

References

- [Af1] Afraimovich, V.S. and Nekorkin, V.I.: Stable stationary motions in a chain of diffusively coupled maps [in Russian]. Preprint N 267. Inst. Appl. Phys. N. Novgorod (1991)
- [Af2] Afraimovich, V.S. and Nekorkin, V.I.: Chaos of travelling waves in a discrete chain of diffusively coupled maps [in Russian]. Preprint N 330. Inst. Appl. Phys. N. Novgorod (1991)
- [Af3] Afraimovich, V.S. and Pilyugin, S.Yu.: Special pseudotrajectories for lattice dynamical systems. *Random Comput. Dynamics* **4** (1996) 29–47
- [Ak] Akin, E.: *The General Topology of Dynamical Systems*. Grad. Stud. in Math. **1**. Amer. Math. Soc., Providence, RI (1993)
- [AlN] Al-Nayef, A., Diamond, P., Kloeden, P., Kozyakin, V., and Pokrovskii, A.: Bi-shadowing and delay equations. *Dyn. Stab. Syst.* **11** (1996) 121–135
- [Alo] Alouges, F. and Debussche, A.: On the qualitative behavior of the orbits of a parabolic partial differential equation and its discretization in the neighborhood of a hyperbolic fixed point. *Numer. Funct. Anal. Optim.* **12** (1991) 253–269
- [Ang] Angenent, S.B.: The Morse-Smale property for a semi-linear parabolic equation. *J. Diff. Equat.* **62** (1986) 427–442
- [Ano1] Anosov, D.V.: Geodesic Flows on Closed Riemannian Manifolds of Negative Curvature. *Proc. Steklov Math. Inst.* **90** (1967). Amer. Math. Soc., Providence, RI (1969)
- [Ano2] Anosov, D.V.: On a class of invariant sets of smooth dynamical systems [in Russian]. In: *Proc. 5th Int. Conf. on Nonl. Oscill.* **2**. Kiev (1970) 39–45
- [Ano3] Anosov, D.V. and Bronshtein, I.U.: Topological dynamics. In: *Dynamical Systems I. Ordinary Differential Equations and Smooth Dynamical Systems*. EMS **1**. Springer-Verlag (1988)
- [Ao1] Aoki, N.: Topological dynamics. In: *Topics on General Topology*. North-Holland, Amsterdam (1989) 625–740
- [Ao2] Aoki, N. and Hiraide, K.: *Topological Theory of Dynamical Systems*. Recent Advances. North-Holland Math. Library **52**. North-Holland, Amsterdam (1994)
- [Bab] Babin, A.V. and Vishik, M.I.: *Attractors of Evolution Equations*. Stud. Math. Appl. **25**. North-Holland, Amsterdam (1992)
- [Bar] Barge, M. and Swanson, R.: Rotation shadowing properties of circle and annulus maps. *Ergod. Theory Dyn. Syst.* **8** (1988) 509–521
- [Beg] Begun, E.N. and Pilyugin, S.Yu.: Uniformly Lipschitz shadowing of pseudotrajectories [in Russian]. *Vestn. SPbGU*, Issue 1 (1996) 3–7

- [Ben] Benaïm, M. and Hirsch, M.W.: Asymptotic pseudotrajectories and chain recurrent flows, with applications. *J. Dynam. Diff. Equat.* **8** (1996) 141–176
- [Bey] Beyn, W.-J.: On the numerical approximation of phase portraits near stationary points. *SIAM J. Numer. Anal.* **24** (1987) 1095–1113
- [Bi] Birkhoff, G.: *Dynamical Systems*. Amer. Math. Soc., Providence, RI (1927)
- [Bl1] Blank, M.L.: Metric properties of ϵ -trajectories of dynamical systems with stochastic behavior. *Ergod. Theory Dyn. Syst.* **8** (1988) 365–378
- [Bl2] Blank, M.L.: Shadowing of ϵ -trajectories of general multidimensional mappings. *Wiss. Z. Tech. Univ. Dresden* **40** (1991) 157–159
- [Bo1] Bowen, R.: Periodic orbits for hyperbolic flows. *Amer. J. Math.* **94** (1972) 1–30
- [Bo2] Bowen, R.: *Equilibrium States and the Ergodic Theory of Anosov Diffeomorphisms*. Lect. Notes in Math. **470**. Springer-Verlag (1975)
