JEFFREY L. STEIN

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The University of Michigan
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EDUCATION: **Massachusetts Institute of Technology, Cambridge, MA**

Ph.D. Mechanical Engineering, 1983
S.M. Mechanical Engineering, 1976
S.B. Mechanical Engineering, 1976

University of Massachusetts, Amherst, MA

B.S. Premedical Studies with a minor in Psychology, 1973

RESEARCH AND PROFESSIONAL EXPERIENCE:

University of Michigan, Ann Arbor, MI

2023 - Emeritus Professor of Mechanical Engineering
Specializing in systems and controls, mechanical design as applied to automotive and manufacturing engineering.

University of Michigan, Ann Arbor, MI

2012-2022 Professor, Design Science Program
Participating faculty member in the new Ph.D. program in Design Science.

1996-2022 Professor, Dept. of Mechanical Engineering (name changed 7/00).
Specializing in areas of algorithms for deducing or reducing proper dynamic system models to design and control autonomous, resilient and sustainable systems, model parameter and estimation as well as Optimal Design of Experiments. Nonlinear model predictive control. Applications across many domains some of which include; autonomous vehicles, hybrid and electric vehicles, vehicle to grid integration, design for health conscious battery performance, internet-distributed hardware in-the-loop simulation, resilient and sustainable infrastructures, autonomous vehicles for accessibility, machine design and control, machine monitoring, and high speed precision spindles.

1994-2009 Associate Director and Thrust Area Leader of the Automotive Research Center (ARC)
Leader of the ARC's Dynamics and Controls of Vehicle and Mobile Robotics Thrust Area
Research in modeling and simulation of ground vehicles, including hybrid vehicles and batteries.

Stoneridge Control Devices, Inc. - Exhibit 2006 - Page 1
ZF North America, Inc. et al vs. Stroneridge Control Devices, Inc.
IPR2023-00273

1988-1996 **University of Michigan, Ann Arbor, MI**
Associate Professor, Dept. of Mech. Engr. and Applied Mech.
Research and teaching in system dynamics, control, machine diagnostics, machine design and control, computer-assisted modeling and design, vehicle (including hybrids) dynamics and control and control of artificial limbs.

1983-88 **University of Michigan, Ann Arbor, MI**
Assistant Professor, Dept. of Mech. Engr. and Applied Mech.

1991- & 1983-1987 **Independent Consultant, Ann Arbor, MI**
Design analysis of mechanical systems and manufacturing machines. Assessment of validity/invalidity, infringement/noninfringement in patents related to mechanical systems design, particularly vehicle and manufacturing technology.

1988-1991 **Failure Analysis Associates, San Francisco, CA**
Consultant
Design analysis of mechanical systems and manufacturing machines.

SPECIALIZED PROFESSIONAL COMPETENCE:

Automated Modeling of Dynamic Systems; Proper modeling.
Modeling, analysis, design and control of mechanical systems.
Modeling and design of automatic control systems; electromechanical, hydraulic and pneumatic servosystems.
Vehicle Electrification. Design and control of hybrid, Plug-In hybrid and electric vehicles. Batter health conscious charging. Autonomous vehicle control.
Internet-Distributed Hardware in-the-Loop Simulation.
Vehicle (automobiles and trucks) handling, ride, mobility. Vehicle suspension and drivetrain design, modeling, control and simulation including hybrid and autonomous vehicles.
Design and control of machine tool systems; machine tool drive systems and machine tool diagnostics; sensors, signal processing, model based diagnostics techniques; gear backlash dynamics, slide friction characteristics, high speed spindle bearing design, machine guarding.
Biomechanics and modeling of human locomotion. Design and control of prosthetic devices.

