

References

1. Van Kampen, N.G., Elimination of fast variables, *Physics Reports*, **124** (1985), 69–160.
2. Bogolyubov, N.N., *Dynamic theory problems in statistical physics*, Gostekhizdat, Moscow, Leningrad, 1946.
3. Lyapunov A.M., *The general problem of the stability of motion*, Taylor & Francis, London, 1992.
4. Kolmogorov, A.N., On conservation of conditionally periodic motions under small perturbations of the Hamiltonian. *Dokl. Akad. Nauk SSSR*, **98** (1954), 527–530.
5. Arnold, V.I., Proof of a theorem of A.N. Kolmogorov on the invariance of quasi-periodic motions under small perturbations of the Hamiltonian. (English translation) *Russian Math Surveys*, **18** (1963), 9–36.
6. Moser, J., Convergent series expansions for quasi-periodic motions, *Math. Ann.*, **169** (1967), 136–176.
7. Moser, J., On invariant manifolds of vector fields and symmetric partial differential equations, *Differential Anal., Bombay Colloq.* (1964), 227–236.
8. Sacker, R.J., A new approach to the perturbation theory of invariant surfaces, *Comm. Pure. Appl. Math.*, **18** (1965), 717–732.
9. Gorban, A.N., Karlin, I.V., Thermodynamic parameterization, *Physica A*, **190** (1992), 393–404.
10. Gorban, A.N., Karlin, I.V., Uniqueness of thermodynamic projector and kinetic basis of molecular individualism, *Physica A*, **336**, 3–4 (2004), 391–432. Preprint online: <http://arxiv.org/abs/cond-mat/0309638>.
11. Gorban, A.N., Karlin, I.V., Method of invariant manifolds and regularization of acoustic spectra, *Transport Theory and Stat. Phys.*, **23** (1994), 559–632.
12. Gorban, A.N., Karlin, I.V., Zinovyev, A.Yu., Constructive methods of invariant manifolds for kinetic problems, *Phys. Reports*, **396**, 4–6 (2004), 197–403. Preprint online: <http://arxiv.org/abs/cond-mat/0311017>.
13. Roberts, A.J., Low-dimensional modelling of dynamical systems applied to some dissipative fluid mechanics, in: *Nonlinear dynamics from lasers to butterflies*, World Scientific, Lecture Notes in Complex Systems, **1**, (2003), Rowena Ball and Nail Akhmediev, eds, 257–313.
14. Gorban, A.N., Karlin, I.V., The constructing of invariant manifolds for the Boltzmann equation, *Adv. Model. and Analysis C*, **33(3)** (1992), 39–54.
15. Ehrenfest, P., Ehrenfest-Afanasyeva, T., in: *Mechanics Enziklopädie der Mathematischen Wissenschaften*, Vol.4., Leipzig, 1911. (Reprinted in: Ehrenfest, P., *Collected Scientific Papers*, North-Holland, Amsterdam, 1959, pp. 213–300.)
16. Hilbert, D. Begründung der kinetischen Gastheorie, *Mathematische Annalen*, **72** (1912), 562–577.

17. Karlin, I.V., Dukek, G., Nonnenmacher, T.F., Invariance principle for extension of hydrodynamics: Nonlinear viscosity, *Phys. Rev. E*, **55**(2) (1997), 1573–1576.
18. Santos, A., Nonlinear viscosity and velocity distribution function in a simple longitudinal flow, *Phys. Rev. E* **62** (2000), 6597–6607.
19. Santos, A., Comments on nonlinear viscosity and Grad’s moment method, *Phys. Rev. E* **67** (2003), 053201.
20. Garzó, V., Santos, A., Kinetic theory of gases in shear flows. nonlinear transport, Book series: Fundamental Theories of Physics, Vol. 131, Kluwer, Dordrecht, 2003.
21. Karlin, I.V., Gorban, A.N., Dukek, G., Nonnenmacher, T.F. Dynamic correction to moment approximations, *Phys. Rev. E*, **57** (1998), 1668–1672.
22. Gorban, A.N., Karlin, I.V., Method of invariant manifold for chemical kinetics, *Chem. Eng. Sci.*, **58**, 21 (2003), 4751–4768. Preprint online: <http://arxiv.org/abs/cond-mat/0207231>.
23. Gorban, A.N., Karlin, I.V., Zmievskii, V.B., Dymova S.V., Reduced description in reaction kinetics, *Physica A*, **275**(3–4) (2000), 361–379.
24. Karlin, I.V., Zmievskii, V.B., Invariant closure for the Fokker–Planck equation, 1998. Preprint online: <http://arxiv.org/abs/adap-org/9801004>.
25. Foias, C., Jolly, M.S., Kevrekidis, I.G., Sell, G.R., Titi, E.S. On the computation of inertial manifolds, *Physics Letters A*, **131**, 7–8 (1988), 433–436.
26. Gorban, A.N., Karlin, I.V., Zmievskii, V.B., Nonnenmacher, T.F., Relaxational trajectories: global approximations, *Physica A*, **231** (1996), 648–672.
27. Gorban, A.N., Karlin, I.V., Zmievskii, V.B., Two-step approximation of space-independent relaxation, *Transp.Theory Stat. Phys.*, **28**(3) (1999), 271–296.
28. Guckenheimer, J., Vladimirov, A., A fast method for approximating invariant manifolds, *SIAM Journal on Applied Dynamical Systems*, **3**, 3 (2004), 232–260.
29. Gorban, A.N., Karlin, I.V., Ilg, P., and Öttinger, H.C., Corrections and enhancements of quasi-equilibrium states, *J.Non-Newtonian Fluid Mech.* **96** (2001), 203–219.
30. Gorban, A.N., Karlin, I.V., Öttinger, H.C., and Tatarinova, L.L., Ehrenfest’s argument extended to a formalism of nonequilibrium thermodynamics, *Phys. Rev. E* **63** (2001), 066124.
31. Gorban, A.N., Karlin, I.V., Reconstruction lemma and fluctuation–dissipation theorem, *Revista Mexicana de Fisica* **48**, Supl. 1 (2002), 238–242.
32. Gorban, A.N., Karlin, I.V., Macroscopic dynamics through coarse-graining: A solvable example, *Phys. Rev. E*, **56** (2002), 026116.
33. Gorban, A.N., Karlin, I.V., Geometry of irreversibility, in: *Recent Developments in Mathematical and Experimental Physics, Volume C: Hydrodynamics and Dynamical Systems*, Ed. F. Uribe, Kluwer, Dordrecht, 2002, 19–43.
34. Karlin, I.V., Tatarinova, L.L., Gorban, A.N., Öttinger, H.C., Irreversibility in the short memory approximation, *Physica A*, **327**, 3–4 (2003), 399–424. Preprint online: <http://arXiv.org/abs/cond-mat/0305419> v1 18 May 2003.
35. Karlin, I.V., Ricksen, A., Succi, S., Dissipative quantum dynamics from Wigner distributions, in: *Quantum Limits to the Second Law: First International Conference on Quantum Limits to the Second Law*, San Diego, California (USA), 29–31 July 2002, *AIP Conference Proceedings*, **643**, 19–24.