- [Bro] Bronshtein, I.U.: *Nonautonomous Dynamical Systems* [in Russian]. Kishinev (1984)
- [Bru] Brunovsky, P. and Chow, S.-N.: Generic properties of stationary state solutions of reaction-diffusion equations. *J. Diff. Equat.* **53** (1984) 1–23
- [By] Bylov, B.V., Vinograd, R.E., Grobman, D.M., and Nemytski, V.V.: *Theory of Lyapunov Exponents* [in Russian]. Moscow (1966)
- [Cha] Chaffee, N. and Infante, E.: A bifurcation problem for a nonlinear parabolic equation. *J. Appl. Anal.* **4** (1974) 17–37
- [Che] Chen, L. and Li, S.-H.: Shadowing properties for inverse limit spaces. *Proc. Amer. Math. Soc.* **115** (1992) 573–580
- [Cho1] Chow, S.-N., Lin, X.-B., and Palmer, K.J.: A shadowing lemma for maps in infinite dimensions. In: *Differential Equations (Xanthi, 1987)*. Dekker, N.Y. (1989) 127–135
- [Cho2] Chow, S.-N. and Palmer, K.J.: On the numerical computation of orbits of dynamical systems: the one-dimensional case. *J. Dynam. Diff. Equat.* **3** (1991) 361–379
- [Cho3] Chow, S.-N. and Palmer, K.J.: On the numerical computation of orbits of dynamical systems: the higher-dimensional case. *J. Complexity* **8** (1992) 398–423
- [Cho4] Chow, S.-N. and Palmer, K.J.: The accuracy of numerically computed orbits of dynamical systems in \mathbf{R}^k . In: *Differential Equations and Mathematical Physics (Birmingham, AL, 1990)*. Academic Press, Boston, MA (1992) 39–44
- [Cho5] Chow, S.-N., Lu, K. and Sell, G.R.: Smoothness of inertial manifolds. *J. Math. Anal. Appl.* **169** (1992) 283–312
- [Cho6] Chow, S.-N. and Van-Vleck, E.S.: A shadowing lemma for random diffeomorphisms. *Random Comput. Dynamics* **1** (1992/93) 197–218
- [Cho7] Chow, S.-N. and Shen, W.: *Dynamics in a Discrete Nagumo Equation*. Preprint (1993)
- [Cho8] Chow, S.-N. and Van-Vleck, E.S.: A shadowing lemma approach to global error analysis for initial value ODEs. *SIAM J. Sci. Comput.* **15** (1994) 959–976
- [Cho9] Chow, S.-N. and Van-Vleck, E.S.: Shadowing of lattice maps. *Contemp. Math.* **172** (1994) 97–113

- [Col] Colonius, F. and Kliemann, W.: The Lyapunov spectrum of families of time varying matrices. Rep. 504, Inst. Math., Univ. Augsburg (1994)
- [Con] Conley, R.: Isolated Invariant Sets and the Morse Index. Reg. Conf. Series in Math. **38**. Amer. Math. Soc., Providence, RI (1978)
- [Coo1] Coomes, B.A., Koçak, H., and Palmer, K.J.: Shadowing orbits of ordinary differential equations. J. Comput. Appl. Math. **52** (1994) 35-43
- [Coo2] Coomes, B.A., Koçak, H., and Palmer, K.J.: Periodic shadowing. Contemp. Math. **172** (1994) 115-130
- [Coo3] Coomes, B.A., Koçak, H., and Palmer, K.J.: A shadowing theorem for ordinary differential equations. Z. Angew. Math. Phys. **46** (1995) 85-106
- [Coo4] Coomes, B.A., Koçak, H., and Palmer, K.J.: Rigorous computational shadowing of orbits of ordinary differential equations. Numer. Math. **69** (1995) 401-421
- [Coo5] Coomes, B.A., Koçak, H., and Palmer, K.J.: Shadowing in discrete dynamical systems. In: Six Lectures on Dynamical Systems. World Scientific (1996) 163-211
- [Coo6] Coomes, B.A., Koçak, H., and Palmer, K.J.: Long periodic shadowing. Numer. Algorithms **14** (1997) 55-78