AWARDS, HONORS and MEMBERSHIP:

ASME DSCD Henry M Paynter Outstanding Investigator Award, 2020, for "For seminal contributions to the basic engineering science of proper modeling of physical systems with a broad range of applications including rehabilitation, transportation and manufacturing engineering"

Autonomous Transportation Systems Technical Committee 2018 Best Paper award for papers presented at the both 2016 & 2017 ACC "Moving Obstacle Avoidance for Large, High-Speed Autonomous Ground Vehicles"

ASME DSCC 2016 Best Student Paper, Finalist (Ph.D. student Xin Zhou) " Battery State of Health Monitoring by Estimation of the Number of Cyclable Li-Ions"

ASME DSCC 2015 Best Student Paper, Finalist (Ph.D. student Jiechao Liu) "An MPC Algorithm with Combined Speed and Steering Control for Obstacle Avoidance in Autonomous Ground Vehicles"

ASME Energy and Environmental Standards Advisory Board, Chair (7/1/15)

ASME DSCC 2014 Best Student Paper, Finalist (Ph.D. student Xin Zhou) " Battery State of Health Monitoring by Side Reaction Current Density Estimation via Retrospective-Cost Subsystem Identification"

ASME DSCC 2013 Best Student Paper, Finalist (Ph.D. student Xin Zhou) "Battery Health Diagnostics Using Retrospective-Cost System Identification: Sensitivity to Noise and Initialization Errors"

ASME DSCD Michael J. Rabins Leadership Award, 2012. “For distinguished and steadfast leadership within the Dynamics Systems and Control Division, for promoting efficiency and integrity in division governance, and for advancing the reputation of the division nationally and internationally.”

ASME DSCC 2012 Semi-Plenary Talk based on paper “An iterative learning control approach to improving fidelity in internet-distributed hardware-in-the-loop simulation" selected as one of six from a total of 350 conference papers.

Invited Speaker, Congressional Briefing, “The Road to the New Energy Economy: Electric Cars”, March 23, 2011, Rayburn Office Bldg., Washington, DC.

ASME Dedicated Service Award, 2010. For “unusual dedicated voluntary service to the ASME marked by outstanding performance, demonstrated effective leadership, prolonged and committed service, devotion, enthusiasm and faithfulness”.

Invited Plenary Speaker, 2010 International Conference on Bond Graph Modeling, Orlando, FL.

Invited Panelist and Speaker for “Toward Green Mobility: Integrating Electric Drive Vehicles and Smart Grid Technology “ sponsored by the American Association for the Advancement of Science, 2010.

The most downloaded article of the month, *Journal of Dynamic Systems Measurement and Control*, for the manuscript "A Review of Proper Modeling Techniques" (Oct 2008)

Guest Editor of a Special Issue, ASME Transactions: *Journal of Dynamic Systems Measurement and Control* on Physical System Modeling, 2010

ASME DSCC 2009 Best Student Paper, Finalist (Ph.D. student Scott Moura), "Control of Film Growth in Lithium Ion Battery Packs via Switches"

Associate Editor Modeling *Simulation Modeling Practice and Theory,* International Journal of the Federation of European Simulation Societies, 2009-2011

Area Editor of *Simulation*: Transactions of The Society for Modeling and Simulation International, (2007-9).

ASME – Fellow, named by the Board of Governors of ASME, September, 2005

Outstanding Teacher, Department of Mechanical Engineering Teacher Incentive Program, 1999-2000.

Invited manuscript in the Special 50th Anniversary Issue of the *Journal of Dynamic Systems Measurement and Control,* 1993

Named one of the "125 Alumni to Watch" by the University of Massachusetts, Amherst, 1988.

Presidential Young Investigator Award, National Science Foundation, 1987

Research Incentive Award, Exxon Foundation Faculty Assistance Program, 1984

Chair, Executive Committee, Dynamics Systems and Control Division of American Society of Mechanical Engineers (ASME), 2001- 2002

Past Associate Editor of the ASME *Journal of Dynamic Systems Measurement and Control* (1991- 1996)

Member of the National Society of Professional Engineers, ASME, Past Chairman of the Modeling and Identification; Biomechanical Systems; and Manufacturing Systems Technical Panels of the Dynamic Systems and Control Division of ASME, Society of Manufacturing Engineers, Society of Automotive Engineers, American Society of Engineering Educators, The Society for Computer Simulation and honorary societies; Phi Beta Kappa, Pi Tau Sigma, Phi Kappa Phi and Sigma Xi.

PROFESSIONAL:

1990 - 2020 Registered Professional Engineer, #36154, State of Michigan

REFERENCES:

Available upon request

PUBLICATIONS:

Books/Chapters

B1)Loucas, L.S., Rideout, D.G., Ersal T., Stein, J.L. (2011) "Energy-Based Bond Graph Model Reduction" Chapter 2 in Book *Bond Graph Modelling of Engineering Systems*, Springer Science+Business Media, LLC 2011, Ed. Wolfgang Borutzky.