36. Wigner, E., On the quantum correction for thermodynamic equilibrium, *Phys. Rev.*, **40** (1932), 749–759.
37. Caldeira, A.O., Leggett, A.J. Influence of damping on quantum interference: An exactly soluble model, *Phys. Rev. A*, **31** (1985), 1059–1066.
38. Filinov, V.S., Wigner approach to quantum statistical mechanics and quantum generalization molecular dynamics method. 1, *Mol. Phys.*, **88** (1996), 1517–1528; 2, *ibidem* 1529–1539.
39. Calzetta, E.A., Hu, B.L., Correlation entropy of an interacting quantum field and H-theorem for the $O(N)$ model, *Phys. Rev. D*, **68** (2003), 065027.
40. Gorban, A.N., Karlin, I.V., Short-wave limit of hydrodynamics: a soluble example, *Phys. Rev. Lett.* **77** (1996), 282–285.
41. Karlin, I.V., Exact summation of the Chapman-Enskog expansion from moment equations, *J. Physics A: Math. Gen.*, **33** (2000), 8037–8046.
42. Karlin, I.V., Gorban, A.N., Hydrodynamics from Grad's equations: What can we learn from exact solutions?, *Ann. Phys. (Leipzig)* **11** (2002), 783–833. Preprint online: <http://arXiv.org/abs/cond-mat/0209560>.
43. Gorban, A.N., Karlin, I.V., Structure and approximations of the Chapman-Enskog expansion, *Sov. Phys. JETP* **73** (1991), 637–641.
44. Gorban, A.N., Karlin, I.V., Structure and approximations of the Chapman-Enskog expansion for linearized Grad equations, *Transport Theory and Stat. Phys.* **21** (1992), 101–117.
45. Karlin, I.V., Simplest nonlinear regularization, *Transport Theory and Stat. Phys.*, **21** (1992), 291–293.
46. Fenichel, N., Persistence and smoothness of invariant manifolds for flows, *Indiana Univ. Math. J.*, **21** (1971), 193–226.
47. Hirsch, M.W., Pugh, C., Shub, M., *Invariant manifolds*, Lecture Notes in Mathematics, V. 583, Springer, NY, 1977.
48. Jones, D.A., Stuart, A.M., Titi, E.S., Persistence of invariant sets for dissipative evolution equations, *Journal of Mathematical Analysis and Applications*, **219**, 2 (1998), 479–502.
49. De la Llave, R., Invariant manifolds associated to invariant subspaces without invariant complements: a graph transform approach, *Mathematical Physics Electronic Journal*, **9** (2003). <http://www.ma.utexas.edu/mpej/MPEJ.html>
50. Poincaré, H.: *Les méthodes nouvelles de la mécanique céleste*. Vols. 1–3. Gauthier-Villars, Paris, 1892/1893/1899.
51. Beyn, W.-J., Kless, W. Numerical Taylor expansions of invariant manifolds in large dynamical systems, *Numerische Mathematik* **80** (1998), 1–38.
52. Kazantzis, N., Singular PDEs and the problem of finding invariant manifolds for nonlinear dynamical systems, *Physics Letters, A* **272** (4) (2000), 257–263.
53. Shirkov, D.V., Kovalev, V.F., Bogoliubov renormalization group and symmetry of solution in mathematical physics, *Physics Reports*, **352** (2001), 219–249. Preprint online: <http://arxiv.org/abs/hep-th/0001210>.
54. Zinn-Justin, J., *Quantum field theory and critical phenomena*, Clarendon Press, Oxford, 1989.
55. Pashko O., Oono, Y., The Boltzmann equation is a renormalization group equation, *Int. J. Mod. Phys. B*, **14** (2000), 555–561.
56. Kunihiro T., A geometrical formulation of the renormalization group method for global analysis, *Prog. Theor. Phys.* **94** (1995), 503–514; Erratum: *ibid.* **95** (1996), 835. Preprint online: <http://arxiv.org/abs/hep-th/9505166>.