- [Cor1] Corless, R. and Pilyugin, S.Yu.: Evaluation of upper Lyapunov exponents on hyperbolic sets. J. Math. Anal. Appl. **189** (1995) 145-159
- [Cor2] Corless, R. and Pilyugin, S.Yu.: Approximate and real trajectories for generic dynamical systems. J. Math. Anal. Appl. **189** (1995) 409-423
- [Cou] Coupled Map Lattices (ed. K. Kaneko). John Wiley (1992)
- [Cov] Coven, E.M., Kan, I., and Yorke, J.A.: Pseudo-orbit shadowing in the family of tent maps. Trans. Amer. Math. Soc. **308** (1988) 227-241
- [D] Diamond, P., Kloeden, P., and Pokrovskii, A.: Cycles of spatial discretizations of shadowing dynamical systems. Math. Nachr. **171** (1995) 95-110
- [DG] De Gregorio, S.: The study of periodic orbits of dynamical systems. The use of a computer. J. Stat. Phys. **38** (1985) 947-972
- [DM] de Melo, W.: Moduli of stability of two-dimensional diffeomorphisms. Topology **19** (1980) 9-21
- [Ea] Easton, R.: Chain transitivity and the domain of influence of an invariant set. In: The Structure of Attractors in Dynamical Systems (North Dakota State Univ., June 1977). Lect. Notes in Math. **668**. Springer-Verlag (1978) 95-102
- [Ei1] Eirola, T. and Pilyugin, S.Yu.: Pseudotrajectories generated by a discretization of a parabolic equation. J. Dynam. Diff. Equat. **8** (1996) 281-297
- [Ei2] Eirola, T., Nevanlinna, O., and Pilyugin, S.Yu.: Limit shadowing property. Numer. Funct. Anal. Optim. **18** (1997) 75-92
- [Ek] Ekeland, I.: Some lemmas about dynamical systems. Math. Scand. **52** (1983) 262-268
- [Fe] Feçkan, M.: A remark on the shadowing lemma. Funkcialaj Ekvacioj **34** (1991) 391-402
- [Fo] Foias, C., Sell, G.R., and Temam, R.: Inertial manifolds for nonlinear evolutionary equations. J. Diff. Equat. **73** (1988) 309-353
- [Fr1] Franke, J.E. and Selgrade, J.F.: Hyperbolicity and chain recurrence. J. Diff. Equat. **26** (1977) 27-36

- [Fr2] Franke, J.E. and Selgrade, J.F.: A computer method for verification of asymptotically stable periodic orbits. *SIAM J. Math. Anal.* **10** (1979) 614–628
- [Ge] Gedeon, T. and Kuchta, M.: Shadowing property of continuous maps. *Proc. Amer. Math. Soc.* **115** (1992) 271–281
- [Gr] Grebogi, C., Hammel, S.M., Yorke, J.A., and Sauer T.: Shadowing of physical trajectories in chaotic dynamics: containment and refinement. *Phys. Rev. Lett.* **65** (1990) 1527–1530
- [Gu1] Guckenheimer, J.: A strange, strange attractor. In: *The Hopf Bifurcation Theorem and its Applications*. Springer-Verlag (1976) 368–381
- [Gu2] Guckenheimer, J., Moser, J., and Newhouse, S.: *Dynamical Systems*. Birkhäuser-Verlag (1980)
- [Had] Haderler, K.P.: Shadowing orbits and Kantorovich's theorem. *Numer. Math.* **73** (1996) 65–73
- [Hal] Hale, J.K.: *Asymptotic Behavior of Dissipative Systems*. Math. Surv. Monogr. **25**. Amer. Math. Soc., Providence, RI (1988)
- [Ham] Hammel, S.M., Yorke, J.A., and Grebogi, C.: Numerical orbits of chaotic processes represent true orbits. *Bull. Amer. Math. Soc.* **19** (1988) 465–469
- [Har] Hardy, G.H., Littlewood, J.E., and Pólya, G.: *Inequalities*. Cambridge Univ. Press (1934)
- [Hay1] Hayashi, S.: Diffeomorphisms in \mathcal{F}^1 satisfy Axiom A. *Ergod. Theory Dyn. Syst.* **12** (1992) 233–253
- [Hay2] Hayashi, S.: On the solution of C^1 stability conjecture for flows. Preprint.
