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Education

B.S. Physics	Montana State University (first two years) University of Washington (final year)	June 1975
M.A. Physics	University of California at Berkeley	June 1977
Ph.D. Physics	University of California at Berkeley	June 1980

Employment History

Research Fellow	Institute for Fusion Studies University of Texas at Austin	1980-1982
Research Associate	Institute for Fusion Studies University of Texas at Austin	1982-1984
Research Scientist	Institute for Fusion Studies University of Texas at Austin	1984-1989
Associate Professor	Program in Applied Mathematics University of Colorado at Boulder	1989-1992
Full Professor	Dept. of Applied Mathematics University of Colorado at Boulder	1992-Present

Honors

Member, Institute for Theoretical Physics, UC Santa Barbara	1985
Fellow of the American Physical Society	1990
Research Professor, Mathematical Sciences Research Institute, UC Berkeley	2007
Sydney University International Visiting Research Fellowship	2009
College of Engineering Student Leadership Council Outstanding Faculty Award	2012
Dresden Senior Fellow, Technische Universität Dresden	2016

Visiting Positions

Postdoctoral Fellow	Woods Hole Oceanographic Inst. Geophysical Fluid Dynamics	June-September 1980
Visiting Professor	Department of Applied Mathematics Queen Mary College, Univ. of London	March-September 1983
Visiting Scientist	Institute for Theoretical Physics University of California, Santa Barbara	January-March 1985
Visiting Scientist	Department of Applied Mathematics Queen Mary College, Univ. of London	June-September 1986
Visiting Professor	Mathematics Institute University of Warwick, Coventry	February-April 1987
Research Scientist	Lawrence Berkeley Laboratory University of California at Berkeley	January-July 1989
Visiting Professor	University of London Centre for Nonlinear Dynamics	September-December 1993
Visiting Professor	Loughborough University Department of Mathematics	October 2000
Visiting Scientist	Newton Institute Cambridge University	November 2000

Research in Pairs	Oberwolfach Institute Collaborative Research	June 2004
Visiting Professor	University of Queensland < ICE-EM Australian Graduate School >	July 2005
Research Professor	Mathematical Sciences Research Inst. University of California at Berkeley	Jan-May 2007
Visiting Professor	Department of Mathematics University of Sydney	July-Aug 2009
Senior Fellow	Center for Dynamics Technische Universität Dresden	June 2016

PUBLICATIONS

0. Thesis

J.D. Meiss, “Statistical Dynamics of Weakly Nonlinear Internal Waves,” University of California at Berkeley, June 1980 (University Microfilms, Ann Arbor), 117pp.

I. Published Books

- 1) R.S. MacKay and J.D. Meiss (Eds.) Hamiltonian Dynamical Systems: a reprint selection, (1987), Adam-Hilgar Press, 784pp., ISBN 0-85274-205-3.
- 2) R.D. Hazeltine and J.D. Meiss, Plasma Confinement, (1991), Addison Wesley, 394 pp., ISBN 0201-53353-5.
- 3) R.D. Hazeltine and J.D. Meiss, Plasma Confinement, (2003) 2nd Edition, Dover Press, 480 pp., ISBN 0486432424.
- 4) J.D. Meiss, Differential Dynamical Systems, (2007) SIAM, Philadelphia 412 pp., ISBN 978-0-899816-35-1.
- 5) J.D. Meiss, Differential Dynamical Systems (Revised Edition), (2017) SIAM, Philadelphia 392 pp., ISBN 978-1-611974-63-8.

II. Published Journal Articles

- 1) J.D. Meiss and N. R. Pereira, “Internal Wave Solitons,” *Physics of Fluids* **21**, 700-702 (1978).
- 2) J.D. Meiss, “Integrability of Multiple Three Wave Interactions,” *Physical Review* **A19**, 1780–1789 (1979).