57. Ei, S.-I., Fujii, K., Kunihiro, T., Renormalization-group method for reduction of evolution equations; invariant manifolds and envelopes, *Annals Phys.* **280** (2000), 236–298. Preprint online: <http://arxiv.org/abs/hep-th/9905088>.
58. Hatta Y., Kunihiro T. Renormalization group method applied to kinetic equations: roles of initial values and time, *Annals Phys.* **298** (2002), 24–57. Preprint online: <http://arxiv.org/abs/hep-th/0108159>.
59. Degenhard A., Rodrigues-Laguna J. Towards the evaluation of the relevant degrees of freedom in nonlinear partial differential equations, *J. Stat. Phys.*, **106**, No. 516 (2002), 1093–1119.
60. Forster, D., Nelson D.R., Stephen, M.J., Long-time tails and the large-eddy behavior of a randomly stirred fluid, *Phys. Rev. Lett.* **36** (1976), 867–870.
61. Forster, D., Nelson D.R., Stephen, M.J., Large-distance and long-time properties of a randomly stirred fluid, *Phys. Rev. A* **16** (1977), 732–749.
62. Adzhemyan, L.Ts., Antonov, N.V., Kompaniets, M.V., Vasil'ev, A.N., Renormalization-group approach to the stochastic Navier Stokes equation: Two-loop approximation, *International Journal of Modern Physics B*, **17**, 10 (2003), 2137–2170.
63. Chen, H., Succi, S., Orszag, S., Analysis of subgrid scale turbulence using Boltzmann Bhatnagar-Gross-Krook kinetic equation, *Phys. Rev. E*, **59** (1999), R2527–R2530.
64. Chen, H., Kandasamy, S., Orszag, S., Shock, R., Succi, S., Yakhot, V., Extended Boltzmann Kinetic Equation for Turbulent Flows, *Science*, **301** (2003), 633–636.
65. Degond, P., Lemou, M., Turbulence Models for Incompressible Fluids Derived from Kinetic Theory, *Journal of Mathematical Fluid Mechanics*, **4**, 3 (2002), 257–284.
66. Ansumali, S., Karlin, I.V., Succi, S., Kinetic theory of turbulence modeling: Smallness parameter, scaling and microscopic derivation of Smagorinsky model, *Physica A*, (2004), to appear. Preprint online: <http://arxiv.org/abs/cond-mat/0310618>.
67. Smagorinsky, J., General Circulation Experiments with the Primitive Equations: I. The Basic Equations, *Mon. Weather Rev.*, **91** (1963), 99–164.
68. Bricmont, J., Gawedzki, K., Kupiainen, A., KAM theorem and quantum field theory. *Commun. Math. Phys.* **201** (1999), 699–727. E-print mp_arc 98-526, online: http://mpej.unige.ch/mp_arc/c/98/98-517.ps.gz.
69. Gorban, A.N., Karlin, I.V., Methods of nonlinear kinetics, in: *Encyclopedia of Life Support Systems*, Encyclopedia of Mathematical Sciences, EOLSS Publishers, Oxford, 2004, <http://www.eolss.net/>. Preprint online: <http://arXiv.org/abs/cond-mat/0306062>.
70. Chapman, S., Cowling, T., *Mathematical theory of non-uniform gases*, Third edition, Cambridge University Press, Cambridge, 1970.
71. Galkin V.S., Kogan M.N., Makashev N.K., Chapman-Enskog generalized method, *Dokl. Akademii Nauk SSSR*, **220** (1975), 304–307.
72. Bobylev, A.V., The Chapman-Enskog and Grad methods for solving the Boltzmann equation, *Sov. Phys. Dokl.*, **27** (1982), No. 1, 29–31.
73. Bobylev, A.V., Exact-solutions of the nonlinear Boltzmann-equation and the theory of relaxation of a Maxwellian gas, *Theor. Math. Phys.*, **60** (1984), 820–841.
74. Bobylev, A.V., Quasi-stationary hydrodynamics for the Boltzmann equation, *J. Stat. Phys.* **80**, (1995), 1063–1083.

75. Ernst, M.H., Nonlinear Model-Boltzmann equations and exact solutions, *Physics Reports*, **78** (1981), 1–171.
76. García-Colín, L.S., Green, M.S., Chaos, F., The Chapman-Enskog solution of the generalized Boltzmann equation *Physica*, **32**, 2 (1966), 450–478.
77. Bowen, J.R., Acrivos, A., Oppenheim, A.K., Singular perturbation refinement to quasi-steady state approximation in chemical Kinetics. *Chemical Engineering Science*, **18** (1963), 177–188.
78. Segel, L.A., Slemrod, M., The quasi-steady-state assumption: A case study in perturbation. *SIAM Rev.*, **31** (1989), 446–477.
79. Fraser, S.J., The steady state and equilibrium approximations: A geometrical picture. *J. Chem. Phys.*, **88**(8) (1988), 4732–4738.
80. Roussel, M.R., Fraser, S.J., Geometry of the steady-state approximation: Perturbation and accelerated convergence methods, *J. Chem. Phys.*, **93** (1990), 1072–1081.
81. Yablonskii, G.S., Bykov, V.I., Gorban, A.N., Elokhin, V.I., Kinetic models of catalytic reactions. *Comprehensive Chemical Kinetics*, Vol. 32, Compton R. G. ed., Elsevier, Amsterdam (1991).
82. Vasil'eva A.B., Butuzov V.F., Kalachev L.V., The boundary function method for singular perturbation problems, *SIAM* (1995).
83. Strygin V.V., Sobolev V.A., Splitting of motion by means of integral manifolds. Nauka, Moscow (1988).
84. Roos, H.G., Stynes, M., Tobiska, L., numerical methods for singularly perturbed differential equations: Convection–diffusion and flow problems, Springer Verlag, 1996.
85. Mishchenko, E.F., Kolesov, Y.S., Kolesov, A.U., Rozov, N.Kh., Asymptotic methods in singularly perturbed systems, Consultants Bureau, 1994.
86. Novozhilov, I.V., Fractional analysis: Methods of motion decomposition, Birkhäuser, Boston, 1997.
87. Milik, A., Singular perturbation on the Web, 1997. <http://www.ima.umn.edu/~milik/singdir.html#geo:sing>.
88. Gear, C.W., Numerical initial value problems in ordinary differential equations, Prentice–Hall, Englewood Cliffs, NJ (1971).
89. Rabitz, H., Kramer, M., Dacol, D., Sensitivity analysis in chemical kinetics, *Ann. Rev. Phys. Chem.*, **34**, 419–461 (1983).
90. Lam, S.H., Goussis, D.A., The CSP Method for Simplifying Kinetics, *International Journal of Chemical Kinetics*, **26** (1994), 461–486.
91. Valorani, M., Goussis, D.A., Explicit time-scale splitting algorithm for stiff problems: Auto-ignition of gaseous mixtures behind a steady shock, *Journal of Computational Physics*, **169** (2001), 44–79.
92. Valorani, M., Najm, H.N., Goussis, D.A., CSP analysis of a transient flame-vortex interaction: time scales and manifolds, *Combustion and Flame* **134** (2003), 35–53.
93. Maas, U., Pope, S.B., Simplifying chemical kinetics: intrinsic low-dimensional manifolds in composition space, *Combustion and Flame*, **88** (1992), 239–264.
94. Kaper, H.G., Kaper, T.J., Asymptotic analysis of two reduction methods for systems of chemical reactions, *Physica D*, **165** (2002), 66–93.
95. Zagaris, A., Kaper, H.G., Kaper, T.J. Analysis of the computational singular perturbation reduction method for chemical kinetics, *Journal of Non-linear Science*, **14**, 1 (2004), 59–91. Preprint on-line: <http://arxiv.org/abs/math.DS/0305355>.

