

**Stephen Schecter**  
**Professor Emeritus of Mathematics**  
**North Carolina State University**

**Education**

B.A. (Philosophy), Antioch College, 1970.

M.A. (Mathematics), University of California at Berkeley, 1973.

Ph.D. (Mathematics), University of California at Berkeley, 1975.

- Advisor: Stephen Smale
- Thesis: “Smooth Pareto Economic Systems with Natural Boundary Conditions”

**Professional Experience**

University of California at Berkeley

- Teaching Assistant, 1972–1975

North Carolina State University

- Visiting Instructor, 1975–1976
- Assistant Professor, 1976–1982
- Associate Professor, 1982–1992
- Professor, 1992–2017
- Professor Emeritus, 2017–present
- Mathematics Department Director of Graduate Studies, 1995–1997.

**Research Interests**

Traveling waves and other distinguished solutions of partial differential equations and their stability; geometric singular perturbation theory; mathematical epidemiology

**Invited Lectures (since 1982)**

- (1) November 1982, University of North Carolina at Charlotte. “Vector fields in the plane with polynomial models” (colloquium).
- (2) August 1983, Special Session on Dynamical Systems at AMS summer meeting, Albany, NY. “Vector fields in the plane with polynomial models.”
- (3) February 1984, Montana State University. “Nonlinear programming with parameters” and “A singular perturbation problem in the plane.”
- (4) May 1985, 7th Symposium on Mathematical Programming with Data Perturbations, Washington, DC. “Structure of the Kuhn-Tucker sets in nonlinear programs with parameters.”
- (5) August 1985, Special Session on Dynamical Systems at AMS summer meeting, Laramie, WY. “Melnikov’s method at a saddle-node and the dynamics of the Josephson junction.”
- (6) October 1985, International Conference on Parametric Optimization, Plaue, East Germany. “Structure of the Kuhn-Tucker sets in nonlinear programs with parameters.”
- (7) February 1986, Michigan State University. “Melnikov’s method at a saddle-node and the dynamics of the Josephson junction.”

- (8) July 1986, Canadian Mathematical Society International Conference on Differential Equations, Toronto. “Stable manifolds in the method of averaging.”
- (9) March 1987, University of Miami. “Melnikov’s method at a saddle-node and the dynamics of the Josephson junction.”
- (10) August 1987, Conference on Generic Families of Vector Fields, University of Montreal. “Codimension three bifurcations occurring in the study of traveling wave solutions of a nonstrictly hyperbolic equation.”
- (11) March 1988, Piedmont Dynamical Systems Conference, University of North Carolina at Charlotte. “Interaction of equilibrium and heteroclinic bifurcation for planar vector fields.”
- (12) July 1988, International Conference on Bifurcation Theory and its Numerical Analysis, Xian, China. “Interaction of equilibrium and heteroclinic bifurcation for planar vector fields.”
- (13) December 1988, Duke University. “Shocks, traveling waves, and heteroclinic bifurcation.”
- (14) June 1989, Conference on the Qualitative Theory of Vector Fields, University of Montreal. “Shocks, traveling waves, and heteroclinic bifurcation.”
- (15) May 1990, SIAM Conference on Dynamical Systems, Orlando. “Simultaneous equilibrium and heteroclinic bifurcation.”
- (16) July 1991, Second Workshop on Partial Differential Equations, IMPA, Rio de Janeiro. “Heteroclinic bifurcation theory and shock waves.”
- (17) June 1992, European Bifurcation Theory Group Conference on Bifurcations in Differentiable Dynamics, Diepenbeek, Belgium. “Rate of convergence of numerical approximations to homoclinic and heteroclinic bifurcation points.”
- (18) November 1992, University of Houston. “Shock waves and heteroclinic bifurcations” and “Numerical computation of homoclinic orbits.”
- (19) February 1993, Georgia Institute of Technology. “Shock waves and heteroclinic bifurcations” and “Numerical computation of homoclinic orbits.”
- (20) May 1993, Duke University. “Numerical computation of homoclinic and heteroclinic solutions.”
- (21) July 1993, Third Workshop on Partial Differential Equations, IMPA, Rio de Janeiro. “Riemann problems that are stable to perturbation.”
- (22) August 1993, Equadiff 8, Bratislava, Slovakia. “Riemann problems that are stable to perturbation.”
- (23) September 1993, European Bifurcation Theory Group Conference on Dynamics, Bifurcations, and Symmetries, Cargèse, Corsica. “Riemann problems that are stable to perturbation.”
- (24) July 1995, Conference on Problems and Methods in Singular Perturbations, CIRM, Marseilles. “Riemann problems of codimension 0 and 1.”
- (25) November 1995, University of North Carolina at Wilmington. “Structurally stable Riemann problem solutions.”
- (26) March 1996, Special Session on Current Issues in Nonlinear Conservation Laws, AMS Sectional Meeting, Iowa City. “Riemann problem solutions of codimensions 0 and 1.”
- (27) March 1996, Iowa State University. “Riemann problem solutions of codimensions 0 and 1.”