- 3) J.D. Meiss, N. Pomphrey, and K. M. Watson, "Numerical Analysis of Weakly Nonlinear Wave Turbulence," Proceedings of the National Academy of Sciences U.S.A. **76**, 2109-2113 (1978).
- 4) N. Pomphrey, J.D. Meiss, and K. M. Watson, "Description of Nonlinear Internal Wave Interactions Using Langevin Methods," Journal of Geophysical Research **85**, 1085-1094 (1980).
- 5) J.D. Meiss and K. M. Watson, "Internal Wave Interactions in the Induced Diffusion Approximation," Journal of Fluid Mechanics **117**, 315-341 (1982).
- 6) J.D. Meiss and K. M. Watson, "Relaxation Processes for a Three Wave Interaction Model," Proceedings of the National Academy of Sciences U.S.A. **78**, 2029-2032 (1981).
- 7) J. R. Cary, J.D. Meiss, and A. Bhattacharjee, "Statistical Characterization of Periodic Measure-Preserving Mappings," Physical Review **A23**, 2744-2746 (1981).
- 8) J. R. Cary and J.D. Meiss, "Rigorously Diffusive Deterministic Map," Physical Review **A24**, 2664-2668 (1981).
- 9) J.D. Meiss, R.D. Hazeltine, P. H. Diamond, and S. M. Mahajan, "Effect of Turbulent Diffusion on Collisionless Tearing Instabilities," Physics of Fluids **25**, 815-820 (1982).
- 10) J.D. Meiss and W. Horton, "Fluctuation Spectra of a Drift Wave Soliton Gas," Physics of Fluids **25**, 1838-1843 (1982).
- 11) J.D. Meiss and W. Horton, "Drift-Wave Turbulence from a Soliton Gas," Physical Review Letters **48**, 1362-1364 (1982).
- 12) J.D. Meiss, J. R. Cary, C. Grebogi, J.D. Crawford, A. N. Kaufman and H.D.I. Abarbanel, "Correlations of Periodic Area-Preserving Maps," Physica D **6**, 375-384 (1983).
- 13) J.D. Meiss and W. Horton, "Solitary Drift Waves in the Presence of Magnetic Shear," Physics of Fluids **26**, 990-997 (1983).
- 14) J.D. Meiss and P.J. Morrison, "Nonlinear Electron Landau Damping of Ion Acoustic Solitons," Physics of Fluids **26**, 983-989 (1983).
- 15) P. J. Morrison, J.D. Meiss, and J. R. Cary, "Scattering of Regularized-Long-Wave Solitary Waves," Physica D **11**, 324-336 (1984).
- 16) R.S. MacKay and J.D. Meiss, "Linear Stability of Periodic Orbits in Lagrangian Systems," Physics Letters **98A**, 92-94 (1983).
- 17) R.S. MacKay, J.D. Meiss, and I.C. Percival, "Stochasticity and Transport in Hamiltonian Systems," Physical Review Letters **52**, 697-700, (1984).
- 18) R.S. MacKay, J.D. Meiss, and I.C. Percival, "Transport in Hamiltonian Systems," Physica D **13**, 55-81 (1984).