96. Debussche A., Temam, R., Inertial manifolds and slow manifolds. *Appl. Math. Lett.*, **4**, 4 (1991), 73–76.
97. Foias, C., Prodi, G., Sur le comportement global des solutions non stationnaires des equations de Navier-Stokes en dimension deux, *Rend. Sem. Mat. Univ. Padova*. **39** (1967), 1–34.
98. Ladyzhenskaya, O.A., A dynamical system generated by Navier-Stokes equations, *J. of Soviet Mathematics*, **3** (1975), 458–479.
99. Chueshov, I.D., Theory of functionals that uniquely determine the asymptotic dynamics of infinite-dimensional dissipative systems, *Russian Math. Surveys.*, **53**, 4 (1998), 731–776.
100. Chueshov, I.D., Introduction to the theory of infinite-dimensional dissipative systems, The Electronic Library of Mathematics, 2002, <http://rattler.cameron.edu/EMIS/monographs/Chueshov/>. [Translated from Russian edition, ACTA Scientific Publishing House, Kharkov, Ukraine, 1999].
101. Dellnitz, M., Junge, O., Set oriented numerical methods for dynamical systems, in: B. Fiedler, G. Iooss and N. Kopell (eds.): *Handbook of Dynamical Systems II: Towards Applications*, World Scientific, 2002, 221–264. <http://math-www.upb.de/~agdellnitz/papers/handbook.pdf>.
102. Dellnitz, M., Hohmann, A. The computation of unstable manifolds using subdivision and continuation, in H.W. Broer et al. (eds.), *Progress in Nonlinear Differential Equations and Their Applications 19:449–459*, Birkhäuser, Basel / Switzerland, 1996.
103. Broer, H.W., Osinga, H.M., and Vegter, G. Algorithms for computing normally hyperbolic invariant manifolds, *Z. angew. Math. Phys.* **48** (1997), 480–524.
104. Garay, B.M., Estimates in discretizing normally hyperbolic compact invariant manifolds of Ordinary Differential Equations, *Computers and Mathematics with Applications*, **42** (2001), 1103–1122.
105. Gorban, A.N., Karlin, I.V., Zinovyev, A.Yu., Invariant grids for reaction kinetics, *Physica A*, **333** (2004), 106–154. Preprint online: <http://www.ihes.fr/PREPRINTS/P03/Resu/resu-P03-42.html>.
106. Zmievskii, V.B., Karlin, I.V., Deville, M., The universal limit in dynamics of dilute polymeric solutions, *Physica A*, **275(1–2)** (2000), 152–177.
107. Theodoropoulos, C., Qian, Y.H., Kevrekidis, I.G., Coarse stability and bifurcation analysis using time-steppers: a reaction-diffusion example, *Proc. Nat. Acad. Sci.*, **97** (2000), 9840–9843.
108. Kevrekidis, I.G., Gear, C.W., Hyman, J.M., Kevrekidis, P.G., Runborg, O., Theodoropoulos, C., Equation-free, coarse-grained multiscale computation: enabling microscopic simulators to perform system-level analysis, *Comm. Math. Sci.*, **14** (2003), 715–762.
109. Ilg P., Karlin, I.V., Validity of macroscopic description in dilute polymeric solutions, *Phys. Rev. E* **62** (2000), 1441–1443.
110. Ilg, P., De Angelis, E., Karlin, I.V., Casciola, C.M., Succi, S., Polymer dynamics in wall turbulent flow, *Europhys. Lett.*, **58** (2002), 616–622.
111. Boltzmann, L., *Lectures on gas theory*, University of California Press, 1964.
112. Cercignani, C., *The Boltzmann equation and its applications*, Springer, New York, 1988.
113. Cercignani, C., Illner, R., Pulvirent, M., *The mathematical theory of dilute gases*, Springer, New York, 1994.

114. Stueckelberg E.C.G., Theoreme H et unitarite de S , *Helv. Phys. Acta* **25**, 5 (1952), 577–580.
115. Gorban, A.N., *Equilibrium encircling. Equations of chemical kinetics and their thermodynamic analysis*, Nauka, Novosibirsk, 1984.
116. Bhatnagar, P.L., Gross, E.P., Krook, M., A model for collision processes in gases. I. Small amplitude processes in charged and neutral one-component systems, *Phys. Rev.*, **94**, 3 (1954), 511–525.
117. Gorban, A.N., Karlin, I.V., General approach to constructing models of the Boltzmann equation, *Physica A*, **206** (1994), 401–420.
118. Lebowitz, J., Frisch, H., Helfand, E., Non-equilibrium distribution functions in a fluid, *Physics of Fluids*, **3** (1960), 325.
119. DiPerna, R.J., Lions, P.L., On the Cauchy problem for Boltzmann equation: Global existence and weak stability, *Ann. Math.*, **130** (1989), 321–366.
120. Enskog, D., *Kinetische theorie der Vorange in massig verdunnten Gasen. I Allgemeiner Teil*, Almqvist and Wiksell, Uppsala, 1917.
121. Pöschel, Th., Brilliantov, N. V. Kinetic integrals in the kinetic theory of dissipative gases, In: T. Pöschel, N. Brilliantov (eds.) “Granular Gas Dynamics”, *Lecture Notes in Physics*, Vol. 624, Springer, Berlin, 2003, 131–162.
122. Broadwell, J.E., Study of shear flow by the discrete velocity method, *J. Fluid Mech.* **19** (1964), 401–414.
123. Broadwell, J.E., Shock structure in a simple discrete velocity gas, *Phys. Fluids*, **7** (1964), 1243–1247.
124. Palczewski, A., Schneider, J., Bobylev, A.V., A consistency result for a discrete-velocity model of the Boltzmann equation, *SIAM Journal on Numerical Analysis*, **34**, 5 (1997), 1865–1883.
125. Zwanzig, R., Ensemble method in the theory of irreversibility. *J. Chem. Phys.*, **33**, 5 (1960), 1338–1341.
126. Robertson, B., Equations of motion in nonequilibrium statistical mechanics, *Phys. Rev.*, **144** (1966), 151–161.
127. Bird, G.A., *Molecular gas dynamics and the direct simulation of gas flows*, Clarendon Press, Oxford, 1994.
128. Oran, E.S., Oh, C.K., Cybyk, B.Z., Direct simulation Monte Carlo: recent advances and applications, *Annu Rev. Fluid Mech.*, **30** (1998), 403–441.
129. Gatignol, R. *Theorie cinetique des gaz a repartition discrete de vitesses. Lecture notes in physics*, V. 36, Springer, Berlin, etc, 1975.
130. Frisch, U., Hasslacher, B., Pomeau, Y., Lattice-gas automata for the Navier–Stokes equation, *Phys. Rev. Lett.*, **56** (1986), 1505–1509.
131. Mcnamara, Gr., Zanetti, G., Use of the Boltzmann-equation to simulate lattice-gas automata, *Phys. Rev. Lett.*, **61** (1988), 2332–2335.
132. Higuera, F., Succi, S., Benzi, R., Lattice gas – dynamics with enhanced collisions, *Europhys. Lett.*, **9** (1989), 345–349.
133. Benzi, R., Succi, S., Vergassola, M., The lattice Boltzmann-equation - theory and applications *Physics Reports*, **222**, 3 (1992), 145–197.
134. Chen, S., Doolen, G.D., Lattice Boltzmann method for fluid flows, *Annu. Rev. Fluid. Mech.* **30** (1998), 329–364.
135. Succi, S., *The lattice Boltzmann equation for fluid dynamics and beyond*, Clarendon Press, Oxford, 2001.
136. Succi, S., Karlin, I.V., Chen H., Role of the H theorem in lattice Boltzmann hydrodynamic simulations, *Rev. Mod. Phys.*, **74** (2002), 1203–1220.