B2)Ge, X., Zheng, Y., Brudnak, M. J., Jayakumar, P., Stein J.L. and Ersal, T. (2017) "Analysis of a Model-free Predictor For Delay Compensation In Networked Systems" in Time-Delay Systems - Theory, Numerics, Applications and Experiments, vol. 7, *Advances in Delays and Dynamics*, T. Insperger, T. Ersal, and G. Orosz, Eds.: Springer.

Archival Journals[1]

J1) Stein, J. L., Hsu, W. L., & Lele, P. P. (1976). Ultrasonic-intensity-insonation-duration thresholds for morphological damage to mammalian CNS in vivo. The Journal of the Acoustical Society of America, 59(S1), S60-S60.

J2) Stein, J. L. and Hedrick, J. K., 1980 "Influence of Fifth Wheel Location on Truck Ride Quality", *Transportation Research Record* 774, pp. 31-39, National Academy of Sciences.

J3) Stein, J. L., Colvin, D ., Clever, G. and Wang, C.-H., 1986 "Evaluation of DC Servo Machine Tool Feed Drives As Force Sensors" *Journal of Dynamic Systems Measurement and Control,* Vol. 108, No. 4., pp. 279-288, Dec. (Also appeared in the 1984 *Proceeding of the Symposium on Sensors and Controls for Automated Manufacturing and Robotics*, ASME Winter Annual Meeting).

J4) Stein, J. L., and Shin K.-C.,1986 "Current Monitoring on Field Controlled DC Spindle Drives", *Journal of Dynamic Systems Measurement and Control,* Vol. 108, No. 4, pp. 289-295, Dec. (Also appeared in the Proceeding of the 1985 Symposium on *Sensors and Controls for Manufacturing*, ASME Winter Annual Meeting).

J5) Stein, J. L. and Flowers, W. C., 1987 "Stance Phase Control of Above-Knee Prostheses: Knee Control Versus SACH Foot Design," Journal of Biomechanics, Vol. 20, No. 1, pp. 19-28. (Also appeared in the Proceedings of the 1987 ASME Biomechanics Symposium).

J6) Stein, J. L., Flowers, W. C. and Yigit, A., 1987 "Modeling Prosthetic Gait", *Journal of Biomechanics,* (accepted for publication). (Also appeared in the *Proceedings of the 1987 ASME Biomechanics Symposium*).

[1] It is common practice in the field of Mechanical Engineering to present and publish research results at professional meetings (conferences). Often these results are also published in archival journals as either related or revised publications. The relationship between papers published in different venues is indicated in some but not all places in this publication list.
Updated: February 6, 2023

J7) Stein, J.L. and Park, Y., 1988 "Measurement Signal Selection and a Simultaneous State and Input Observer", *Journal of Dynamic Systems Measurement and Control*. Vol. 110, No. 2, June. (Also appeared in the Proceedings *of the 1987 American Control Conference*).

J8) Stein, J.L., and Park, Y., 1988 "Closed Loop Simultaneous Input and State Observer", *International Journal of Control*, Vol. 48, No. 3, pp. 1121-36. (Also appeared in the Symposium on *Sensors For Manufacturing*, 1987 ASME Winter Annual Meeting.)

J9) Stein, J.L. and Park, Y. "Modeling and Sensing Issues for Machine Diagnostics", *IEEE Control Systems* (accepted for publication but not published). (also appeared in the 1988 *Proceedings of the American Control Conference*).

J10) Stein, J.L. and Park, Y., 1989 "Steady-State, Optimal State and Input Observer for Discrete Stochastic Systems", *Journal of Dynamic Systems Measurement and Control* Vol. 111, pp. 121-127, June. (Also appeared as "Steady-State, Optimal State and Input Observer" in the Symposium on *Expert Systems and Intelligent Control*, 1987 ASME Winter Annual Meeting).

J11) Stein, J. L., Wang, C.-H., 1990 "Analysis of Power Monitoring on AC Induction Drive Systems", *Journal of Dynamic Systems, Measurement and Control,* Vol. 112, No. 2, pp. 239--248, June. (Also appeared in the 1986 Symposium on *Sensors and Controls for Manufacturing*, Proceedings of the 1986 ASME Winter Annual Meeting).

