Vita

Name Ernest J. Barany

Post Professor
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Previous Employment

2010-2018 Professor and Associate Department Head, Department of Mathematical Sciences, New Mexico State University, Las Cruces, NM

2006-2010 Professor, Department of Mathematical Sciences, New Mexico State University, Las Cruces, NM

1997-2006 Associate Professor, Department of Mathematical Sciences, New Mexico State University, Las Cruces, NM

2001-2002 Senior Research Scientist, Institute for Complex Additive Systems Analysis, New Mexico Tech, Socorro, NM (On leave from NMSU.)

1992-1997 Assistant Professor, Department of Mathematical Sciences, New Mexico State University, Las Cruces, NM

1989-1992 Visiting Assistant Professor, Department of Mathematics, University of Houston, Houston, TX

1988-1989 Lecturer, Department of Physics, The Ohio State University and Part-Time Faculty at Columbus State Community College, Columbus, OH

1980-1988 Graduate Teaching Associate, Department of Physics, The Ohio State University, Columbus, OH

Degrees B.S. Physics, Indiana University, Aug. 1980
Ph.D. Physics, Ohio State University, Aug. 1988

Research Interests

- Mathematical modeling of biological systems. Modeling of evolutionary change by bifurcations
- Simulation and analysis of hybrid dynamical models of computer and communication networks and electric power networks.
- Modeling, simulation and control of large, decentralized automatic systems (SCADA systems).
- Control theory, adaptive control and identification, mechanical systems.
- Dynamical systems, equivariant dynamics, bifurcation theory.

Publications

1. Abu-Rqayiq, A., E. Barany (2019). Singularity of Lotka-Volterra Models Under Unfoldings. *Math Meth Appl Sci*, 42(1), 1-13, April 2019
2. Izadi, M., A. Sanyal, E. Barany and S. Prabhakaran, " Rigid Body Motion Estimation based on the Lagrange-d'Alembert Principle", *Proc 54th IEEE Conference of Decision and Control*, Osaka, Japan, December 2015.

3. Vivas-Barber, A., C. Castillo-Chavez and E. Barany, " Dynamics of an SAIQR Influenza Model", *Biomath*, **3**(2), October, 2014
4. Birand, A. and E. Barany, "Evolutionary Dynamics through Multi-species Competition", *Theoretical Ecology*, **7**(4), May 2014
5. Barany, E., "Bifurcation as the source of polymorphism", Proceedings of COMPLEX 2012, Santa Fe, December 2012.
6. Shpak, M., S. Orzack and E. Barany, "The influence of demographic stochasticity on evolutionary dynamics and stability", *Theoretical Population Biology*, *88* pp47-56, 2013
7. Galayda, S. and E. Barany, "Stochastic Differential Equation Derivation: Comparison of the Markov Method versus the Additive Method". *Physica A* **391** (20), pp 4564-4574, 15 October 2012
8. Barany, E., M.P. Beccar Varela, I. Florescu and I. SenGupta. Detecting market crashes by analyzing long memory effects using high frequency data. *Quantitative Finance*, **12**, #4, pp623-634, Jan 2012
9. Barany, E., M.P. Beccar Varela. Stochastic differential equations and Levy models with applications to high-frequency data, *Handbook of Modeling High-Freuqency Data*, pp327-346, Wiley, Hoboken NJ 2012
10. Barany, E., M.P. Beccar Varela. Long Correlations applied to the study of memory effects in high frequency (tick) data, the Dow-Jones index and international indices. *Handbook of Modeling High-Freuqency Data*, pp119-164, Wiley, Hoboke, NJ 2012
11. Ballyk, Mary; Barany, Ernest The role of resource types in the control of chemostats using feedback linearization *Ecological Modelling* **211** #1-2 Pages: 25-35, FEB 24 2008
12. Ball, Steven; Barany, Ernest; Schaffer, Steve; Wedeward, Kevin Nonlinear controllability of singularly perturbed models of power flow networks. Int. J. Pure Appl. Math. 47 (2008), no. 2, 243–266.
13. Ballyk, M. and E. Barany, "The role of resource type in the control of chemostats using feedback linearization", Proc. of Amer. Cont. Conf., New York, NY, July 2007
14. Barany, E. and M. Krupa, "Stability of multiple access network control schemes with carrier sensing and exponential backoff", *Physica A*, **363**, pp573-590, May, 2006
15. Golinski, M., E. Barany, M. Ballyk, "Ecological conditions that favor the evolution of intermediate virulence in an environmentally transmitted parasite." *Journal of Mathematical Biology* **51** 389-402, 2005
16. Ball, S., E. Barany, S. Schaeffer and K. Wedeward, "Nonlinear Control of Power Network Models using Feedback Linearization", Proc. IASTED conference on Circuits, Signals and Systems , Marina del Rey, CA, pp20-25, October 2005
17. Ball, S., E. Barany, S. Schaeffer and K. Wedeward, "A Reduced Generator Model with Excitation Limits", Proc. IASTED Conference on Power and Energy Systems, Marina del Rey, CA, pp100-105, October (2005)
18. Barany, E., Schaeffer, S., Wedeward, K., Ball, S.: "Nonlinear controllability of singularly perturbed models of power flow networks." Proceedings of 43rd IEEE Conference on Decision and Control, pp4826-4832, Bahamas, December (2004)
19. Barany, E., and M. Krupa, "Emergence of critical rates in multiple access network control schemes", Proceedings of the 42nd IEEE Conference on Decision and Control,pp1592-1597, Maui, HI, December (2003)
20. Barany, E., "Identification in the presence of symmetry", *IEEE Trans. on Aut. Cont*, **46**(3),pp476-481, March 2001
21. Barany, E., "Tuning nonlinear identifiers: Networks of Coupled Oscillators" *Proc. 2000 Amer. Cont. Conf.*, pp245-249, Chicago, IL, June, 2000.
22. Colbaugh, R., K. Glass, and E. Barany "Mechatronic Systems Approach to Controlling Robotic Systems with Actuator Dynamics", invited chapter in *Mechatronic System Techniques and Applications*, pp201-262, Gordon and Breach International Series in Engineering, Technology, and Applied Science, 2000
23. Colbaugh, R., E. Barany and M. Trabatti, "Control of Nonholonomic Mechanical Systems Using Reduction and Adaptation", *Robotica*, **17**(3), pp249-260, 1999
24. Barany, E. and R. Colbaugh,"Identification in the Presence of Symmetry: Oscillator Networks",*Proc. 38th IEEE Conference on Decision and Control*, pp 1059-1064, Phoenix, AZ, December 1999
25. Colbaugh, R., E . Barany and K. Glass,"Identification of SCADA Systems: Case Studies", *Proc. 38th IEEE Conference on Decision and Control*, Phoenix, AZ, pp63-68, December 1999
26. Barany, E. and R. Colbaugh, "Identification of symmetric systems: a preliminary study",1999 Amer. Control Conf., pp2045-2049, San Diego, CA, June 1999