- (28) April 1996, Duke University. “Riemann problem solutions of codimensions 0 and 1.”
- (29) October 1997, Special Session on Nonlinear Dynamics and Applications, AMS Sectional Meeting, Atlanta. “Riemann problem solutions of codimensions 0 and 1.”
- (30) November 1997, Conference in Honor of Olga Oleinik, Iowa State University. “Traveling-wave solutions of convection-diffusion equations by center manifold reduction.”
- (31) September 1998, Third Americas Conference on Differential Equations and Nonlinear Analysis, Atlanta. “Traveling-wave solutions of convection-diffusion equations by center manifold reduction.”
- (32) March 1999, Technical University of Vienna. “Traveling-wave solutions of convection-diffusion equations by center manifold reduction.”
- (33) April 1999, University of Missouri. “Loss of normal hyperbolicity in geometric singular perturbation theory.”
- (34) August 2000, SIAM Pacific Rim Dynamical Systems Conference, Maui, HI. “Undercompressive shock waves and the Dafermos regularization.”
- (35) February 2001, University of Massachusetts at Amherst. “Undercompressive shock waves, the Dafermos regularization, and numerical computation of Riemann solutions.”
- (36) July 2001, VII Workshop on Partial Differential Equations: Theory, Computation and Applications, IMPA, Rio de Janeiro. “Transitional shock waves, the Dafermos regularization, and numerical computation of Riemann solutions” (45-minute talk).
- (37) April 2002, University of Kansas. “Numerical computation and stability of Riemann solutions via the Dafermos regularization” (colloquium).
- (38) May 2002, Fourth International Conference on Dynamical Systems and Differential Equations, University of North Carolina at Wilmington. “Computation and stability of Riemann solutions via the Dafermos regularization.”
- (39) July 2002, Special Session on Hyperbolic Systems of Conservation Laws, SIAM Annual Meeting, Philadelphia. “Numerical computation and stability of Riemann solutions via the Dafermos regularization.”
- (40) October 2002, Duke University. “The Dafermos regularization of a system of conservation laws” (seminar talk).
- (41) July 2003, Equadiff, Diepenbeek, Belgium. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”
- (42) October 2003, AMS sectional meeting, special session on nonlinear waves, Chapel Hill, NC. “Dafermos profiles for singular shocks.”
- (43) May 2004, Kyoto University dynamical systems seminar. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”
- (44) May 2004, International Workshop on Bifurcation Theory and Applications, Shanghai Jiao Tong University. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”
- (45) May 2004, Fudan University (Shanghai) partial differential equations seminar. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”
- (46) June 2004, Fifth International Conference on Dynamical Systems and Differential Equations, Pomona, California. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”