J12) Stein, J.L. 1993 "Modeling And State Estimator Design Issues for Model-Based Monitoring Systems" Special 50th Anniversary Issue of the *Journal of Dynamic Systems Measurement and Control,* Vol. 115, No. 2(B) June. (This paper was solicited by the editorial board of the 50th Anniversary Issue and reviewed anonymously.)

J13) Stein, J.L. and Tu, J.F. 1994 "A State Space Model for Monitoring Thermally-Induced Preload in Anti-Friction Spindle Bearings of High Speed Machine Tools" *Journal of Dynamic Systems Measurement and Control,* Vol. 11, No. 3, September, pp. 372-386. (Also appeared in the Symposium on *Control of Manufacturing Processes*, Proceedings of the 1991 ASME Winter Annual Meeting.)

J14) Huh, K. and Stein J.L. 1994 "A Quantitative Performance Index for Observer-Based Monitoring Systems" *Journal of Dynamic Systems Measurement and Control,* Vol. 11, No. 3, September, pp. 487-497. (Also appeared in the *Proceedings of the 1993 American Control Conference on Automatic Control*.)

J15) Tu, J.F. and Stein, J.L. 1995 "On-line Preload Monitoring for Anti-Friction Spindle Bearings of High-Speed Machine Tools" *Journal of Dynamic Systems Measurement and Control*) Vol. 117, No. 1, March, pp. 43-53. (Also appeared in the *Proceedings of the 1992 American Control Conference*. Awarded Best Paper of the Technical Session)

J16) Huh, K. and Stein J.L. 1995 "Well-Conditioned Observer Design for Observer-Based Monitoring Systems" *Journal of Dynamic Systems Measurement and Control* Vol. 117, No. 4, December, pp. 592-599. (Also appeared in the *Proceedings of the 1993 American Control Conference on Automatic Control*, Nominated for O. Hugo Schuck, Best Paper of Conference.)

J17)Stein J.L and Wilson, B.H. 1995 "An Algorithm for Obtaining Proper Models of Distributed and Discrete Systems" *Journal of Dynamic Systems Measurement and Control* Vol 117, No. 4, December, pp. 534-540. (An earlier version also appeared in 1992 Symposium on *Automated Modeling, Proceedings of the 1992 ASME Winter Annual Meeting*.)

J18)Tu, J.F. and Stein, J.L. 1996 "Active Thermal Preload Regulation for Machine Tool Spindles with Rolling Element Bearings" ASME Transactions: *Journal of Manufacturing Science and Engineering*. Vol. 118, No. 4, pp. 499-505, November. (An earlier version appeared in the Symposium on *Mechatronics in Manufacturing, P*roceedings of the 1994 ASME Winter Annual Meeting, Chicago, IL.)

J19)Stein, J.L. and Wang, C.W. 1996 "Automatic Detection of Clearance in Mechanical Systems: Experimental Validation", *Journal of Mechanical Systems and Signal Processing*. Vol. 10, No. 4, pp. 395-412, July. (Also appeared as Stein, J.L. and Wang, C.W., 1990 "Automatic Detection of Clearance in Mechanical Systems: Experimental Validation" Proceedings of the USA/Japan Symposium on Flexible Automation, July, Kyoto, Japan.)

J20)Tu, J.F. and Stein, J.L. 1996 "Model Error Compensation for Bearing Temperature and Preload Estimation" ASME Transactions: *Journal of Dynamic Systems Measurement and Control* , Vol. 118, No. 3, pp. 580-585, Sept.

J21)Ohl, G., Stein, J.L. and Smith E. 1996 "Fundamental Factors in the Design of a Fast Responding Methanol to Hydrogen Steam Reformer for Transportation Applications" Transactions of the *ASME: Journal of Energy Resources Technology*, Vol. 118, No. 2, June.

J22)Stein, J.L. and L.S. Louca, 1996. "A Template-Based Modeling Approach for System Design: Theory and Implementation". *Transactions of the Society for Computer Simulation International*, Vol. 13, No. 2, pp.87–101. Published by the Society for Computer Simulation, ISSN 0740-6797, San Diego, CA. (Also appeared as Stein, J.L. and Louca, L.S. 1995 "A Component-Based Modeling Approach for System Design: Theory and Implementation" Proceedings of the 1995 International Conference on Bond Graph Modeling, pp. 109-115, Las Vegas, NV.)