137. Karlin, I.V., Gorban, A.N., Succi, S., Boffi, V., Maximum entropy principle for lattice kinetic equations, *Phys. Rev. Lett.*, **81** (1998), 6–9.
138. Karlin, I.V., Ferrante, A., Öttinger, H.C., Perfect entropy functions of the Lattice Boltzmann method, *Europhys. Lett.*, **47** (1999), 182–188.
139. Ansumali, S., Karlin, I.V., Stabilization of the Lattice Boltzmann method by the H theorem: A numerical test, *Phys. Rev. E*, **62** (6), (2000), 7999–8003.
140. Ansumali, S., Karlin, I.V., Entropy function approach to the lattice Boltzmann method, *J. Stat. Phys.*, **107** (1/2) (2002), 291–308.
141. Ansumali, S., Karlin, I.V., Öttinger, H.C., Minimal entropic kinetic models for hydrodynamics, *Europhys. Lett.*, **63** (2003), 798–804.
142. Ansumali, S., Karlin, I.V., Kinetic Boundary condition for the lattice Boltzmann method, *Phys. Rev. E*, **66** (2002), 026311.
143. Ansumali, S., Chikatamarla, S.S., Frouzakis, C.E., Boulouchos, K., Entropic lattice Boltzmann simulation of the flow past square cylinder, *Int. J. Mod. Phys. C*, **15** (2004), 435–445.
144. Shan, X., He, X., Discretization of the velocity space in the solution of the Boltzmann equation, *Phys. Rev. Lett.*, **80** (1998), 65–67.
145. Van Beijeren, H., Ernst, M.H., Modified Enskog equation, *Physica A*, **68**, 3 (1973), 437–456.
146. Marsden, J.E., Weinstein, A., The Hamiltonian structure of the Maxwell-Vlasov equations, *Physica D*, **4** (1982), 394–406.
147. Braun W, Hepp K, Vlasov dynamics and its fluctuations in 1-N limit of interacting classical particles, *Comm. Math. Phys.*, **56**, 2 (1977), 101–113.
148. Van Kampen, N.G., *Stochastic processes in physics and chemistry*, North-Holland, Amsterdam 1981.
149. Risken, H., *The Fokker-Planck equation*, Springer, Berlin, 1984.
150. Hänggi P., Thomas H., *Stochastic Processes: Time Evolution, Symmetries and Linear Response*, *Physics Reports*, **88** (1982), 207–319.
151. Bird, R.B., Curtiss, C.F., Armstrong, R.C., Hassager, O., *Dynamics of Polymer Liquids*, 2nd edn., Wiley, New York, 1987.
152. Doi, M., Edwards, S.F., *The theory of polymer dynamics*, Clarendon Press, Oxford, 1986.
153. Öttinger, H.C., *Stochastic processes in polymeric fluids*, Springer, Berlin, 1996.
154. Grmela, M., Öttinger, H.C., Dynamics and thermodynamics of complex fluids. I. Development of a general formalism, *Phys. Rev. E* **56** (1997), 6620–6632.
155. Öttinger, H.C., Grmela, M., Dynamics and thermodynamics of complex fluids. II. Illustrations of a general formalism, *Phys. Rev. E*, **56** (1997), 6633–6655.
156. Kullback, S., *Information theory and statistics*, Wiley, New York, 1959.
157. Plastino, A.R., Miller, H.G., Plastino, A., Minimum Kullback entropy approach to the Fokker-Planck equation, *Physical Review E* **56** (1997). 3927–3934.
158. Gorban, A.N., Karlin, I.V., Family of additive entropy functions out of thermodynamic limit, *Phys. Rev. E*, **67** (2003), 016104. Preprint online: <http://arxiv.org/abs/cond-mat/0205511>.
159. Gorban, A.N., Karlin, I.V., Öttinger H.C., The additive generalization of the Boltzmann entropy, *Phys. Rev. E*, **67**, 067104 (2003). Preprint online: <http://arxiv.org/abs/cond-mat/0209319>.
160. Gorban, P., Monotonically equivalent entropies and solution of additivity equation, *Physica A*, **328** (2003), 380–390. Preprint online: <http://arxiv.org/pdf/cond-mat/0304131>.