27. Barany, E, R. Colbaugh and K. Glass,"Control of symmetric mechanical systems with incomplete model information using reduction, dynamic feedback and flatness",(Invited paper) 1999 Amer. Control Conf., pp3505-3509, San Diego, CA, June 1999
28. Barany, E. and R. Colbaugh,"Global Stabilization of Uncertain Mechanical Systems With Bounded Controls", *International Journal of Robotics and Automation*, Vol. 13, Vol. 2, pp48-53, 1998
29. Colbaugh, R., E . Barany and K. Glass, "Adaptive Control of Nonholonomic Robotic Systems", *Journal of Robotic Systems*, **15**(7), pp365-393, 1998
30. Colbaugh, R., E . Barany and K. Glass, "Adaptive Stabilization of Uncertain Nonholonomic Mechanical Systems", *Robotica*, **16**(2), pp181-192, 1998
31. Colbaugh, R., E . Barany and K. Glass,"Adaptive Control of Constrained Robotic Systems for Waste Management Applications", *International Journal of Environmentally Conscious Design and Manufacturing*, **7**(1), 1998
32. Barany, E., K. Glass, and R. Colbaugh"Control of Uncertain Nonholonomic Mechanical Systems Using Differential Flatness", *Proc. 1998 American Control Conference*, pp917-921, Philadelphia, PA, June 1998
33. Colbaugh, R. and E . Barany,"Global Stabilization of Uncertain Mechanical Systems with Bounded Controls", *Proc. 1998 American Control Conference*, pp2212-2216, Philadelphia, PA, June 1998
34. Colbaugh, R. and E . Barany,"Global Stabilization of Uncertain Underactuated Mechanical Systems", *Proc. 37th IEEE Conference on Decision and Control*, pp4553-4554, Tampa, FL, December 1998
35. Colbaugh, R., E . Barany and K. Glass,"Adaptive Control of Electrically Driven Nonholonomic Mechanical Systems", *Proc. 37th IEEE Conference on Decision and Control*, pp1018-1024, Tampa, FL, December 1998
36. Barany, E. , R. Colbaugh and G. Gallegos," Control of Chaos in the Presence of Uncertainty", *Advances in Systems Science and Applications*, **3**, pp1-6, 1997
37. Barany, E., and R. Colbaugh, "Global Stabilization of Uncertain Mechanical Systems", *Proc. 36th IEEE Conference on Decision and Control*, pp809-814, San Diego, CA, December, 1997
38. Colbaugh, R., E . Barany, and K. Glass"Adaptive Stabilization of Nonholonomic Mechanical Systems", *Proc. 1997 IEEE Conference on Decision and Control*, pp3081-3088, San Diego, CA, December, 1997
39. Colbaugh, R. and E. Barany,"Control of Nonholonomic Robotic Systems Using Reduction and Adaptation", *Proc. 1997 IFAC Symposium on Robot Control*, pp723-729, Nantes, France, September 1997
40. Barany, E. , R. Colbaugh and K. Glass,"Stabilization of Uncertain Manipulators Using Bounded Controls", *Proc. 1997 IFAC Symposium on Robot Control*, pp237-232, Nantes, France, September 1997
41. Colbaugh, R., E . Barany, and K. Glass,"Adaptive Stabilization of Uncertain Nonholonomic Mechanical Systems", *Proc. 1997 IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp981-988, Nantes, France, September 1997
42. Colbaugh, R., E. Barany, and K. Glass, "Global Stabilization of Uncertain Manipulators Using Bounded Controls ", *Proc. 1997 Am. Cont. Conf.*, pp86-91, Albuquerque, NM, June 1997
43. Barany, E. and R. Colbaugh "Control of Uncertain Nonholonomic Mechanical Systems using Reduction and Adaptation.", *Proc. 1997 Am. Cont. Conf.*, pp3847-3853, Albuquerque, NM, June 1997
44. Barany, E., R. Colbaugh and K. Glass,"Global Regulation of Uncertain Manipulators Using Bounded Controls", *Proc. 1997 IEEE Int'l Conf. on Robotics and Automation*, pp1148-1155, Albuquerque, NM, April 1997
45. Colbaugh, R., E . Barany and K. Glass, "Adaptive Stabilization and Tracking Control of Electrically-Driven Manipulators", *Journal of Robotic Systems*, Vol. 13, No. 4, pp203-217, 1996
46. Colbaugh, R., K. Glass and E. Barany,"Adaptive Regulation of Manipulators Using Only Position Measurements", *International Journal of Robotic Research*, **16**(5), pp703-713, October 1997
47. Barany, E. , R. Colbaugh and G. Gallegos,"Control of Chaos in the Presence of Uncertainty" , *Proc. 35th IEEE Conference on Decision and Control*, pp2175-2176, Kobe, Japan, December 1996
48. Colbaugh, R., E . Barany and K. Glass,"Adaptive Control of Nonholonomic Mechanical Systems" ,*Proc. 35th IEEE Conference on Decision and Control*, pp1428-1434, Kobe, Japan, December 1996
49. Colbaugh, R. and E . Barany,"Stability Analysis for a Class of Neural Network", *Proc. 1995 IEEE Int'l. Symp. on Intelligent Control*, pp422-426, Monterey, CA, August, 1995
50. Colbaugh, R., E . Barany and K. Glass,"Adaptive Output Stabilization of Manipulators", *Proc. 33rd IEEE Conference on Decision and Control*, pp1296-1302, Lake Buena Vista, FL, December 1994
51. Barany, E., M. Dellnitz and M. Golubitsky, "Detecting the Symmetry of Attractors", *Physica D* **67** pp66-87 (1993)