J23)Huh, K. and Stein J.L. 1997 "A Non-Normality Measure of The Condition Number For Monitoring And Control" *Journal of Dynamic Systems Measurement and Control*, Vol. 119, No. 2, pp 217-222, June,

J24)Stein, J.L., and Wang C.W. 1998 "Estimation of Gear Backlash: Theory And Simulation", *Journal of Dynamic Systems Measurement and Control*., Vol. 120, No. 1, pp. 74-82. (Revised version of Stein, J.L., and Wang C.W., "Automatic Detection Of Clearance In Mechanical Systems: Theory And Simulation", *Proceedings of the 1995 American Control Conference on Automatic Control* , Seattle, WA.)

J25)Tu, J.F. and Stein, J.L., 1998, "Model Error Compensation for Observer Design" *International Journal of Control*, Vol. 69, No. 2, pp. 329 - 345.

J26)Ferris, J., Stein, J.L. and Bernitsas, M. 1998 "Development Of Proper Models of Hybrid Systems" *Journal of Dynamic Systems Measurement and Control*, Vol. 120, No. 3, pp. 328 – 333. (Also appeared as Ferris, J., Stein, J.L. and Bernitsas, M. 1994

"Development Of Proper Models of Hybrid Systems" 1994 ASME WAM Symposium on Automated Modeling, Chicago, IL.)

J27)Park, Y.P. and Stein, J.L., 1999 "Recursive Optimal State and Input Observer for Discrete Time-Variant Systems" *Transaction on Control, Automation and Systems Engineering* Vol. 1, No. 2, December, published by the Institute of Control, Automation and Systems Engineering, Korea. (This is a revision of what appeared in the proceedings of the 1989 ASME Winter Annual Meeting).

J28)Ferris, J. B., M. M. Bernitsas and J. L. Stein, 2000, "Redesigning the Dynamics of Complex Structural Systems," AIAA Journal, Vol. 38, No. 1, pp. 147-154.

J29)Walker, D.G., Stein, J.L. and Ulsoy A.G. 2000 "An input-Output Criterion for Linear Model Deduction" *Journal of Dynamic Systems Measurement and Control*, Vol. 122, No. 3, pp. 507-513. (Also appeared as Walker, D.G., Stein, J.L. and Ulsoy A.G. 1996 "An input-Output Criterion for Linear Model Deduction" Proceedings of the Dynamic Systems and Control Division, 1996 ASME IMECE, Atlanta, GA.).

J30)Assanis, D.N., Z.S. Filipi, S. Gravante, D. Grohnke, X. Gui, L.S. Louca, G.D. Rideout, J.L. Stein, Y. Wang, 2000. "Validation and Use of SIMULINK Integrated, High Fidelity, Engine-In-Vehicle Simulation of the International Class VI Truck". *2000 SAE Transactions – Journal of Engines*. Published by the Society of Automotive Engineers, ISBN 0-7680-0842-5, Warrendale, PA. Also presented at the *SAE 2000 World Congress*, Paper 2000–01–0288.

J31)Michelena, N.F., L.S. Louca, M. Kokkolaras, Chan-Chiao Lin, Dohoy Jung, Z.S. Filipi, D.N. Assanis, P.Y. Papalambros, H. Peng and J.L. Stein, 2001. "Design of an Advanced Heavy Tactical Truck: A Target Cascading Case Study". *2001 SAE Transactions – Journal of Commercial Vehicles*. Published by the Society of Automotive Engineers, Warrendale, PA. Also presented at the *2001 SAE International Truck and Bus Meeting and Exposition*, Paper 2001-01-2793.

*J32)*Huh, K., Jung, J. and Stein J.L., 2001 "Discrete-time Well-conditioned State Observer Design and Evaluation" ASME Transactions: *Journal of Dynamic Systems Measurement and Control* Special Issue on the Identification of Mechanical Systems, Vol. 123, Dec., pp. 615-622.