- (47) January 2005, Sixth Americas Conference on Differential Equations and Nonlinear Analysis, Santiago, Chile. “Combustion fronts in porous media with two layers.”
- (48) April 2005, Workshop on Structured Dynamical Systems, Lefschetz Center for Dynamical Systems, Brown University. “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws.”
- (49) May 2005, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah. “Combustion fronts in porous media with two layers.”
- (50) May 2006, Dynamical Systems Weekend on the Occasion of Carmen Chicone’s 60th Birthday, University of Missouri. “Exchange lemmas.”
- (51) July 2006, SIAM Conference on Analysis of Partial Differential Equations. “Exchange Lemma for Nontrivial Slow Flows.”
- (52) November 2006, Boston University dynamical systems seminar. “Stability of patterns.”
- (53) January 2007, MSRI seminar, Berkeley. “Stability of patterns for viscous conservation laws.”
- (54) April 2007, Conference on Dynamics in Perturbations, University of Hasselt, Belgium. “Traveling waves in a thin liquid film with surfactant.”
- (55) May 2007, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah. “Stability of fronts in gasless combustion.”
- (56) August 2007, X Workshop on Partial Differential Equations, IMPA, Rio de Janeiro. “Stability of patterns in viscous conservation laws.” (Plenary talk)
- (57) August 2007, Universidade de Sao Paulo differential equations seminar. “Stability of fronts in gasless combustion.”
- (58) September 2007, University of North Carolina at Chapel Hill applied mathematics seminar. “Stability of fronts in gasless combustion.”
- (59) April 2008, University of Wyoming colloquium. “Stability of fronts in gasless combustion.”
- (60) May 2008, University of Missouri differential equations seminar. “Stability of fronts in gasless combustion.”
- (61) September 2008, International Conference on Infinite Dimensional Dynamical Systems, York University, Toronto. “Stability of fronts in gasless combustion.”
- (62) October 2008, AMS Fall Southeastern Meeting, Huntsville, AL. “Heteroclinic solutions of a singularly perturbed Hamiltonian system representing anisotropic crystalline phase interfaces in alloys.”
- (63) May 2009, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah. “A general exchange lemma.”
- (64) May 2010, 8th AIMS International Conference on Dynamical Systems, Differential Equations, and Applications, Dresden. “Heteroclinic solutions of a singularly perturbed Hamiltonian system.”
- (65) June 2010, Conference on Emerging Topics in Dynamical Systems and Partial Differential Equations, Barcelona. “Stability of traveling waves for a class of reaction-diffusion systems that arise in chemical reaction models.”
- (66) September 2010, Duke University Applied Mathematics Seminar. “Stability of traveling waves for a class of reaction-diffusion systems that arise in chemical reaction models.”

- (67) November 2010, Ohio State University PDE Seminar. “Stability of traveling waves for a class of reaction-diffusion systems that arise in chemical reaction models.”
- (68) March 2011, Miami University (Ohio) Colloquium. “Stability of traveling waves for a class of reaction-diffusion systems that arise in chemical reaction models.”
- (69) May 2011, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah. “Stability of traveling waves for parabolic and partially parabolic combustion problems.”
- (70) June 2011, IMA New Directions Short Course on Invariant Objects in Dynamical Systems and their Applications. Two lectures on “Loss of normal hyperbolicity in geometric singular perturbation theory.”
- (71) September 2011, Seminar on Mathematical Sciences and Applications, Virginia State University, Fredericksburg. “How the Talmud divides an estate among creditors.”
- (72) February 2012, Drexel University Applied Mathematics Seminar. “Concatenated traveling waves.”
- (73) March 2012, AMS Spring Midwestern Sectional Meeting, Lawrence, KS. “Concatenated traveling waves.”
- (74) June 2012, SIAM Conference on Nonlinear Waves and Coherent Structures, Seattle. “Concatenated traveling waves.”
- (75) March 2013, International Conference on Dynamics of Differential Equations, Atlanta. “Morse theory, Lagrange multipliers, and geometric singular perturbation theory.”
- (76) August 2013, Coloquio Brasileiro de Matemática, Rio de Janeiro. “Combustion in a porous medium under air injection.”
- (77) May 2014, Miami University (Ohio) Colloquium. “Concatenated traveling waves.”
- (78) July 2014, Université de Paris-Sud (Orsay) Séminaire d’analyse numérique et E.D.P. “Ondes progressives concaténées.”
- (79) July 2014, 10th AIMS International Conference on Dynamical Systems, Differential Equations, and Applications, Madrid. “Concatenated traveling waves.”
- (80) August 2014, SIAM Conference on Nonlinear Waves and Coherent Structures, Cambridge, England. “Concatenated traveling waves.”
- (81) May, 2015, SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah. “The entry-exit function and geometric singular perturbation theory.”
- (82) July, 2015, Equadiff 2015, Lyon, France. “Concatenated traveling waves.”
- (83) May, 2016, National Center for Theoretical Sciences International Workshop on Mathematical Biology, Hsinchu, Taiwan. “The entry-exit function and geometric singular perturbation theory.”
- (84) May, 2016, National Center for Theoretical Sciences Applied Mathematics Seminar, Hsinchu, Taiwan. “Concatenated traveling waves.”
- (85) August, 2016, SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia. “The entry-exit function and geometric singular perturbation theory.”
- (86) September, 2016, 44th Annual Mathematics Conference: Differential Equations and Dynamical Systems, Miami University (Ohio). “The entry-exit function and geometric singular perturbation theory.” (Featured talk.)
- (87) September, 2016, 43rd Annual Pi Mu Epsilon Student Conference, Miami University (Ohio). “How the Talmud divides an estate among creditors.” (Featured talk.)