161. Tsallis, C., Possible generalization of Boltzmann-Gibbs statistics. *J. Stat. Phys.*, **52** (1988), 479–487.
162. Abe, S., Okamoto, Y. (Eds.), *Nonextensive statistical mechanics and its applications*, Springer, Heidelberg, 2001.
163. Dukek, G., Karlin, I.V., Nonnenmacher, T.F., Dissipative brackets as a tool for kinetic modeling, *Physica A*, **239**(4) (1997), 493–508.
164. Orlov, N.N., Rozonoer, L.I., The macrodynamics of open systems and the variational principle of the local potential, *J. Franklin Inst.*, **318** (1984), 283–314 and 315–347.
165. Volpert, A.I., Hudjaev, S.I., *Analysis in classes of discontinuous functions and the equations of mathematical physics*. Dordrecht: Nijhoff, 1985.
166. Ansumali S., Karlin, I.V., Single relaxation time model for entropic Lattice Boltzmann methods, *Phys. Rev. E*, **65** (2002), 056312.
167. Bykov, V.I., Yablonskii, G.S., Akramov, T.A., The rate of the free energy decrease in the course of the complex chemical reaction. *Dokl. Akad. Nauk USSR*, **234**, 3 (1977) 621–634.
168. Struchtrup, H., Weiss, W., Maximum of the local entropy production becomes minimal in stationary processes, *Phys. Rev. Lett.*, **80** (1998), 5048–5051.
169. Grmela, M., Karlin, I.V., Zmievski, V.B., Boundary layer minimum entropy principles: A case study, *Phys. Rev. E*, **66** (2002), 011201.
170. Dimitrov, V.I., *Simple kinetics*, Nauka, Novosibirsk, 1982.
171. Prigogine, I., *Thermodynamics of irreversible processes*, Interscience, New York, 1961.
172. Lifshitz, E.M., Pitaevskii L.P., *Physical kinetics* (Landau L.D. and Lifshitz E.M. *Course of Theoretical Physics*, V. 10), Pergamon Press, Oxford, 1968.
173. Constantin, P., Foias, C., Nicolaenko, B., Temam, R., *Integral manifolds and inertial manifolds for dissipative partial differential equations*, *Applied Math. Sci.*, 1988, Vol. 70 (Springer Verlag, New York).
174. Robinson, J.C., A concise proof of the “geometric” construction of inertial manifolds, *Phy. Lett. A*, **200** (1995), 415–417.
175. Ryashko, L.B., Shnol, E.E., On exponentially attracting invariant manifolds of ODEs, *Nonlinearity*, **16** (2003), 147–160.
176. Walter, W., An elementary proof of the Cauchy–Kovalevsky Theorem, *Amer. Math. Monthly* **92** (1985), 115–126.
177. Evans, L.C., *Partial differential equations*, AMS, Providence, RI, USA, 1998.
178. Dubinskii, Ju.A., *Analytic pseudo-differential operators and their applications*. Kluwer Academic Publishers, Book Series: Mathematics And its Applications Soviet Series: Volume 68, 1991.
179. Levermore, C.D., Oliver, M., Analyticity of solutions for a generalized Euler equation, *J. Differential Equations* **133** (1997), 321–339.
180. Oliver, M., Titi, E.S., On the domain of analyticity for solutions of second order analytic nonlinear differential equations, *J. Differential Equations* **174** (2001), 55–74.
181. Arnold, V.I., *Geometrical methods in the theory of differential equations*, Springer–Verlag, New York–Berlin, 1983.
182. Arnold, V.I., Vogtmann, K., Weinstein, A., *Mathematical methods of classical mechanics*, Springer Verlag, 1989.
183. Bogoliubov, N.N., Mitropolskii, Yu.A., *Asymptotic Methods in the Theory of Nonlinear Oscillations*, Fizmatgiz, Moscow, 1958 (in Russian).

184. Kazantzis, N., Kravaris, C., Nonlinear observer design using Lyapunov's auxiliary theorem, *Systems Control Lett.*, **34** (1998), 241–247.
185. Krener, A.J., Xiao, M., Nonlinear observer design in the Siegel domain, *SIAM J. Control Optim.* Vol. **41**, 3 (2002), 932–953.
186. Kazantzis, N., Good, Th., Invariant manifolds and the calculation of the long-term asymptotic response of nonlinear processes using singular PDEs, *Computers and Chemical Engineering* **26** (2002), 999–1012.
187. Onsager, L., Reciprocal relations in irreversible processes. I. *Phys. Rev.* **37** (1931), 405–426; II. *Phys. Rev.* **38** (1931), 2265–2279.
188. Nettleton, R.E., Freidkin, E.S., Nonlinear reciprocity and the maximum entropy formalism, *Physica A*, **158**, 2 (1989), 672–690.
189. Grmela, M., Reciprocity relations in thermodynamics, *Physica A*, **309**, 3–4 (2002), 304–328.
190. Berdichevsky, V.L., Structure of equations of macrophysics, *Phys. Rev. E*, **68**, 6 (2003), 066126.
191. Wehrl, A., General properties of entropy, *Rev. Mod. Phys.* **50**, 2 (1978), 221–260.
192. Schlögl, F., Stochastic measures in nonequilibrium thermodynamics, *Phys. Rep.* **62**, 4 (July 1980), 267–380.
193. Jaynes E.T., Information theory and statistical mechanics, in: *Statistical Physics. Brandeis Lectures, V.3*, K. W. Ford, ed., New York: Benjamin, 1963, pp. 160–185.
194. Grabert, H. *Projection operator techniques in nonequilibrium statistical mechanics*, Springer Verlag, Berlin, 1982.
195. Zubarev, D., Morozov, V., Röpke, G. *Statistical mechanics of nonequilibrium processes, V.1*, Basic concepts, kinetic theory, Akademie Verlag, Berlin, 1996, *V.2*, Relaxation and hydrodynamic processes, Akademie Verlag, Berlin, 1997.
196. Evans, M.W., Grigolini, P., Pastori Parravicini, G. (Eds.), *Memory function approaches to stochastic problems in condensed matter*, *Advances in Chemical Physics*, V. 62, J. Wiley & Sons, New York etc., 1985.
197. Uhlenbeck, G.E., in: *Fundamental problems in statistical mechanics II*, edited by E.G.D. Cohen, North Holland, Amsterdam, 1968.
198. Glimm, J., Jaffe, A., *Quantum Physics: A Functional Integral Point of View*, Springer, NY, 1981.
199. Parisi, G., *Statistical Field Theory*, Addison-Wesley, Reading, Massachusetts, 1988.
200. Grad, H. Principles of the kinetic theory of gases, in: S. Flügge, ed., *Handbuch der Physics*, Band 12, Springer, Berlin, 205–294.
201. Grad, H., On the kinetic theory of rarefied gases, *Comm. Pure and Appl. Math.* **24**, (1949), 331–407.
202. Hauge, E.H., Exact and Chapman-Enskog Solutions of the Boltzmann Equation for the Lorentz Model *Phys. Fluids* **13** (1970), 1201–1208.
203. Titulaer, U.M., A systematic solution procedure for the Fokker-Planck equation of a Brownian particle in the high-friction case, *Physica A*, **91**, 3–4 (1978), 321–344.
204. Widder, M.E., Titulaer, U.M., Two kinetic models for the growth of small droplets from gas mixtures, *Physica A*, **167**, 3 (1990), 663–675.
205. Karlin, I.V., Dukek, G., Nonnenmacher, T.F., Gradient expansions in kinetic theory of phonons, *Phys. Rev. B* **55** (1997), 6324–6329.