- 19) R.D. Hazeltine and J.D. Meiss, “Shear-Alfvén Dynamics of Toroidally Confined Plasmas,” *Physics Reports* **121** Nos. 1&2, 1–167 (1985).
- 20) J.D. Hanson, J. R. Cary, and J.D. Meiss, “Algebraic Decay in Self-Similar Markov Chains,” *Journal of Statistical Physics* **39**, 327–345 (1985).
- 21) W. Horton, J. Liu, J.D. Meiss, and J.E. Sedlak, “Solitary Vortices in a Rotating Plasma,” *Physics of Fluids* **29**, 1004–1010 (1986).
- 22) J.D. Meiss, “Transport Near the Onset of Stochasticity,” *Journal of Particle Accelerators* **19**, 9–24 (1986).
- 23) R.D. Hazeltine, J.D. Meiss, and P.J. Morrison, “Analytical Theory of the Nonlinear $m=1$ Tearing Mode,” *Physics of Fluids* **29**, 1633–1639 (1986).
- 24) J.D. Meiss and E. Ott, “Markov-Tree Model of Intrinsic Transport in Hamiltonian Systems,” *Phys. Rev Letters* **55**, 2741–2744 (1985).
- 25) J.D. Meiss and E. Ott, “Markov Tree Model of Transport in Area-Preserving Maps,” *Physica D* **20**, 387–402 (1986).
- 26) R.S. MacKay and J.D. Meiss, “Flux and Differences in Action in Continuous Time Hamiltonian Systems,” *Journal of Physics A* **19**, L225–L229 (1986).
- 27) V. V. Mirnov, J.D. Meiss and J. L. Tennyson, “Relaxation to the Steady State in Neutral-Beam Injected Mirrors,” *Physics of Fluids* **29**, 3740–3748 (1986).
- 28) J.D. Meiss, “Class Renormalization: Islands around Islands,” *Physical Review* **34A**, 2375–2383 (1986).
- 29) A. Aydemir, R.D. Hazeltine, J.D. Meiss, and M. Kotschenreuther, “Destabilization of Alfvén-Resonant Modes by Resistivity and Diamagnetic Drifts,” *Physics of Fluids* **30**, 4–6 (1987).
- 30) R.S. MacKay, J.D. Meiss, and I.C. Percival, “Resonances in Area Preserving Maps,” *Physica D* **27**, 1–20 (1987).
- 31) J.D. Meiss, “Transport Near the Onset of Chaos,” *Physics Today*, *Physics News* of 1986, January (1987).
- 32) Q. Chen, J.D. Meiss, and I.C. Percival, “Orbit Extension Method for Finding Unstable Orbits,” *Physica D* **29**, 143–154 (1987).
- 33) R.S. MacKay and J.D. Meiss, “The Relation between Quantum and Classical Thresholds for Multi-photon Ionization of Excited Atoms,” *Physical Review* **37A**, 4702–4706 (1988).
- 34) Q. Chen and J.D. Meiss, “Flux, Resonances and the Devil’s Staircase for the Sawtooth Map,” *Nonlinearity* **2**, 347–356 (1988).
- 35) H.T. Kook and J.D. Meiss, “Periodic Orbits for Reversible, Symplectic Mappings,” *Physica D* **35**, 65–86 (1989).

- 36) J.D. Meiss, “Comment on Microwave Ionization of H-atoms: breakdown of classical dynamics for high frequencies,” *Physical Review Letters* **62**, 1576 (1989).
- 37) H.T. Kook and J.D. Meiss, “Application of Newton’s Method to Lagrangian Dynamical Systems,” *Physica D* **36**, 317–326 (1989).
- 38) R.S. MacKay, J.D. Meiss, and J. Stark, “Converse KAM Theory for Symplectic Twist Maps,” *Nonlinearity* **2**, 555–570 (1989).
- 39) H.T. Kook and J.D. Meiss, “Diffusion in Symplectic Maps,” *Physical Review A*, **41**, 4143–4150 (1990).
- 40) J.D. Meiss and R.D. Hazeltine, “Canonical Coordinates for Guiding Center Particles,” *Physics of Fluids*, **B2** 2563–2567 (1990).
- 41) Q. Chen, I. Dana, J.D. Meiss, N.W. Murray, and I.C. Percival, “Resonances and Transport in the Sawtooth Map,” *Physica D*, **46** 217–240 (1990).
- 42) Q. Chen, R.S. MacKay, and J.D. Meiss, “Cantori for Symplectic Maps,” *Journal of Physics A* **23** L1093–L1100 (1990).
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- 44) J.D. Meiss, “Symplectic Maps, Variational Principles and Transport,” *Reviews of Modern Physics*, **64** 795–848 (1992).
- 45) J.D. Meiss, “Cantori for the Stadium Billiard,” *Chaos* **2** 267–272 (1992).
- 46) R.L. Dewar and J.D. Meiss, “Flux-Minimizing Curves for Reversible Area-Preserving Maps,” *Physica D*, **57** 476–502 (1992).
- 47) R.E. Easton, J.D. Meiss, and S. Carver, “Exit Times and Transport for Symplectic Twist Maps,” *Chaos* **3** 153–165 (1993).
- 48) E. Bollt and J.D. Meiss, “Break-up of Invariant Tori for the Four Dimensional Semi-standard Map,” *Physica D* **66** 282–297 (1993).
- 49) J. L. Tennyson, J.D. Meiss and P. J. Morrison, “Self-Consistent Chaos in the Beam-Plasma Instability,” *Physica D* **71** 1–17 (1994).
- 50) J.D. Meiss, “Transient Measures for the Standard Map,” *Physica D* **74**, 254–267 (1994).
- 51) R.S. MacKay, J.D. Meiss, and J. Stark, “An Approximate Renormalization for the Break-up of Invariant Tori with Three Frequencies,” *Physics Lett. A* **190** 417–424 (1994).
- 52) E. Bollt and J.D. Meiss, “Controlling Transport through Recurrences,” *Physica D* **81** 280–294, 1995.
- 53) T. Hayashi, T. Sato, H.J. Gardner and J.D. Meiss, “Evolution of Magnetic Islands in a Helic,” *Physics of Plasmas*, **2** 752–775, 1995.

