Publications

Erik Scott Van Vleck

Refereed Journal Publications

1. S.N. Chow and E.S. Van Vleck, "A Shadowing Lemma for Random Diffeomorphisms," (1992) *Random & Computational Dynamics* **1(2)** pp. 197-218.

2. R. Shonkwiler and E.S. Van Vleck, "Parallel Speed-Up of Monte Carlo Methods for Global Optimization," (1994) *J. of Complexity* **10** pp. 64-95.

3. S.N. Chow and E.S. Van Vleck, "A Shadowing Lemma Approach to Global Error Analysis for Initial Value ODEs," (1994) *SIAM J. Sci. Comp.* **15** pp. 959-976.

4. L. Dieci, R.D. Russell and E.S. Van Vleck, "Unitary Integrators and Applications to Continuous Orthonormalization Techniques," (1994) *SIAM J. Numer. Anal.* **31** pp. 261-281.

5. W. Shen and E.S. Van Vleck, "Bifurcation Phenomena in a Condensed Two-Phase Combustion Model," (1994) *Random & Computational Dynamics* **2(2)** pp. 227-245.

6. S.N. Chow and E.S. Van Vleck, "Shadowing of Lattice Maps," (1994) *Contemporary Mathematics* **172** pp. 97-116.

7. J.W. Cahn, S.N. Chow and E.S. Van Vleck, "Spatially Discrete Nonlinear Diffusion Equations," (1995) *Rocky Mount. J. Math.* **25** pp. 87-118.

8. E.S. Van Vleck, "Numerical Shadowing Near Hyperbolic Trajectories," (1995) *SIAM J. Sci. Comp.* **16** pp. 1177-1189.

9. C.P. Grant and E.S. Van Vleck, "Slowly-Migrating Transition Layers for the Discrete Allen-Cahn and Cahn-Hilliard Equations," (1995) *Nonlinearity* **8** pp. 861-876.

10. L. Dieci and E.S. Van Vleck, "Computation of a Few Lyapunov Exponents for Continuous and Discrete Dynamical Systems," (1995) *Appld. Numer. Math.* **17** pp. 275-291.

11. J.W. Cahn and E.S. Van Vleck, "Quadrijunctions Do Not Stop Two-Dimensional Grain Growth," (1996) *Scripta Mater.* **34** pp. 909-912.

12. C.E. Elmer and E.S. Van Vleck, "Computation of Traveling Waves for Spatially Discrete Bistable Reaction-Diffusion Equations," (1996) *Appld. Numer. Math.* **20** pp. 157-169.

13. S.N. Chow, J. Mallet-Paret and E.S. Van Vleck, "Pattern Formation and Spatial Chaos in Spatially Discrete Evolution Equations," (1996) *Random & Computational Dynamics* **4(2&3)** pp. 109-178.

14. S.N. Chow, J. Mallet-Paret and E.S. Van Vleck, "Dynamics of Lattice Differential Equations," (1996) *Int. J. Bif. and Chaos* **6** pp. 1605-1622.

15. L. Dieci, R.D. Russell and E.S. Van Vleck, "On the Computation of Lyapunov Exponents for Continuous Dynamical Systems," (1997) *SIAM J. Numer. Anal.* **34** pp. 402-423.

16. B. Leimkuhler and E.S. Van Vleck, "Orthosymplectic Integration of Linear Hamiltonian Systems," (1997) *Numer. Math.* **77** pp. 269-282.

17. J.A. Scales and E.S. Van Vleck, "Lyapunov Exponents and Localization in Randomly Layered Media," (1997) *J. Comp. Phys.* **133** pp. 27-42.

18. A. Rodriguez-Bernal and E.S. Van Vleck, "Diffusion Induced Chaos in a Closed Loop Thermosyphon," (1998) *SIAM J. Appld. Math.* **58** pp. 1072-1093.

19. A. Rodriguez-Bernal and E.S. Van Vleck, "Complex Oscillations in a Closed Thermosyphon," (1998) *Int. J. Bif. and Chaos* **8** pp. 41-56.

20. C. Morey, J.A. Scales and E.S. Van Vleck, "A Feedback Algorithm for Determining Search Parameters for Monte Carlo Optimization," (1998) *J. Comp. Phys.* **146** pp. 263–281.