206. Narayanamurti, V., Dynes, R.C., Phys. Rev. B **12** (1975), 1731–1738.
207. Narayanamurti, V., Dynes, R.C., Andres, K., Propagation of sound and second sound using heat pulses Phys. Rev. B **11** (1975), 2500–2524.
208. Guyer, R.A., Krumhansl, J.A., Dispersion relation for 2nd sound in solids, Phys. Rev. **133** (1964), A1411–A1417.
209. Guyer, R.A., Krumhansl, J.A., Solution of linearized phonon Boltzmann equation, Phys. Rev. **148** (1966), 766–778.
210. Guyer, R.A., Krumhansl, J.A., Thermal conductivity 2nd sound and phonon hydrodynamic phenomena in nonmetallic crystals, Phys. Rev. **148** (1966), 778–788.
211. H.Beck, in: Dynamical Properties of Solids, Vol. 2, G.K.Horton and A.A.Maradudin, eds., North-Holland, Amsterdam, 1975, p. 207.
212. Dreyer, W., Struchtrup, H., Heat pulse experiments revisited, Continuum Mech. Thermodyn. **5** (1993), 3–50.
213. Ranninger, J., Heat-Pulse Propagation in Ionic Lattices, Phys. Rev. B **5** (1972), 3315–3321.
214. Paszkiewicz, T., Exact and approximate generalized diffusion equation for the Lorentz gas, Physica A, **123** (1984), 161–174.
215. Jasiukiewicz Cz., Paszkiewicz, T., The explicit time-dependence of moments of the distribution function for the Lorentz gas with planar symmetry in k-space, Physica A, **145** (1987), 239–254.
216. Jasiukiewicz Cz., Paszkiewicz, T., Woźny, J., Crossover from kinetic to diffusive behavior for a class of generalized models of the Lorentz gas, Physica A, **158** (1989), 864–893.
217. Jasiukiewicz Cz., Paszkiewicz, T., Relaxation of initial spatially inhomogeneous states of phonon gases scattered by point mass defects embedded in isotropic media, Z. Phys. B, **77** (1989), 209–218.
218. F.Uribe and E.Piña, Comment on “Invariance principle for extension of hydrodynamics: Nonlinear viscosity”, Phys. Rev. E **57** (1998), 3672–3673.
219. Karlin, I.V., Exact summation of the Chapman–Enskog expansion from moment equations, J. Phys. A: Math.Gen. **33** (2000), 8037–8046.
220. Slemrod M., Constitutive relations for monatomic gases based on a generalized rational approximation to the sum of the Chapman–Enskog expansion, Arch. Rat. Mech. Anal, **150** (1) (1999), 1–22.
221. Slemrod M., Renormalization of the Chapman–Enskog expansion: Isothermal fluid flow and Rosenau saturation J. Stat. Phys, **91**, 1–2 (1998), 285–305.
222. Gibbs, G.W., Elementary Principles of Statistical Mechanics, Dover, 1960.
223. Kogan, A.M., Rozonoer, L.I., On the macroscopic description of kinetic processes, Dokl. AN SSSR **158** (3) (1964), 566–569.
224. Kogan, A.M., Derivation of Grad–type equations and study of their properties by the method of entropy maximization, Prikl. Math. Mech. **29** (1) (1965), 122–133.
225. Rozonoer, L.I., Thermodynamics of nonequilibrium processes far from equilibrium, in: Thermodynamics and Kinetics of Biological Processes (Nauka, Moscow, 1980), 169–186.
226. Karkheck, J., Stell, G., Maximization of entropy, kinetic equations, and irreversible thermodynamics Phys. Rev. A **25**, 6 (1984), 3302–3327.
227. Alvarez-Romero, J.T., García-Colín, L.S., The foundations of informational statistical thermodynamics revisited, Physica A, **232**, 1–2 (1996), 207–228.

228. Eu, B.C., Kinetic theory and irreversible thermodynamics, Wiley, New York, 1992.
229. Bugaenko, N.N., Gorban, A.N., Karlin, I.V., Universal Expansion of the Triplet Distribution Function, *Teoreticheskaya i Matematicheskaya Fizika*, **88**, 3 (1991), 430–441 (Transl.: *Theoret. Math. Phys.* (1992) 977–985).
230. Levermore C.D., Moment Closure Hierarchies for Kinetic Theories, *J. Stat. Phys.* **83** (1996), 1021–1065.
231. Balian, R., Alhassid, Y., Reinhardt, H., Dissipation in many-body systems: A geometric approach based on information theory, *Physics Reports* **131**, 1 (1986), 1–146.
232. Degond, P., Ringhofer, C., Quantum moment hydrodynamics and the entropy principle, *J. Stat. Phys.*, **112** (2003), 587–627.
233. Gorban, A.N., Karlin, I.V., Quasi-equilibrium approximation and non-standard expansions in the theory of the Boltzmann kinetic equation, in: "Mathematical Modelling in Biology and Chemistry. New Approaches", ed. R. G. Khlebopros, Nauka, Novosibirsk, P. 69–117 (1991). [in Russian]
234. Gorban, A.N., Karlin, I.V., Quasi-equilibrium closure hierarchies for the Boltzmann equation [Translation of the first part of the paper [233]], Preprint, 2003, Preprint online: <http://arXiv.org/abs/cond-mat/0305599>.
235. Jou, D., Casas-Vázquez, J., Lebon, G., Extended irreversible thermodynamics, Springer, Berlin, 1993.
236. Müller, I., Ruggeri, T., Extended Thermodynamics, Springer, NY, 1993.
237. Gorban, A., Karlin, I., New methods for solving the Boltzmann equations, AMSE Press, Tassin, France, 1994.
238. Hirschfelder, J.O., Curtiss C.F., Bird, R.B., Molecular theory of gases and liquids, J. Wiley, NY, 1954.
239. Dorfman, J., van Beijeren, H., in: *Statistical Mechanics B*, B. Berne, ed., Plenum, NY, 1977.
240. Résibois, P., De Leener, M., Classical kinetic theory of fluids, Wiley, NY, 1977.
241. Ford, G., Foch, J., in: *Studies in Statistical Mechanics*, G. Uhlenbeck and J. de Boer, eds., V. 5, North Holland, Amsterdam, 1970.
242. Van Rysselberge, P., Reaction rates and affinities, *J. Chem. Phys.*, **29**, 3 (1958), 640–642.
243. Feinberg, M., Chemical kinetics of a certain class, *Arch. Rat. Mech. Anal.*, **46**, 1 (1972), 1–41.
244. Bykov, V.I., Gorban, A.N., Yablonskii, G.S., Description of nonisothermal reactions in terms of Marcelin – de Donder kinetics and its generalizations, *React. Kinet. Catal. Lett.*, **20**, 3–4 (1982), 261–265.
245. De Donder, T., Van Rysselberghe, P., Thermodynamic theory of affinity. A book of principles. Stanford: University Press, 1936.
246. Karlin, I.V., On the relaxation of the chemical reaction rate, in: *Mathematical Problems of Chemical Kinetics*, eds. K.I. Zamaraev and G.S. Yablonskii, Nauka, Novosibirsk, 1989, 7–42. [In Russian].
247. Karlin, I.V., The problem of reduced description in kinetic theory of chemically reacting gas, *Modeling, Measurement and Control C*, **34(4)** (1993), 1–34.
248. Gorban, A.N., Karlin, I.V., Scattering rates versus moments: Alternative Grad equations, *Phys. Rev. E* **54** (1996), R3109.
249. Treves, F., Introduction to pseudodifferential and Fourier integral operators, Plenum, NY, (1982).