- (88) September, 2016, SIAM Conference on Applied Mathematics Education, Philadelphia. “A game theory course for mathematics students.”

### Professional Service

- Organizing committee for Workshop on Viscous Profiles and Numerical Methods for Shock Waves, N.C. State University, May 1990.
- Co-organizer, Southeast Dynamical Systems Conference, N.C. State University, April 1992.
- Organizer, minisymposium on “Bifurcation theory and systems of nonlinear conservation laws,” SIAM Conference on Applications of Dynamical Systems, Snowbird, Utah, May 1997.
- Co-organizer, minisymposium on “Conservation laws: Traveling waves and other self-similar solutions,” SIAM Pacific Rim Dynamical Systems Conference, Lahaina, Hawaii, August 2000.
- Co-organizer, special session on “Traveling waves and shock waves” (16 speakers), Fourth International Conference on Dynamical Systems and Differential Equations, University of North Carolina at Wilmington, May 2002.
- Co-editor, special issue on traveling waves and shock waves, *Discrete and Continuous Dynamical Systems*, June 2004.
- Co-organizer, minisymposium on “Existence and stability of traveling waves,” SIAM Conference on Analysis of Partial Differential Equations, Boston, July 2006.
- Co-organizer, minisymposium on “Existence, uniqueness and stability of combustion wavefronts,” SIAM Conference on Applications of Dynamical Systems, Snowbird, May 2007.
- Served on three NSF panels 2004–2008.
- Member, editorial board of *Dynamical Systems Magazine*, the on-line magazine of the SIAM Dynamical Systems Activity Group, since Fall 2007.
- Co-organizer, minisymposium on “Stability of combustion waves,” SIAM Conference on Nonlinear Waves and Coherent Structures, Rome, July 2008.
- Minicourse on “Game theory and climate change” (3 hours), with Mary-Lou Zeeman (Bowdoin College), SACNAS (Society for the Advancement of Chicanos and Native Americans in the Sciences) National Conference, Salt Lake City, October 2008.
- Co-organizer, minisymposium on “Stability of traveling waves,” Joint SIAM/RSME-SCM-SEMA Meeting on Emerging Topics in Dynamical Systems and Partial Differential Equations, Barcelona, May 2010.
- Organizer, minisymposium on “Traveling waves in partially parabolic systems,” SIAM Conference on Applications of Dynamical Systems, Snowbird, May 2011.
- Organizer, minisymposium on “Game theory in the mathematics curriculum,” SIAM Conference on Applied Mathematics Education, Philadelphia, September 2016.

### Grants

- N. C. State University Engineering Foundation Grant, Summer 1976.
- N.S.F. Grant MCS-7902524, “Vector fields in the plane,” 1979–1981 (with Michael Singer).
- N.S.F. Grant DMS-9002803, “Theory and applications of homoclinic and heteroclinic bifurcation,” 1990–1992 (with Xiao-Biao Lin).

- N.S.F. Grant DMS-9205535, “Theory and applications of homoclinic and heteroclinic bifurcation,” 1992-1995 (with Xiao-Biao Lin).
- N.S.F. Grant DMS-9501255, “Singular perturbation and Riemann problems,” 1995–1999 (with Xiao-Biao Lin).
- N.S.F. Grant DMS-9973105, “Homoclinic and heteroclinic bifurcations, shock waves, and singular perturbations,” 1999–2003 (with Xiao-Biao Lin).
- N.S.F. Grant DMS-0406016, “The Dafermos regularization of a system of conservation laws,” 2004–2007 (with Xiao-Biao Lin).
- N.S.F. Grant DMS-0708386, “Stability of patterns,” 2007–2010 (with Xiao-Biao Lin).
- N.S.F. Grant DMS-1211707, “Concatenated traveling waves,” 2012–2016.