- [He1] Henry, D.: *Geometric Theory of Semilinear Parabolic Equations*. Lect. Notes in Math. **840**. Springer-Verlag (1981)
- [He2] Henry, D.: Some infinite-dimensional Morse-Smale systems defined by parabolic PDE. *J. Diff. Equat.* **59** (1985) 165–205
- [He3] Henry, D.B.: Exponential dichotomies, the shadowing lemma, and homoclinic orbits in Banach spaces. *Resenhas IME-USP* **1** (1994) 381–401
- [Hira1] Hiraide, K.: Expansive homeomorphisms with the pseudo-orbit tracing property on compact surfaces. *J. Math. Soc. Japan* **40** (1988) 123–137
- [Hira2] Hiraide, K.: Expansive homeomorphisms with the pseudo-orbit tracing property on n -tori. *J. Math. Soc. Japan* **41** (1989) 357–389
- [Hirs1] Hirsch, M., Palis, J., Pugh, C., and Shub, M.: Neighborhoods of hyperbolic sets. *Invent. math.* **9** (1970) 133–163
- [Hirs2] Hirsch, M.: *Differential Topology*. Springer-Verlag (1976)
- [Hirs3] Hirsch, M., Pugh, C.C., and Shub, M.: *Invariant Manifolds*. Lect. Notes in Math. **583**. Springer-Verlag (1977)
- [Hirs4] Hirsch, M.: Asymptotic phase, shadowing and reaction-diffusion systems. In: *Differential Equations, Dynamical Systems, and Control Science*. Lect. Notes in Pure and Applied Math. **152**. Marcel Dekker Inc. New York, Basel, Hong Kong (1994) 87–99
- [Hu] Hurley, M.: Consequences of topological stability. *J. Diff. Equat.* **54** (1984) 60–72
- [Ka] Kakubari, S.: A note on a linear automorphism of \mathbf{R}^n with the pseudo-orbit tracing property. *Sci. Rep. Niigata Univ. Ser. A* (1987) 35–37
- [Kato1] Kato, K.: Pseudo-orbits and stabilities of flows. *Mem. Fac. Sci. Kochi Univ.* **5** (1984) 45–62

- [Kato2] Kato, K.: Pseudo-orbits and stabilities of flows, II. Mem. Fac. Sci. Kochi Univ. **6** (1985) 33–43
- [Kato3] Kato, K.: Hyperbolicity and pseudo-orbits for flows. Mem. Fac. Sci. Kochi Univ. **12** (1991) 43–55
- [Katok1] Katok, A.: Local properties of hyperbolic sets [in Russian]. Appendix to the Russian translation of [Ni1]. Moscow (1975)
- [Katok2] Katok, A. and Hasselblatt, B.: Introduction to the Modern Theory of Dynamical Systems. Encyclopedia of Math. and its Appl. **54**. Cambridge Univ. Press (1995)
- [Ki] Kirby, R. and Siebenmann, L.C.: Foundational Essays on Topological Manifolds, Smoothings, and Triangulations. Annals of Math. Stud. **88**. Princeton Univ. Press (1977)
- [Kol] Komuro, M.: One-parameter flows with the pseudo orbit tracing property. Monatsh. Math. **98** (1984) 219–253
- [Ko2] Komuro, M.: Lorenz attractors do not have the pseudo-orbit tracing property. J. Math. Soc. Japan **37** (1985) 489–514
- [Kr] Kruger, T. and Troubetzkoy, S.: Markov partitions and shadowing for non-uniformly hyperbolic systems with singularities. Ergod. Theory Dyn. Syst. **12** (1992) 487–508