J33)Stein, J.L. and Huh, K. 2002 "Monitoring Cutting Forces In Turning: A Model-Based Approach" ASME *Transactions: Journal of Manufacturing Science and Engineering, Vol. 124, Feb., pp. 26-31.*(Revised version of Stein, J.L. and Huh, K., 1991 "A Design Procedure for Model-Based Monitoring Systems: Cutting Force Estimation as a Case Study" 1991 ASME WAM, Symposium on Control of Manufacturing processes, Dec., Atlanta, GA.)

J34)Louca, L.S. and J.L. Stein, 2002. "Ideal Physical Element Representation from Reduced Bond Graphs". *Journal of Systems and Control Engineering: Special Issue on Bond Graphs*, Vol. 216, No. 1, pp. 73-83. Published by the Professional Engineering Publishing, ISSN 0959-6518, Suffolk, United Kingdom.

J35)Kim, H.M. Kokkolaras, M., Louca, L.S., Delagrammatikas, G.J. Michelena, N.F., Filipi, Z.S., Papalambros, P.Y., Stein, J.L. and Assanis, D.N. 2002 "Target Cascading in Vehicle resdesign: a Class VI Truck Study" International Journal of Vehicle Design, Vol. 29, No. 3. Published by Interscience Enterprises Ltd., ISSN 0143–3369, St. Helier, United Kingdom

J36)Kim, H.M., Rideout, D.G., Papalambros, P.Y., Stein, J.L. (2003) "Analytical Target Cascading in Automotive Vehicle Design." Journal of Mechanical Design, Vol. 125 / 1, September, American Society of Mechanical Engineers, New York, NY. (Also presented as "Analytical Target Cascading in Automotive Vehicle Design." Proceeding of the DETC 2001, 27th Design Automation Conference, September 9-12, 2001, Pittsburgh, Pennsylvania.)

J37)Filipi, Z.S., L.S. Louca, B. Daran, Chan-Chiao Lin, U. Yildir, B. Wu, M. Kokkolaras, D.N. Assanis, H. Peng, P.Y. Papalambros, and J.L. Stein, 2003. "Combined Optimization of Design and Power Management of the Hydraulic Hybrid Propulsion System for the 6x6 Medium Truck". *Special Issue on Advanced Vehicle Design and Simulation of the International Journal of Heavy Vehicle Systems*, Vol. 11, No.3/4 pp. 372 - 402. Published by Inderscience Enterprises Ltd., ISSN 1744232X, St. Helier, United Kingdom.

J38)Louca, L.S., D.G. Rideout, J.L. Stein, and G.M. Hulbert, 2003. "Generating Proper Dynamic Models for Truck Mobility and Handling". *Special Issue on Advanced Vehicle Design and Simulation of the International Journal of Heavy Vehicle Systems*, Vol. 11, No.3/4 pp. 209 - 236. Published by Inderscience Enterprises Ltd., ISSN 1744232X, St. Helier, United Kingdom.

J39)Lin, Chan-Chiao, Z. Filipi, L.S. Louca, H. Peng, D.N. Assanis and J.L. Stein, 2003. "Modeling and Control for a Medium-Duty Hybrid Electric Truck". *Special Issue on Advanced Vehicle Design and Simulation of the International Journal of Heavy Vehicle Systems*, Vol. 11, No.3/4 pp. 349 - 371. Published by Inderscience Enterprises Ltd., ISSN 1744232X, St. Helier, United Kingdom.

J40)Kokkolaras, M., L.S. Louca, G.J. Delagrammatikas, N.F. Michelena, Z.S. Filipi, P.Y. Papalambros, J.L. Stein, and D.N. Assanis, 2003. "Simulation-Based Optimal Design of Heavy Trucks by Model-Based Decomposition: An Extensive Analytical Target Cascading Case Study". *Special Issue on Advanced Vehicle Design and Simulation of the International Journal of Heavy Vehicle Systems*, Vol. 11, No.3/4 pp. 403 - 433. Published by Inderscience Enterprises Ltd., ISSN 1744232X, St. Helier, United Kingdom.

J41)Ohl, G., Stein, J.L. and Smith, E. (2004) "A Dynamic Model for the Design of Methanol to Hydrogen Steam Reformers for Transportation Applications" ASME Transaction: Journal of Energy Resources Technology, Vol. 126 No. 2, June.