## Students

- Ph.D. students: John Shutt (1994), Monique Taylor (2010), Fatih Ozbag (2016).
- M.S. students: Rebecca Krakowski (1995), Ashley Daly (2010).

## Publications in Refereed Journals

- (1) “Accessibility of optima in pure exchange economies,” *Journal of Mathematical Economics* **4** (1977), 197–216.
- (2) “Structure of the demand function and Pareto optimal set with natural boundary conditions,” *Journal of Mathematical Economics* **5** (1978), 1–21.
- (3) “On the structure of the equilibrium manifold,” *Journal of Mathematical Economics* **6** (1979), 1–5.
- (4) “Planar polynomial foliations” (with M. Singer), *Proceedings of the American Mathematical Society* **79** (1980), 649–656.
- (5) “Separatrices at singular points of planar vector fields” (with M. Singer), *Acta Mathematica* **145** (1980), 47–78; correction, *Acta Mathematica* **151** (1983), 297–298.
- (6) “Feuilletages de  $\mathbb{R}^3$  définis par des équations de Pfaff polynomiales homogènes” (with C.F.B. Palmeira), *Annales de l’Institut Fourier* **32** (1982), 241–250.
- (7) “Applications of the blowing-up construction and algebraic geometry to bifurcation problems” (with M. Buchner and J. Marsden), *Journal of Differential Equations* **48** (1983), 404–433.
- (8) “Examples for the infinite dimensional Morse lemma” (with M. Buchner and J. Marsden), *SIAM Journal on Mathematical Analysis* **14** (1983), 1045–1055.
- (9) “A class of vectorfields on  $S^2$  that are topologically equivalent to polynomial vectorfields” (with M. Singer), *Journal of Differential Equations* **57** (1985), 406–435.
- (10) “Persistent unstable equilibria and closed orbits of a singularly perturbed equation,” *Journal of Differential Equations* **60** (1985), 131–141.
- (11) “Structure of the first-order solution set for a class of nonlinear programs with parameters,” *Mathematical Programming* **34** (1986), 84–110.
- (12) “The saddle-node separatrix-loop bifurcation,” *SIAM Journal on Mathematical Analysis* **18** (1987), 1142–1156.
- (13) “Melnikov’s method at a saddle-node and the dynamics of the forced Josephson junction,” *SIAM Journal on Mathematical Analysis* **18** (1987), 1699–1715.
- (14) “Stable manifolds in the method of averaging,” *Transactions of the American Mathematical Society* **308** (1988), 159–176.