- [Lad1] Ladyzhenskaya, O.A.: Attractors for Semi-Groups and Evolution Equations. Cambridge Univ. Press (1991)
- [Lad2] Ladyzhenskaya, O.A.: Globally stable difference schemes and their attractors [in Russian]. Preprint POMI P-5-91. St.-Petersburg (1991)
- [Lanf] Lanford, O.E. III: Introduction to the mathematical theory of dynamical systems. In: Chaotic Behavior of Deterministic Systems (Les Houches, 1981). North-Holland, Amsterdam (1983) 3–51
- [Lani] Lani-Wayda, B.: Hyperbolic Sets, Shadowing, and Persistence for Noninvertible Mappings in Banach Spaces. Pitman Res. Notes in Math. Longman (1995)
- [Lar1] Larsson, S.: Nonsmooth data error estimates with application to the study of the long-time behavior of finite element solutions of semilinear parabolic equations. Preprint 1992-36, Dept. Math. Chalmers Univ. Techn. Göteborg Univ. (1992)
- [Lar2] Larsson, S. and Sanz-Serna, J.-M.: The behavior of finite element solutions of semilinear parabolic problems near stationary points. SIAM J. Numer. Anal. **31** (1994) 1000–1018
- [Lar3] Larsson, S. and Sanz-Serna, J.-M.: A shadowing result with applications to finite element approximation of reaction-diffusion equations. Preprint 1996-05, Dept. Math. Chalmers Univ. Techn. Göteborg Univ. (1996)
- [Lar4] Larsson, S. and Pilyugin, S.Yu.: Numerical shadowing near the global attractor for a semilinear parabolic equation. Preprint 1998-21, Dept. Math. Chalmers Univ. Techn. Göteborg Univ. (1998)
- [Lo] Lorenz, E.: Deterministic nonperiodic flow. J. Atmosph. Sci. **20** (1963) 130–141
- [Ma] Mañé, R.: A proof of the C^1 -stability conjecture. IHES Publ. Math. **66** (1988) 161–210
- [Me] Meyer, K.R. and Sell, G.R.: An analytic proof of the shadowing lemma. Funkcialaj Ekvacioj **30** (1987) 127–133

- [Mi] Mizera, I.: Generic properties of one-dimensional dynamical systems. In: *Ergodic Theory and Related Topics III* (Gustrov, 1990). Lect. Notes in Math. **1514**. Springer-Verlag (1992)
- [Morim1] Morimoto, A.: Stochastically stable diffeomorphisms and Takens conjecture. *Surikais Kokyuruko* **303** (1977) 8–24
- [Morim2] Morimoto, A.: The method of pseudo-orbit tracing and stability of dynamical systems. Sem. Note **39**. Tokyo Univ. (1979)
- [Morim3] Morimoto, A.: Some stabilities of group automorphisms. In: *Manifolds and Lie Groups* (Progress in Math., **14**). Birkhäuser-Verlag (1981) 283–299
- [Moriy] Moriyasu, K.: The topological stability of diffeomorphisms. *Nagoya Math. J.* **123** (1991) 91–102
- [Mu] Munkres, J.: Obstructions to the smoothing of piecewise-differentiable homeomorphisms. *Ann. Math.* **72** (1960) 521–554
- [Na] Nadzieja, T.: Shadowing lemma for family of ϵ -trajectories. *Arch. Math.* **27A** (1991) 65–77
- [Ni1] Nitecki, Z.: *Differentiable Dynamics*. MIT Press (1971)