J42)Huh, K., Hong, D., Stein, J.L. (2005) "Development of a Lane Departure Monitoring and Control System" *Journal of Mechanical Science and Technology*, KSME Int. J., Vol. 19, No. 11, pp. 1998-2006.

J43)Rideout, D.G., Stein, J.L. and Louca, L.S. (2007) "Systematic Identification of Decoupling in Dynamic System Models", ASME Transaction: *Journal of Dynamic Systems, Measurement and Control* Vol. 129, Issue 4, pp. 503-13, July, American Society of Mechanical Engineers, New York, NY.

J44)Filipi, Z., Fathy, H., Hagena, J., Knafl, A., Ahlawat, R., Liu, J., Jung, D., Assanis, D.N., Peng, H., and J. Stein, (2007) "Engine-in-the-Loop Testing for Evaluating Hybrid Propulsion Concepts and Transient Emissions: A HMMWV Case Study" SAE Transactions, *Journal of Commercial Vehicles*. Paper No. 2006-01-0443, March.

(Also published as SAE Paper 2006-01-0443, SP-2008, 2006 SAE Congress, Detroit, MI, April 3-6, 2006.)

J45)Rideout, D.G., Stein, J.L. and Louca, L. (2007) "Extension and Application of an Algorithm for Systematic Identification of Weak Coupling and Partitions in Dynamic System Models" International Journal of the Federation of European Simulation Societies: *Simulation Modelling Practice and Theory*, doi:10.1016/j.simpart.2007.10.004, Published by Elsevier (in press (available on-line).

J46)Rideout, D.G., Stein, J.L., and Louca, L.S. (2008) "Systematic Assessment of Rigid Internal Combustion Engine Dynamic Coupling" ASME Transactions: *J. Eng. for Gas Turbines and Power,* Volume 130, Issue 2 (March), 022804 (12 pages), ASME, New York, NY.

J47)Hoffman, R.C., Stein, J.L., Loucas L.S., and Kunsoo, H. (2008) "Using the Milliken Moment Method and Dynamic Simulation to Evaluate Vehicle Stability and Controllability" *International Journal of Vehicle Design*, Vol. 48, Nos. 1/2, pp. 132-148, Inderscience Enterprises Ltd.

J48)Tulga Ersal, Hosam K. Fathy, Loucas S. Louca, D. Geoff Rideout, and Jeffrey L. Stein (2008) "A Review Of Proper Modeling Techniques ", ASME Transactions: *Journal of Dynamic Systems Measurement and Control* **130**(6), doi:10.1115/1.2977484. Also: Proceedings of the 2007 ASME International Mechanical Engineering Congress and Exposition, Seattle, WA, USA, Nov. 10-16.

J49)Ersal, T., Fathy, H. K., and Stein (2009), J. L., "Orienting Body Coordinate Frames Using Karhunen-Loève Expansion for More Effective Structural Simplification", Simulation Modelling Practice and Theory **17**(1), pp. 197–210, doi: 10.1016/j.simpat.2007.08.002. (See also T. Ersal, H. K. Fathy, and J. L. Stein, "Orienting Body Reference Frames Using Proper Orthogonal Decomposition for More Effective Structural Simplification," ASME Paper IMECE2006-14572, Proc. IMECE 2006, Dynamic Systems and Controls Division, Chicago, IL, 2006

J50)Ersal, T., Fathy, H. and Stein, J. L. (2009) "Structural simplification of modular bond-graph models based on junction inactivity" International Journal of the Federation of European Simulation Societies: *Simulation Modelling Practice and Theory*, 17(1), pp.175-196, Published by Elsevier (online: doi: 10.1016/j.simpat.2008.02.010). (also appeared as Ersal, T., Fathy, H. K., Stein, J. L., 2006, "Structural simplification of modular bond-graph models based on junction inactivity", *Proceedings of the 2006 ASME International Mechanical Engineering Congress and Exposition (*ASME Paper IMECE2006-14567), Chicago, IL USA.