21. J.W. Cahn, J. Mallet-Paret and E.S. Van Vleck, "Traveling Wave Solutions for Systems of ODEs on a Two-Dimensional Spatial Lattice," (1999) *SIAM J. Appld. Math.* **59** pp. 455–493.

22. L. Dieci and E.S. Van Vleck, "Computation of Orthonormal Factors for Fundamental Solution Matrices," (1999) *Numer. Math.* **83** pp. 599–620.

23. C.E. Elmer and E.S. Van Vleck, "Analysis and Computation of Traveling Wave Solutions of Bistable Differential-Difference Equations," (1999) *Nonlinearity* **12** pp. 771–798.

24. L. Dieci and E.S. Van Vleck, "Continuous Orthonormalization for Linear Two-Point Boundary Value Problems Revisited," (1999) *IMA Volumes in Mathematics and Its Applications* **118** pp. 69–90.

25. J.W. Cahn and E.S. Van Vleck, "On the Co-existence and Stability of Trijunctions and Quadrijunctions in a Simple Model," (1999) *Acta Materialia* **47** pp. 4627–4639.

26. B. Jennings and E.S. Van Vleck, "Mosaic Solutions and Spatial Entropy for a Class of Neural Networks Models," (2000) *Int. J. Bif. Chaos* **10** pp. 1661–1676.

27. K.A. Abell, A.R. Humphries, and E.S. Van Vleck, "Mosaic Solutions and Spatial Entropy for Spatially Discrete Cahn-Hilliard Equations," (2000) *IMA J. Appld. Math.* **65** pp. 219–255.

28. E.S. Van Vleck, "Numerical Shadowing Using Componentwise Bounds and a Sharper Fixed Point Result," (2001) *SIAM J. Sci. Comp.* **22** pp. 787–801.

29. C.E. Elmer and E.S. Van Vleck, "Traveling Waves Solutions for Bistable Differential-Difference Equations with Periodic Diffusion," (2001) *SIAM J. Appld. Math.* **61** pp. 1648–1679.

30. K.A. Abell, A.R. Humphries, and E.S. Van Vleck, "Mosaic Solutions and Entropy for Spatially Discrete Coupled Phase-Transition Equations," (2001) *Physica D* **155** pp. 223–259.

31. L. Dieci and E.S. Van Vleck, "Lyapunov and Other Specta: A Survey," (2002) *Collected Lectures on the Preservation of Stability under Discretization, A Volume Published by SIAM* pp. 197–218.

32. C.E. Elmer and E.S. Van Vleck, "A Variant of Newton's Method for the Computation of Traveling Waves of Bistable Differential-Difference Equations," (2002) *J. Dynam. Diff. Eqn.* **14** pp. 493–517.

33. L. Dieci and E.S. Van Vleck, "Lyapunov Spectral Intervals: Theory and Computation," (2002) *SIAM J. Numer. Anal.* **40** pp. 516–542.

34. C.E. Elmer and E.S. Van Vleck, "Existence of Monotone Traveling Fronts for BDF Discretizations of Bistable Reaction-Diffusion Equations," (2003) *Journal of Dynamics of Continuous, Discrete and Impulsive Systems,* **10A** pp. 389–402.

35. C.E. Elmer and E.S. Van Vleck, "Anisotropy, Propagation Failure, and Wave Speedup in Traveling Waves of Discretizations of a Nagumo PDE," (2003) *J. Comp. Phys.* **185** pp. 562–582.

36. L. Dieci and E.S. Van Vleck, "Orthonormal Integrators Based on Householder and Givens Transformations," (2003) *Future Generation Computer Systems* **19** pp. 363–373.

37. J. Collis and E. S. Van Vleck, "Efficient Numerical Shadowing Global Error Estimation for High Dimensional Dissipative Systems," (2004) *Advanced Nonlinear Studies* **4** pp. 165–188.

38. S. Maier-Paape, B. E. Moore, and E.S. Van Vleck, "Spinodal Decomposition for Spatially Discrete Cahn-Hilliard Equations," (2005) *Journal of Dynamics of Continuous, Discrete and Impulsive Systems, Series A* **12** pp. 529–554.

39. C.E. Elmer and E.S. Van Vleck, "Spatially Discrete FitzHugh-Nagumo Equations," (2005) *SIAM J. Appld. Math.* **65** pp. 1153–1174.