- (15) “Simultaneous equilibrium and heteroclinic bifurcation of planar vector fields via the Melnikov integral,” *Nonlinearity* **3** (1990), 79–99.
- (16) “Undercompressive shocks for nonstrictly hyperbolic conservation laws” (with M. Shearer), *Journal of Dynamics and Differential Equations* **3** (1991), 199–271.
- (17) “ $C^p$  singularity theory and heteroclinic bifurcation with a distinguished parameter,” *Journal of Differential Equations* **99** (1992), 306–341.
- (18) “Heteroclinic bifurcation theory and Riemann problems,” *Matemática Contemporânea* **3** (1992), 165–189.
- (19) “Pitchfork bifurcation with a heteroclinic orbit: Normal form, recognition criteria, and universal unfolding,” *Journal of Differential Equations* **105** (1993), 63–93.
- (20) “Nonstrictly hyperbolic conservation laws with a parabolic line” (with D. Schaeffer and M. Shearer), *Journal of Differential Equations* **103** (1993), 94–126.
- (21) “Numerical computation of saddle-node homoclinic bifurcation points,” *SIAM Journal on Numerical Analysis* **30** (1993), 1155–1178.
- (22) “Riemann problem solutions that are stable to perturbation,” *Tatra Mountains Mathematical Publications* **4** (1994), 187–198.
- (23) “Rate of convergence of numerical approximations to homoclinic bifurcation points,” *IMA Journal of Numerical Analysis* **15** (1995), 23–60.
- (24) “Structurally stable Riemann solutions” (with D. Marchesin and B. J. Plohr), *Journal of Differential Equations* **126** (1996), 303–354.
- (25) “An organizing center for wave bifurcation in multiphase flow models” (with D. Marchesin and B. J. Plohr), *SIAM Journal on Applied Mathematics* **57** (1997), 1189–1215.
- (26) “Classification of codimension-one Riemann solutions” (with B. J. Plohr and D. Marchesin), *Journal of Dynamics and Differential Equations* **13** (2001), 523–588.
- (27) “Codimension-one Riemann solutions: classical missing rarefaction cases,” *Journal of Differential Equations* **157** (1999), 247–318.
- (28) “Codimension-one Riemann solutions: missing rarefactions in transitional wave groups,” *Advances in Differential Equations* **5** (2000), 929–975.
- (29) “Traveling-wave solutions of convection-diffusion systems by center manifold reduction,” *Nonlinear Analysis: Theory, Methods, and Applications* **49** (2002), 35–59.
- (30) “Codimension-one Riemann solutions: missing rarefactions adjacent to doubly sonic transitional waves,” *Journal of Dynamics and Differential Equations* **14** (2002), 295–348.
- (31) “Undercompressive shock waves and the Dafermos regularization,” *Nonlinearity* **15** (2002), 1361–1377.
- (32) “Geometric singular perturbation analysis of oxidation heat pulses for two-phase flow in porous media” (with D. Marchesin), *Bulletin of the Brazilian Mathematical Society* **32** (2002), 237–270.
- (33) “Oxidation heat pulses in two-phase expansive flow in porous media” (with D. Marchesin), to appear in *ZAMP* **54** (2003), 48–83.
- (34) “Stability of self-similar solutions of the Dafermos regularization of a system of conservation laws” (with X.-B. Lin), *SIAM J. Math. Anal.* **35** (2003), 884–921.
- (35) “Steam condensation waves in water-saturated porous rock” (with J. Bruining and D. Marchesin), *Qual. Theory Dyn. Syst.* **4** (2003), 205–231.



- (36) “Computation of Riemann solutions using the Dafermos regularization and continuation” (with B. Plohr and D. Marchesin), *Discrete and Continuous Dynamical Systems* **10** (2004), 965–986.
- (37) “Existence of Dafermos profiles for singular shocks,” *Journal of Differential Equations* **205** (2004), 185–210.
- (38) “Composite waves in the Dafermos regularization” (with P. Szmolyan), *Journal of Dynamics and Differential Equations* **16** (2004), 847–867.
- (39) “Eigenvalues of self-similar solutions of the Dafermos regularization of a system of conservation laws via geometric singular perturbation theory,” *Journal of Dynamics and Differential Equations* **18** (2006), 53 - 101.
- (40) “Combustion fronts in a porous medium with two layers” (with J. C. da Mota), *Journal of Dynamics and Differential Equations* **18** (2006), 615 - 665.
- (41) “Exchange lemmas 1: Deng’s lemma”, *Journal of Differential Equations* **245** (2008), 392–410.
- (42) “Exchange lemmas 2: General exchange lemma,” *Journal of Differential Equations* **245** (2008), 411–441.
- (43) “Persistence of rarefactions under Dafermos regularization: Blow-up and an exchange lemma for gain-of-stability turning points” (with Peter Szmolyan), *SIAM Journal on Applied Dynamical Systems* **8** (2009), 822–853.
- (44) “Traveling waves for a thin liquid film with surfactant on an inclined plane” (with Vahagn Manukian, *Nonlinearity* **22** (2009), 85–122.
- (45) “Stability of gasless combustion fronts in one-dimensional solids” (with Anna Ghazaryan, Yuri Latushkin, and Aparecido J. de Souza), *Arch. Ration. Mech. Anal.* **198** (2010), 981–1030.
- (46) “Heteroclinic orbits in slow-fast Hamiltonian systems with slow manifold bifurcations” (with Christos Sourdis), *J. Dynam. Differential Equations* **22** (2010), 629–655.
- (47) “Stability of traveling waves for degenerate systems of reaction diffusion equations” (with Anna Ghazaryan and Yuri Latushkin), *Indiana University Mathematic Journal* **60** (2011), 443–472.
- (48) “Stability of traveling waves for a class of reaction-diffusion systems that arise in chemical reaction models” (with Anna Ghazaryan and Yuri Latushkin), *SIAM J. Math. Anal.* **42** (2010), 2434–2472.
- (49) “Dafermos regularization of a diffusive-dispersive equation with cubic flux” (with Monique Richardson Taylor), *Discrete Contin. Dyn. Syst. A* **32** (2012), 4069–4110.
- (50) “How the Talmud divides an estate among creditors,” expository article in *Bridging Mathematics, Statistics, Engineering and Technology: Contributions from the Seminar on Mathematical Sciences and Applications*, Springer, 2012.
- (51) “Gasless combustion fronts with heat loss” (with Anna Ghazaryan and Peter L. Simon), *SIAM J. Appl. Math.* **73** (2013), 1303–1326.
- (52) “Stability of traveling waves in partly parabolic systems” (review article with Anna Ghazaryan and Yuri Latushkin), *Math. Model. Nat. Phenom.* **8** (2013), 31–47.
- (53) “Combustion waves and Riemann solutions in light porous foam” (with Grigori Chapiro and Dan Marchesin), *J. Hyperbolic Differ. Equ.* **11** (2014), 295–328.
- (54) “Morse theory for Lagrange multipliers and adiabatic limits” (with Guangbo Xu), *J. Differential Eqs.* **257** (2014), 4277–4318.