- 54) E. Bollt and J.D. Meiss, “Targeting Chaotic Orbits to the Moon through Recurrence,” Phys. Lett. A, **204** 373–383, 1995.
- 55) J.D. Meiss, “Average Exit, Times for Volume Preserving Maps” Chaos, **7** 139–147 1997.
- 56) D. Sterling and J.D. Meiss, “Computing Periodic Orbits using the Anti-Integrable Limit,” Physics Letters A **241**, 46–52 (1998).
- 57) H.E. Lomelí and J.D. Meiss, “Quadratic Volume Preserving Maps,” Nonlinearity **11**, 557–574 (1998).
- 58) V. Robins, J.D. Meiss and E. Bradley, “Computing Connectedness: an Exercise in Computational Topology,” Nonlinearity **11**, 913–922 (1998).
- 59) H.R. Dullin and J.D. Meiss, “Stability of Minimal Periodic Orbits,” Phys. Lett. A **247**, 227–324 (1998).
- 60) K.E. Lenz, H.E. Lomelí and J.D. Meiss, “Quadratic Volume Preserving Maps: an Extension of a Result of Moser,” Regular and Chaotic Dynamics **3**, 122–130 (1999).
- 61) D. Sterling, H.R. Dullin and J.D. Meiss, “Homoclinic Bifurcations for the Hénon Map,” Physica D **134** 153–184 (1999).
- 62) H.R. Dullin, J.D. Meiss, and D. Sterling, “Generic Twistless Bifurcations,” Nonlinearity **13**, 203–224 (2000).
- 63) H.E. Lomelí and J.D. Meiss, “Heteroclinic Primary Intersections and Codimension one Melnikov Method for Volume Preserving Maps,” Chaos **10**, 109–121 (1999).
- 64) V. Robins, J.D. Meiss, and L. Bradley, “Computing Connectedness: Disconnectedness and Discreteness” Physica D **139**, 276–300 (2000).
- 65) H.E. Lomelí and J.D. Meiss, “Heteroclinic Orbits and Transport in a Perturbed Integrable Suris Map,” Physics Letters A **269** (5/6) 309–318 (2000).
- 66) H.R. Dullin, and J.D. Meiss, “Generalized Hénon Maps: the Cubic Polynomial Diffeomorphisms of the Plane.” Physica D **143**(1–4): 262–289 (2000).
- 67) H.R. Dullin, D. Sterling and J.D. Meiss “Self-Rotation Number using the Turning Angle.” Physica D **145** (1–2): 25–46 (2000).
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- 69) A. Gomez and J.D. Meiss, “Volume Preserving Maps with an Invariant,” Chaos **12** 289–299 (2002).
- 70) H.R. Dullin, and J.D. Meiss, “Twist Singularities for Symplectic Maps,” Chaos **13** 1–16 (2003).