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41. C.E. Elmer and E.S. Van Vleck, "Dynamics of Monotone Traveling Fronts for Discretizations of Nagumo PDEs," (2005) *Nonlinearity* **18** pp. 1605–1628.

42. L. Dieci and E.S. Van Vleck, "On the Error in Computing Lyapunov Exponents by QR Methods," (2005) *Numer. Math.* **101** pp. 619–642.

43. B. Wang and E.S. Van Vleck, "Attractors for Lattice FitzHugh-Nagumo Systems," (2005) *Physica D* **212** pp. 317–336.

44. M.D. Bateman and E.S. Van Vleck, "Traveling Wave Solutions to a Coupled System of Spatially Discrete Nagumo Equations," (2006) *SIAM J. Appld. Math.* **66** pp. 945–976.

45. C.M. Elliott, B. Gawron, S. Maier-Paape, and E.S. Van Vleck, "Discrete Dynamics for Convex and Non-Convex Smoothing Functionals in PDE Based Image Restoration," (2006) *Comm. Pure Appld. Anal.* **5** pp. 181–200.

46. W. Liu and E.S. Van Vleck, "Turning Points and Traveling Waves in FitzHugh-Nagumo Type Equations," (2006) *J. Diff. Eqn.* **225** pp. 381–410.

47. L. Dieci and E.S. Van Vleck, "Perturbation Theory for the Approximation of Lyapunov Exponents by QR Methods," (2006) *J. Dynam. Diff. Eqn.* **18** pp. 815–840.

48. L. Dieci and E.S. Van Vleck, "Lyapunov and Sacker-Sell Spectral Intervals," (2007) *J. Dynam. Diff. Eqn.* **19** pp. 263–295.

49. D. W. Graham, C. W. Knapp, E. S. Van Vleck, K. Bloor, T. B. Lane, and C. E. Graham, "Experimental Demonstration of Chaotic Instability in Biological Nitrification," (2007) *ISME Journal: Multidisciplinary Journal of Microbial Ecology* **1** pp. 385–393.

50. L. Dieci, M. S. Jolly, R. Rosa, and E.S. Van Vleck, "Error in Approximation of Lyapunov Exponents on Inertial Manifolds: the Kuramoto-Sivashinsky Equation," (2008) *Discrete and Continuous Dynamical Systems B* **9** pp. 555–580.

51. L. Dieci and E.S. Van Vleck, "On the Error in QR Integration," (2008) *SIAM J. Numer. Anal.* **46** pp. 1166–1189.

52. A. Cheskidov, M.S. Jolly, and E.S. Van Vleck, "On a relation between Lyapunov exponents and the radius of analyticity," (2008) *Indiana Univ. Math. J.* **57** pp. 2663–2680.

53. A. Scheel and E.S. Van Vleck, "Lattice Differential Equations Embedded into Reaction-Diffusion Systems," (2009) *Proc. Royal Soc. Edinburgh* **139** pp. 193–207.

54. A. Vainchtein and E.S. Van Vleck, "Nucleation and Propagation of Phase Mixtures in a Bistable Chain," (2009) *Phys. Rev. B.* **79** pp. 144123-1–11.

55. L. Dieci, C. Elia, and E.S. Van Vleck, "Exponential Dichotomy on the Real Line: SVD and QR methods," (2010) *J. Diff. Eqn.* **248** pp. 287–308.

56. E.S. Van Vleck, "On the Error in the Product QR Decomposition," (2010) *SIAM J. Matr. Anal. Appl.* **31** pp. 1775–1791.

57. W. Liu and E.S. Van Vleck, "Exponential Dichotomy for Asymptotically Hyperbolic Two-Dimensional Linear Systems," (2010) *J. Dynam. Diff. Eqn.* **22** pp. 697–722.

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59. M. Menning and E.S. Van Vleck, "On the Error in Approximating Stability Spectra for Discrete Time Dynamical Systems," (2011) *Mathematics and Computers in Simulation* **81** pp. 1006–1016.

60. V.H. Linh, V. Mehrmann, and E.S. Van Vleck, "QR Methods and Error Analysis for Computing Lyapunov and Sacker-Sell Spectral Intervals for Linear Differential-Algebraic Equations," (2011) *Advances in Computational Mathematics* **35** pp. 281–322.