52. Barany, E., "Lattice Periodic Solutions with Local Gauge Symmetry", *Exploiting Symmetry in Applied and Numerical Analysis*, pp87-95, Edited by: Allgower, Georg and Miranda. AMS book series: Lectures in Applied Mathematics (1993)
53. Barany, E., M. Golubitsky and J. Turski, "Bifurcations with Local Gauge Symmetries in the Ginzburg-Landau Equations", *Physica D*, **56**, pp36-56, (1992)
54. Barany, E., and I. Melbourne, " A family of stable equilibria in bifurcation with spherical symmetry", *SIAM J. Math. Anal.* **23** #1, pp72-80 January,1992.
55. Swift, J. W. and E. Barany, "Chaos in the Hopf bifurcation with tetrahedral symmetry: Convection in a rotating fluid with low Prandtl number", *Eur. J. Mech.,B/Fluids*,**10**,#2-Suppl., pp99-104, 1991

PhD students

1. Noussi, Hubert, "Stabilization of Chemostats via Feedback Linearization", 2008
2. Galayda, Suzanne, "Effect of the diffusion coefficient on noise expression in the logistic equation and single microbe model of the chemostat", 2010
3. Beccar Varela, Pia, "Stochastic differential equations and Levy models with applications in finance and biology", 2011
4. Vivas-Mejia, Ana Luz, "Dynamics of a single-strain influenza with isolation and asymptomatic class", 2011
5. Abu Rqayiq, Abdullah, "Singularity of Lotka-Volterra Models Under Unfoldings", 2017