- 71) A. Gomez and J.D. Meiss, “Reversible Polynomial Automorphisms in the Plane: the Involutory Case,” *Physics Letters A* **312** 49–58 (2003).
- 72) H.E. Lomelí and J.D. Meiss, “Heteroclinic Orbits between Invariant Circles in Volume Preserving Mappings,” *Nonlinearity* **16** 1573–1595 (2003).
- 73) A. Gomez and J.D. Meiss, “Reversors and Symmetries for Polynomial Automorphisms of the Complex Plane,” *Nonlinearity* **17** 975–1000 (2004).
- 74) P. MULLOWNEY, K. JULIEN and J.D. Meiss, “Blinking rolls: chaotic advection in a 3D flow with an Invariant,” *SIAM J. Dynamical Systems* **4** 159–186 (2005)
- 75) H.R. Dullin, J.D. Meiss, and D. Sterling, “Symbolic Codes for Rotational Orbits,” *SIAM J. Appl. Dyn. Sys.* **4** 515–562 (2005).
- 76) H.R. Dullin, A.V. Ivanov, and J.D. Meiss, “Normal forms for 4D Symplectic Maps with Twist Singularities,” *Physica D* **215** 175–190 (2006).
- 77) D.B. Wysham and J.D. Meiss, “Iterative Techniques for Computing the Linearized Manifolds of Quasiperiodic Tori,” *Chaos* **16** 023129 (2006).
- 78) S.V. Gonchenko, J.D. Meiss, and I.I. Ovsyannikov “Chaotic dynamics of three-dimensional Hénon maps that originate from a homoclinic bifurcation,” *Regular and Chaotic Dynamics* **11**(2) 191–212 (2006).
- 79) D.J.W. Simpson and J.D. Meiss, “Andronov-Hopf Bifurcations in Planar, Piecewise-Smooth, Continuous Flows,” *Phys. Lett. A* **371**(3) 213–220 (2007).
- 80) H.E. Lomelí, J.D. Meiss, and R. Ramírez-Ros, “Canonical Melnikov Theory for Diffeomorphisms,” *Nonlinearity* **21** 485–508 (2008).
- 81) H.R. Dullin and J.D. Meiss, “Nilpotent Normal form for Divergence Free Vector Fields and Volume-Preserving Maps,” *Physica D* **237**(2) 156–166 (2008).
- 82) P. MULLOWNEY, K. JULIEN, and J.D. Meiss, “Chaotic Advection in the Küppers-Lortz State,” *Chaos* **18**, 033104 (2008).
- 83) J.D. Meiss, “Visual Explorations of Dynamics: the Standard Mapping,” *Pramana, Indian Academy of Sciences* **70** 965–988 (2008).
- 84) D.J.W. Simpson and J.D. Meiss, “Neimark-Sacker Bifurcations in Planar, Piecewise Smooth, Continuous Maps,” *SIAM J. Appl. Dyn. Sys.* **7**(3) 795–824 (2008)
- 85) D.J.W. Simpson and J.D. Meiss, “Unfolding a Codimension-Two Discontinuous Hopf Bifurcation,” *Chaos* **18** 033125 (2008).
- 86) H.E. Lomelí and J.D. Meiss, “Generating Forms for Exact Volume-Preserving Maps,” *Discrete and Continuous Dynamical Systems Series S* **2**(2) 361–277 (2009).
- 87) H.R. Dullin and J.D. Meiss, “Quadratic Volume Preserving Maps: Invariant Circles and Bifurcations,” *SIAM J. Appl. Dyn. Sys.* **8**(1) 76–128 (2009).

