, "Guidance and Attitude Control of Flexible Spacecraft", completed May 2012
18. K. Brown, "Vibration Analysis of Wheelchairs, May 2015
19. Y. Lin "Control of Flexible Rotors", completed December 2015
20. D. Koh "Analysis of Periodic Solutions of Satellites in Earth Orbit, May 2016
21. H. Koorehdavoudi, 2017
22. E. Wagner "Using Nonlinear Feedback To Model Human Landing Dynamics", 2018

### Master Thesis Supervised

1. C. S. Boettger: "Modeling of Human Motion by Parameter Optimization Approach", completed September 1987.
2. K. P. Lee: "Internal Combustion Engine Modelling for Control Design", completed May 1996.

### Courses Taught

AME 301: Dynamics (Third year undergraduate)  
 AME 451: Linear Control Systems I (Fourth year undergraduate)  
 AME 521: Engineering Vibrations II (Graduate)  
 AME 541: Linear Control Systems II (Graduate)  
 AME 552: Nonlinear Control Systems (Graduate)  
 AME 548: Analytical Methods in Robotics (Graduate)  
 ME 599: Control of Mechanical and Aerospace Systems (Graduate)  
 ASTE 585: Attitude Control of Spacecraft (Graduate)  
 AME443 Control Systems Laboratory (Undergraduate)

### **Administrative Duties**

School of Engineering Appointment Promotion and Tenure Committee, 1995-1997  
 Multimedia Task Force, 1996-1997  
 Master of Engineering Task Force 1997  
 Engineering Faculty Senate, 1993-95, 1996-Present  
 Undergraduate Student Advisor, 1994-Present  
 Seaver Library Committee, 1986 -1988  
 Responsible for teaching assistants in Mechanical Engineering Department 1984-1985.  
 School of Engineering Scholarship Committee 1989-1993  
 Undergraduate Student Advisor, 1984-1988  
 Graduate Student Advisor, Control Theory and Vibrations, Mechanical Engineering Department 1983-  
 Present.  
 Graduate Study Requirements Advisor for ME Students, 2008-Present  
 Graduate Study Advisor for Dynamics and Control, 2008-Present  
 Provost WISE Advisory Board, 2008-2014  
 Marshall of Viterbi School of Engineering, Commencement Ceremony, May 2010.  
 Explore USC Presentations, April 2011  
 Marshall of Viterbi School of Engineering, Commencement Ceremony, May 2011.  
 Marshall of Viterbi School of Engineering, Graduate Commencement Ceremony, May 2011.  
 Marshall of Viterbi School of Engineering, Commencement Ceremony, May 2012.  
 Marshall of Viterbi School of Engineering, Graduate Commencement Ceremony, May 2012.  
 AME Teaching Committee 2010-Present  
 AME Screening Examination Organizer, 2010-present  
 AME Chair Selection Committee 2016-Present