- [Ni2] Nitecki, Z.: On semi-stability of diffeomorphisms. *Invent. math.* **14** (1971) 83–122
- [Ni3] Nitecki Z. and Shub, M.: Filtrations, decompositions, and explosions. *Amer. J. Math.* **97** (1975) 1029–1047
- [Nu] Nusse, H.E. and Yorke, J.A.: Is every approximate trajectory of some process near an exact trajectory of a nearby process? *Comm. Math. Phys.* **114** (1988) 363–379
- [Ol] Oliva, W.M., Kuhl, N.M., and Magalhães, L.T.: Diffeomorphisms of \mathbb{R}^n with oscillatory Jacobians. *Publ. Mat.* **37** (1993) 255–269
- [Od] Odani, K.: Generic homeomorphisms have the pseudo-orbit tracing property. *Proc. Amer. Math. Soc.* **110** (1990) 281–284
- [Om1] Ombach, J.: Equivalent conditions for hyperbolic coordinates. *Topology Appl.* **23** (1986) 87–90
- [Om2] Ombach, J.: The simplest shadowing. *Ann. Polon. Math.* **58** (1993) 253–258
- [Om3] Ombach, J.: Shadowing for linear systems of differential equations. *Publ. Mat.* **37** (1993) 245–253
- [Os1] Osipenko, G.S.: On a symbolic image of a dynamical system [in Russian]. In: *Boundary-Value Problems*. Perm' (1983) 101–105
- [Os2] Osipenko, G.S.: Periodic points and symbolic dynamics. In: *Seminar on Dynamical Systems* (St.-Petersburg, 1991). *Progr. Nonlinear Diff. Equat. Appl.* **12**. Birkhäuser-Verlag (1994) 261–267
- [Os3] Osipenko, G.S.: Morse spectrum of dynamical systems and symbolic image. *Proc. 15th IMACS World Congress* **1** (1997) 25–30
- [Pali] Palis, J.: On Morse-Smale dynamical systems. *Topology* **8** (1969) 385–404
- [Palm1] Palmer, K.J.: Exponential dichotomies and transversal homoclinic points. *J. Diff. Equat.* **55** (1984) 225–256
- [Palm2] Palmer, K.J.: Exponential dichotomies, the shadowing lemma and transversal homoclinic points. *Dynamics Reported* **1** (1988) 265–306
- [Palm3] Palmer, K.J.: Shadowing and Silnikov chaos. *Nonlinear Analysis, Theory, Methods & Applications* **27** (1996) 1075–1093
- [Par] Park, J.S., Lee, K.H., and Koo, K.S.: Hyperbolic homeomorphisms. *Bull. Korean Math. Soc.* **32** (1995) 93–102

- [Pe] Pennings, T. and Van-Eeuwen, J.: Pseudo-orbit shadowing on the unit interval. *Real Anal. Exchange* **16** (1990/91) 238–244
- [Pi1] Pilyugin, S.Yu.: *Introduction to Structurally Stable Systems of Differential Equations*. Birkhäuser-Verlag (1992)
- [Pi2] Pilyugin, S.Yu.: *The Space of Dynamical Systems with the C^0 -Topology*. *Lect. Notes in Math.* **1571**. Springer-Verlag (1994)
- [Pi3] Pilyugin, S.Yu.: Complete families of pseudotrajectories and shape of attractors. *Random Comput. Dynamics* **2** (1994) 205–226
- [Pi4] Pilyugin, S.Yu.: Shadowing in structurally stable flows. *J. Diff. Equat.* **140** (1997) 238–265
- [Pi5] Pilyugin, S.Yu. and Plamenevskaya, O.B.: Shadowing is generic [to appear in *Topology Appl.*].