- 88) D.J.W. Simpson, D.S. Kompala, and J.D. Meiss, “Discontinuity Induced Bifurcations in a Model of *Saccharomyces Cerevisiae*,” *Math. Biosci.* **218** 40–49 (2009).
- 89) D.J.W. Simpson and J.D. Meiss, “Shrinking Point Bifurcations of Resonance Tongues for Piecewise-Smooth, Continuous Maps,” *Nonlinearity* **22** 1123–1144 (2009).
- 90) H.E. Lomelí, and J.D. Meiss, “Resonance Zones and Lobe Volumes for Volume-Preserving Maps,” *Nonlinearity* **22** 1761–1789 (2009).
- 91) J. Howard and J.D. Meiss, “Straight Line Orbits in Hamiltonian Flows,” *Celestial Mechanics and Dynamical Astronomy* **105**(4) 337–252 (2009).
- 92) D.J.W. Simpson and J.D. Meiss, “Simultaneous Border-Collision and Period-Doubling Bifurcations,” *Chaos* **19**(3) 033146 (2009).
- 93) D.J.W. Simpson and J.D. Meiss, “Resonance near Border-Collision Bifurcations in Piecewise-Smooth, Continuous Maps,” *Nonlinearity* **23** 3091–3118 (2010).
- 94) M. Gidea, J.D. Meiss, I. Ugarcovici, H. Weiss, “Applications of KAM Theory to Population Dynamics,” *J. Biological Dynamics* **5**(1) 44–63 (2011).
- 95) B.A. Mosovsky and J.D. Meiss, “Transport in Transitory Dynamical Systems,” *SIAM J. Dyn. Sys.* **10**(1) 35–65 (2011).
- 96) D.J.W. Simpson and J.D. Meiss, “Aspects of Bifurcation Theory for Piecewise-Smooth, Continuous Systems,” *Physica D*, **241**(22) 1861–1868 (2012).
- 97) H.R. Dullin and J.D. Meiss, “Resonances and Twist in Volume-Preserving Maps,” *SIAM J. Dyn. Systems* **11** 319–359 (2012).
- 98) J.D. Meiss, “The Destruction of Tori in Volume-Preserving Maps,” *Comm. Nonl. Sci. and Num. Simul.*, **17** 2108–2121 (2012).
- 99) Z. Alexander, J.D. Meiss, E. Bradley, and J. Garland, “Iterated Function System Models in Data Analysis: Detection and Separation,” *Chaos* **22**(2) 023103 (2012).
- 100) H.R. Dullin, H.E. Lomelí and J.D. Meiss, “Symmetry Reduction by Lifting for Maps,” *Nonlinearity* **25** 1709–1733 (2012).
- 101) B.A. Mosovsky and J.D. Meiss, “Transport in Transitory, Three-Dimensional, Liouville Flows,” *SIAM J. Dyn. Sys.* **11**(4) 1785–1816 (2012).
- 102) A.M. Fox and J.D. Meiss, “Greene’s Criterion for the Break-up of Tori in Volume-Preserving Maps,” *Physica D* **243**(1) 45–63 (2013).
- 103) B.A. Mosovsky, M.F.M. Speetjens, and J.D. Meiss, “Finite-Time Transport in Volume-Preserving Flows,” *Phys. Rev. Lett.* **110**(21): 214101 (2013).
- 104) A.M. Fox and J.D. Meiss, “Critical Invariant Circles in Asymmetric and Multiharmonic Generalized Standard Maps,” *Comm. Nonl. Sci. and Num. Simul.* **19**(4) 1004–1026 (2014).

- 105) R.M. Neupauer, J.D. Meiss, and D. C. Mays, “Chaotic advection and reaction during engineered injection and extraction in heterogeneous porous media.” *Water Resources Res.* **50**: 1433-1447 (2014).
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- 118) N. Guillery and J.D. Meiss, “Diffusion and Drift in Volume-Preserving Maps,” *Reg. Chaotic Dyn.* **22**(6): 700-720 (2017).

IV. Conference Proceedings, Book Chapters, Patents, Reviews, etc.

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- 2) J.D. Meiss, “Science Abstract,” appendix in The Formal Mechanics of Mind, S.N. Thomas, (Cornell Press, 1978), 315–318.
- 3) J.D. Meiss and C. P. Cannon, “Ceramic End Seal Design for High Temperature High Voltage Nuclear Instrumentation Cables,” **U. S. Patent No. 4,139,724**, (1979).
- 4) J.D. Meiss and K. M. Watson, “Discussion of Some Weakly Nonlinear Systems in Continuum Mechanics,” in Topics of Nonlinear Dynamics S. Jorna, (ed.), (American Institute of Physics, New York, 1978), 296–323, *Invited Presentation*.
- 5) J.D. Meiss and W. Young, “A Forced Burgers’ Equation,” in Geophysical Fluid Dynamics, WHOI-80-53, (Woods Hole Oceanographic Institute, 1980), 155–164.
- 6) J.D. Meiss, “Rational Solutions to Partial Differential Equations,” in Geophysical Fluid Dynamics, WHOI-80-53, (Woods Hole Oceanographic Institute, 1980), 225–232.
- 7) J.D. Meiss, “Numerical Computation of Relaxation Rates for the Test Wave Model,” in Nonlinear Properties of Internal Waves, B. West (ed.), (American Institute of Physics, New York, 1981), 129–140, *Invited Presentation*.
- 8) J.D. Meiss, “Integrals of the Test-Wave Hamiltonian: A Special Case,” in Mathematical Methods in Hydrodynamics and Integrability in Dynamical Systems, M. Tabor and Y. Treve (eds.), (American Institute of Physics, New York, 1982), 293–300, *Invited Presentation*.
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- 10) J.D. Meiss, “Solitons in Turbulent Flow,” in Statistical Physics and Chaos in Fusion Plasmas, W. Horton and L. Reichl (eds.), (John Wiley and Sons, New York, 1984), 273–284, *Invited Presentation*.
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