61. L. Dieci, C. Elia, and E.S. Van Vleck, "Detecting Exponential Dichotomy on the Real Line: SVD and QR Algorithms," (2011) *BIT* **51** pp. 555–579.

62. A.R. Humphries, B.E. Moore, and E.S. Van Vleck, "Waves for Bistable Differential-Difference Equations with Inhomogeneous Diffusion," (2011) *SIAM J. Appld. Math.* **71** pp. 1374–1400.

63. M. Brucal - Hallare and E.S. Van Vleck, "Traveling Fronts in an Antidiffusion Lattice Nagumo Model," (2011) *SIAM J. Appld. Dyn. Sys.* **10** pp. 921–959.

64. M. Badawy and E.S. Van Vleck, "Perturbation Theory for the Approximation of Stability Spectra by QR Methods for Sequences of Linear Operators on a Hilbert Space," (2012) *Lin. Alg. and Applic.* **437** pp. 37–59.

65. C. Lu, W. Huang, and E.S. Van Vleck, The Cutoff Method for the Numerical Computation of Nonnegative Solutions of Parabolic PDEs with Application to Anisotropic Diffusion and Lubrication-Type Equations," (2013) *J. Comp. Phys.* **242** pp. 24–36.

66. H.J. Hupkes and E.S. Van Vleck, "Negative Diffusion and Traveling Waves in High Dimensional Lattice Systems," (2013) *SIAM J. Math. Anal.* **45** pp. 1068-1135.

67. D. Breda and E.S. Van Vleck, "Approximation of Lyapunov and Sacker-Sell Spectra for Delay Differential Equations," (2014) *Numer. Math.* **126** pp. 225–257.

68. A. Hoffman, H.J. Hupkes, and E.S. Van Vleck, "Multi-Dimensional Stability of Waves Traveling through Rectangular Lattices in Rational Directions," (2015) *Transactions AMS* **367** pp. 8757–8808.

69. A. Vainchtein, E.S. Van Vleck, and A. Zhang, "Propagation of Periodic Patterns in a Discrete Lattice with Competing Interactions," (2015) *SIAM J. Appld. Dyn. Sys.* **14** pp. 523–555.

70. C. Lamb and E.S. Van Vleck, "Neutral Mixed Type Functional Differential Equations," (2016) *J. Dyn. Diff. Eqn.* **28** pp. 763–804.

71. H.J. Hupkes and E.S. Van Vleck, "Traveling Waves for Complete Discretizations of Reaction Diffusion Systems," (2016) *J. Dyn. Diff. Eqn.* **28** pp. 955–1006.

72. A. J. Steyer and E.S. Van Vleck, "A Step-Size Selection Strategy for Explicit Runge-Kutta Methods based on Lyapunov Exponent Theory," (2016) *J. Comp. Appld. Math.* **292** pp. 703–719.

73. E.S. Van Vleck and A. Zhang, "Competing Interactions and Traveling Waves in Lattice Differential Equations," (2016) *Comm. Pure Appld. Anal.* **15** pp. 457-475.

74. Y.-M. Chung, A. J. Steyer, M. Tubbs, E.S. Van Vleck, and M. Vedantam, "Global Error Analysis and Inertial Manifold Reduction," (2016) *J. Comp. Appld. Math.* **307** pp. 204–215.

75. A. Hoffman, H.J. Hupkes, and E.S. Van Vleck, "Traveling Waves Through Obstacles in Bistable Lattice Differential Equations," (2014) *to appear in Memoirs AMS.* pp. 1–99.

Non Refereed Publications

1. Dieci, L. and Van Vleck, E. S., Lyapunov Exponents: Computation, in Encyclopedia of Applied and Computational Mathematics, Ed.: Engquist, B., Springer-Verlag, (2015), pp. 834–838.

2. Festschrift chapter in honor of Volker Mehrmann: Van Vleck, E. S., Continuous Matrix Factorizations, Numerical algebra, matrix theory, differential-algebraic equations and control theory, Springer-Verlag, (2015), pp. 299-318.

Book Review

Review of Partial Difference Equations by S.S. Cheng in *SIAM Review* **47** (2005) pp. 191–193.