- [Pla1] Plamenevskaya, O.B.: Shadowing and limit shadowing on the circle [in Russian]. *Vestn. SPbGU* (1997)
- [Pla2] Plamenevskaya, O.B.: Weak shadowing for two-dimensional diffeomorphisms [to appear].
- [Pli1] Pliss, V.A.: *Integral Sets of Periodic Systems of Differential Equations* [in Russian]. Moscow (1977)
- [Pli2] Pliss, V.A.: Uniformly bounded solutions of linear systems of differential equations [in Russian]. *Differents. Uravneniya* **13** (1977) 883–891
- [Pli3] Pliss, V.A.: Sets of linear systems of differential equations with uniformly bounded solutions [in Russian]. *Differents. Uravneniya* **16** (1980) 1599–1616
- [Po] Poon, L., Dawson, S.P., Grebogi, C., Sauer, T., and Yorke, J.A.: Shadowing in chaotic systems. In: *Dynamical Systems and Chaos 2*. World Scientific (1995) 13–21
- [Pu] Pugh, C. and Shub, M.: The Ω -stability theorem for flows. *Invent. math.* **11** (1970) 150–158
- [Q] Quinn, F.: Topological transversality holds in all dimensions. *Bull. Amer. Math. Soc.* **18** (1988) 145–148
- [Re] Reinfelds, A.: The reduction of discrete dynamical and semidynamical systems in metric spaces. In: *Six Lectures on Dynamical Systems*. World Scientific (1996) 267–312.
- [Robb] Robbin, J.: A structural stability theorem. *Ann. Math.* **94** (1971) 447–493
- [Robi1] Robinson, C.: Structural stability of vector fields. *Ann. Math.* **99** (1974) 154–175
- [Robi2] Robinson, C.: Structural stability for C^1 -diffeomorphisms. *J. Diff. Equat.* **22** (1976) 28–73
- [Robi3] Robinson, C.: Stability theorems and hyperbolicity in dynamical systems. *Rocky Mount. J. of Math.* **7** (1977) 425–437
- [Ru] Ruelle, D.: *Thermodynamic Formalism*. *Encyclopedia of Math. and its Appl.* **5**. Addison-Wesley, Reading, MA (1978)
- [Sac] Sacker, R.J. and Sell, G.R.: A spectral theory for linear differential systems. *J. Diff. Equat.* **27** (1978) 320–358
- [Sak1] Sakai, K.: The C^1 uniform pseudo-orbit tracing property. *Tokyo J. Math.* **15** (1992) 99–109
- [Sak2] Sakai, K.: Pseudo-orbit tracing property and strong transversality of diffeomorphisms on closed manifolds. *Osaka J. Math.* **31** (1994) 373–386

- [Sak3] Sakai, K.: Shadowing property and transversality condition. In: *Dynamical Systems and Chaos. 1.* World Scientific (1995) 233–238
- [Sak4] Sakai, K.: Hyperbolic metrics of expansive homeomorphisms. *Topology Appl.* **63** (1995) 263–266
- [Sak5] Sakai, K.: Diffeomorphisms with the shadowing property. *J. Austral. Math. Soc.* **61** (1996) 396–399
- [San] Sanz-Serna, J.M. and Larsson, S.: Shadows, chaos, and saddles. *Appl. Numer. Math.* **13** (1993) 181–190
- [Sas] Sasaki, K.: Some examples of stochastically stable homeomorphisms. *Nagoya Math. J.* **71** (1978) 97–105
- [Sau1] Sauer, T. and Yorke, J.A.: Shadowing trajectories of dynamical systems. In: *Computer Aided Proofs in Analysis* (Cincinnati, OH, 1989). IMA Vol. Math. Appl. **28.** Springer-Verlag (1991) 229–234
- [Sau2] Sauer, T. and Yorke, J.A.: Rigorous verification of trajectories for the computer simulation of dynamical systems. *Nonlinearity* **4** (1991) 961–979