- (55) “Traveling waves in the Holling-Tanner model with weak diffusion” (with A. Ghazaryan and V. Manukian), *Proc. Roy. Soc. London Ser. A* **471**: 20150045 (2015).
- (56) “Stability of concatenated traveling waves: Alternate approaches” (with X.-B. Lin), *J. Differential Eqs.* **259** (2015), 3144–3177.
- (57) “Stability of concatenated traveling waves” (with X.-B. Lin), *J. Dynam. Differential Equations* **28** (2016), 867–896.
- (58) “The entry-exit function and geometric singular perturbation theory” (with P. De Maesschalck), *J. Differential Eqs.* **260** (2016), 6697–6715.
- (59) “Traveling waves in a simplified gas-solid combustion model in porous media” (with F. Ozbag and G. Chapiro), *Adv. Differential Equations* **23** (2018), 409–454.
- (60) “Stability of combustion waves in a simplified gas-solid combustion model in porous media” (with F. Ozbag), *Philos. Trans. Roy. Soc. A* **376** (2018), no. 2117, 20170185, 19 pp.
- (61) “More traveling waves in the Holling-Tanner model with weak diffusion” (with Vahagn Manukian), preprint, 2020.
- (62) “Geometric singular perturbation theory analysis of an epidemic model with spontaneous human behavioral change,” preprint, 2020

### Articles in Conference Proceedings

- (1) “Singular points of planar vector fields” (with M. Singer), *Global Theory of Dynamical Systems: Proceedings, Northwestern, 1979*, Springer-Verlag, 1980.
- (2) “Riemann problems involving undercompressive shocks” (with M. Shearer), *PDE’s and Continuum Models of Phase Transitions: Proceedings, Univ. of Nice, 1988* (eds. M. Rascle, D. Serre, M. Slemrod), Springer Lecture Notes in Physics **344** (1989), 187–200.
- (3) “Undercompressive shocks in systems of conservation laws” (with M. Shearer), *Nonlinear Evolution Equations that Change Type* (eds. B. L. Keyfitz and M. Shearer), IMA Volumes in Mathematics and its Applications **27**, Springer-Verlag, 1990.
- (4) “Transversality for undercompressive shocks in Riemann problems” (with M. Shearer), in *Viscous Profiles and Numerical Methods for Shock Waves* (M. Shearer, ed.), SIAM, 1991.

### Books

- (1) *Game Theory in Action: An Introduction to Classical and Evolutionary Models* (with H. Gintis), Princeton University Press, 2016.

### Chapters in Books

- (1) “Bifurcations with symmetry,” in J. Marsden and M. McCracken, *The Hopf Bifurcation*, Springer-Verlag, 1976.