J51)Ersal, T., Fathy, H. K., and Stein, J. L., 2009, "Realization-Preserving Structure and Order Reduction of Nonlinear Energetic System Models Using Energy Trajectory Correlations", Journal of Dynamic Systems Measurement and Control, 131(3), pp. 031004 (8p), doi: 10.1115/1.3072128. (also Ersal, T., Fathy, H. K., and Stein, J. L., 2007, "Realization-preserving structure and order reduction of nonlinear energetic system models using energy trajectory correlations", *Proceedings of the 2007 ASME*

International Mechanical Engineering Congress and Exposition, Seattle, WA USA, IMECE2007-42041).

J52)Ersal, T., Kittirungsi, B., Fathy, H. K., and Stein, J. L. (2009) "Model Reduction in Vehicle Dynamics Using Importance Analysis", *Journal of Vehicle System Dynamics*, 47(7), pp. 851–865, doi: 10.1080/00423110802444071, Taylor & Francis ISSN 0042-3114 print/ISSN 1744-5159. Also appeared as "Model Reduction in Vehicle Dynamics Using Importance Analysis", Proceedings of 2008 ASME Dynamic Systems and Control Conference.

J53)S. J. Moura, D. S. Callaway, H. K. Fathy, and J. L. Stein (2010) " Impact of Battery Sizing on Stochastic Optimal Power Management in Plug-in Hybrid Electric Vehicles," *Journal of Power Sources*, Vol. 195, No, 9, pp. 2979-2988. (DOI: 10.1016/j.jpowsour.2009.11.026). (Previously published as Moura, S. J., Callaway, D. S., Fathy, H. K., Stein, J. L., 2008, "Impact of Battery Sizing on Stochastic Optimal Power Management in Plug-in Hybrid Electric Vehicles," Proceedings of the 2008 IEEE International Conference on Vehicular Electronics and Safety (ICVES), pp. 96-102.)

J54)Loucas, L., Stein J.L., Hulbert, G. (2010) "Energy-Based Model Reduction Methodology for Automated Modeling" ASME Transactions: *Journal of Dynamic Systems Measurement and Control*: Special Issue on Physical System Modeling, Vol. 132, No. 6, November. An extended version of Loucas, L., Stein J.L., Hulbert, G. and Sprague, J. 1997 "Proper Model Generation: An Energy-Based Methodology" Proceedings of the 1997 International Conference on Bond Graph Modeling and Simulation, Phoenix, Arizona, January 12 -15, 1997, published by the Society for Computer Simulation International, Simulation Series Vol. 29, No. 1, ISBN 1-56555-103-6, San Diego, CA.

J55)R. Ahlawat, H. Fathy, B. Lee, J. Stein & D. Jung (2010) "Modeling and Simulation of a Dual Clutch Transmission Vehicle to Analyze the Effect of Pump Selection on Fuel Economy", *International Journal of Vehicle System Dynamics* Volume 48, Issue 7 July 2010, pages 851 - 868. (Extended version of Rahul Ahlawat, Hosam K. Fathy, Chengyun Guo, Byungchan Lee, Dohoy Jung, Jeffrey L. Stein, 2009, "Effect of Pump Selection on Fuel Economy in a Dual Clutch Transmission Vehicle", *Proceedings of the 2009 American Control Conference*, St. Louis, MO.)

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Patents and Disclosures

P1) Invention Disclosure: Provisional Application filed October 24, 2007 – "Vehicle Mass Estimation System", Inventor(s): Jeffrey L. Stein, Hosam Fathy, Dongsoo Kang.

P2) US Patent 10,836,383 B2, Issue Nov. 17, 2020 "Collision Imminent Steering Control Systems and Methods", Inventor(s): Tulga Ersal, Jeffrey L. Stein and John Wurts.

P3) US Utility Patent Application Publication, Pub. No.: US2020/0406969A1, Serial No. US Patent App. 16/452,936, "Lane Change Maneuvers with Minimized Tire Slip", Inventor(s): Tulga Ersal, Jeffrey L. Stein and John Wurts. Filed June 26, 2019.

P4) US Utility Patent Application Publication, Pub. No. US 2022/0001861 A1, Pub. Date January 6, 2022, US Patent App. USSN: 17/363,797 filed June 30, 2021, "Contingent Model Predictive Control Incorporating Online Estimation Of Nominal And Uncertain Parameters", Inventor(s): Tulga Ersal, Jeffrey L. Stein, John Wurts and James Dallas. Provisional Application No. 63/047,064, filed July 1, 2020.

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