- [Saw] Sawada, K.: Extended f -orbits are approximated by orbits. *Nagoya Math. J.* **79** (1980) 33–45
- [Sc] Schwartz, I.B.: Estimating regions of existence of unstable periodic orbits using computer-based techniques. *SIAM J. Numer. Anal.* **20** (1983) 106–120
- [Shu1] Shub, M.: Structurally stable diffeomorphisms are dense. *Bull. Amer. Math. Soc.* **78** (1972) 817–818
- [Shu2] Shub, M.: *Global Stability of Dynamical Systems.* Springer-Verlag (1987)
- [Shl] Shlyachkov, S.V.: A theorem on ϵ -trajectories for Lorenz mappings [in Russian]. *Funkts. Anal. Pril.* **19** (1985) 84–85
- [Si] Sinai, Ya.G. and Vul, E.B.: Discovery of closed orbits of dynamical systems with the use of computers. *J. Stat. Phys.* **23** (1980) 27–47
- [Sl] Slackov, S.V.: Pseudo-orbit tracing property and structural stability of expanding maps of the interval. *Ergod. Theory Dyn. Syst.* **12** (1992) 573–587
- [Sm1] Smale, S.: Stable manifolds for differential equations and diffeomorphisms. *Ann. Scuola Norm. Sup. Pisa* **17** (1963) 97–116
- [Sm2] Smale, S.: Differentiable dynamical systems. *Bull. Amer. Math. Soc.* **73** (1967) 747–817
- [Ste1] Steinlein, H. and Walther, H.-O.: Hyperbolic sets and shadowing for non-invertible maps. In: *Advanced Topics in the Theory of Dynamical Systems* (Trento, 1987). Academic Press, Boston, MA (1989) 219–234
- [Ste2] Steinlein, H. and Walther, H.-O.: Hyperbolic sets, transversal homoclinic trajectories, and symbolic dynamics for C^1 maps in Banach spaces. *J. Dynam. Diff. Equat.* **2** (1990) 325–365
- [Sto] Stoffer, D.: Transversal homoclinic points and hyperbolic sets for nonautonomous maps. *I. Z. Angew. Math. Phys.* **39** (1988) 518–549
- [T1] Thomas, R.F.: Stability properties of one-parameter flows. *Proc. London Math. Soc.* **45** (1982) 479–505
- [T2] Thomas, R.F.: Topological stability: some fundamental properties. *J. Diff. Equat.* **59** (1985) 103–122
- [V] Van Vleck, E.S.: Numerical shadowing near hyperbolic trajectories. *SIAM J. Sci. Comput.* **16** (1995) 1177–1189
- [Wa1] Walters, P.: Anosov diffeomorphisms are topologically stable. *Topology* **9** (1970) 71–78

- [Wa2] Walters, P.: On the pseudo orbit tracing property and its relationship to stability. In: *The Structure of Attractors in Dynamical Systems*. Lect. Notes in Math. **668**. Springer-Verlag (1978) 231–244
- [We] Wen, L.: On the C^1 stability conjecture for flows. *J. Diff. Equat.* **129** (1996) 334–357
- [Wh] Whitehead, J.: Manifolds and transverse fields in Euclidean space. *Ann. Math.* **73** (1961) 154–212
- [Y1] Yano, K.; Topologically stable homeomorphisms of the circle. *Nagoya Math. J.* **79** (1980) 145–149
- [Y2] Yano, K.: Generic homeomorphisms of S^1 have the pseudo-orbit tracing property. *J. Fac. Sci. Univ. Tokyo, Sect.IA Math.* **34** (1987) 51–55
- [Z] Zeidler, E.: *Nonlinear Functional Analysis and its Applications I*. Springer-Verlag (1986)

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