250. Shubin, M.A., Pseudodifferential operators and spectral theory, Nauka, Moscow, (1978).
251. Dedeurwaerdere, T., Casas-Vázquez, J., Jou, D., Lebon, G., Foundations and applications of a mesoscopic thermodynamic theory of fast phenomena *Phys. Rev. E*, **53**, 1 (1996), 498–506.
252. Rodríguez, R.F., García-Colín, L.S., López de Haro, M., Jou, D., Pérez-García, C., The underlying thermodynamic aspects of generalized hydrodynamics, *Phys. Lett. A*, **107**, 1 (1985), 17–20.
253. Struchtrup, H., Torrilhon M., Regularization of Grad's 13 Moment Equations: Derivation and Linear Analysis, *Phys. Fluids*, **15** (2003), 2668–2680.
254. Ilg, P., Karlin, I.V., Öttinger H.C., Canonical distribution functions in polymer dynamics: I. Dilute solutions of flexible polymers, *Physica A*, **315** (2002), 367–385.
255. Krook, M, Wu, T.T., Formation of Maxwellian tails, *Phys. Rev. Lett*, **36** (1976), 1107–1109.
256. Krook, M, Wu, T.T., Exact solutions of Boltzmann-equation, *Phys Fluids*, **20** (1977), 1589–1595.
257. Ernst, M.H., Hendriks, E.M., Exactly solvable nonlinear Boltzmann-equation *Phys. Lett. A* **70** (1979), 183–185.
258. Hendriks, E.M., Ernst, M.H., The Boltzmann-equation for very hard particles *Physica A*, **120** (1983), 545–565.
259. Carleman, T., Sur la théorie de l'équation intégrale-différentielle de Boltzmann, *Acta. Math.* **60** (1933), 91–146.
260. Arkeryd, L., Boltzmann-equation. 1. Existence, *Arch. Rat. Mech. Anal.* **45** (1972), 1; Boltzmann-equation. 2. Full initial value-problem, *ibid.* **45** (1972), 17.
261. Truesdell, C., Muncaster, R., *Fundamentals of Maxwell's Kinetic Theory of a Simple Monatomic Gas*, Academic Press, NY, 1980.
262. Bobylev, A.V., Exact solutions to Boltzmann equations, *Dokl. Akad. Nauk SSSR* **225** (1975), 1296–1299; One class of invariant solutions to Boltzmann-equation, *ibid.* **231** (1976), 571–574.
263. Bobylev, A.V., Cercignani, C. Self-similar solutions of the Boltzmann equation and their applications, *J. Stat. Phys.*, **106** (2002), 1039–1071.
264. Tjon, J.A., Approach to Maxwellian distribution, *Phys. Lett. A*, **70** (1979), 369–371.
265. Cornille, H., Nonlinear Kac model - spatially homogeneous solutions and the Tjon effect, *J. Stat. Phys.*, **39** (1985), 181–213.
266. Ilg, P., Karlin, I.V., Kröger, M., Öttinger H.C., Canonical distribution functions in polymer dynamics: II Liquid-crystalline polymers, *Physica A*, **319** (2003), 134–150.
267. Ilg, P, Kröger, M., Magnetization dynamics, rheology, and an effective description of ferromagnetic units in dilute suspension, *Phys. Rev. E* **66** (2002) 021501. Erratum, *Phys. Rev. E* **67** (2003), 049901(E).
268. Ilg, P., Karlin, I.V., Combined micro-macro integration scheme from an invariance principle: application to ferrofluid dynamics, *J. Non-Newtonian Fluid Mech*, 2004, to appear. Ppeprint online: <http://arxiv.org/abs/cond-mat/0401383>.
269. Courant, R., Friedrichs, K.O., Lewy, H., On the partial difference equations of mathematical physics., *IBM Journal* (March 1967), 215–234.

270. Ames, W.F., Numerical Methods for Partial Differential Equations, 2nd ed. (New York: Academic Press), 1977.
271. Richtmyer, R.D., and Morton, K.W., Difference methods for initial value problems, 2nd ed., Wiley-Interscience, New York, 1967.
272. Gorban, A.N., Zinovyev, A.Yu., Visualization of data by method of elastic maps and its applications in genomics, economics and sociology. Institut des Hautes Etudes Scientifiques, Preprint. IHES M/01/36. (2001) . Online: <http://www.ihes.fr/PREPRINTS/M01/Resu/resu-M01-36.html>.
273. Jolliffe, I.T., Principal component analysis, Springer-Verlag, 1986.
274. Callen, H.B., Thermodynamics and an introduction to thermostatistics, Wiley, New York, 1985.
275. Use of Legendre transforms in chemical thermodynamics (IUPAC Technical Report), Prepared for publication by R.A. Alberty. Pure Appl.Chem., **73**, 8 (2001), pp. 1349–1380. Online: <http://www.iupac.org/publications/pac/2001/pdf/7308x1349.pdf>.
276. Aizenberg, L., Carleman's formulas in complex analysis: Theory and applications, (Mathematics and its applications; V. 244), Kluwer, 1993.
277. Gorban, A.N., Rossiev, A.A., Wunsch, D.C.II, Neural network modeling of data with gaps: method of principal curves, Carleman's formula, and other, The talk was given at the USA-NIS Neurocomputing opportunities workshop, Washington DC, July 1999 (Associated with IJCNN'99). Preprint online: <http://arXiv.org/abs/cond-mat/0305508>.
278. Gorban, A.N., Rossiev, A.A., Neural network iterative method of principal curves for data with gaps, Journal of Computer and System Sciences International, **38**, 5 (1999), 825–831.
279. Dergachev, V.A., Gorban, A.N., Rossiev, A.A., Karimova, L.M., Kuandykov, E.B., Makarenko, N.G., Steier, P., The filling of gaps in geophysical time series by artificial neural networks, Radiocarbon, **43**, 2A (2001), 365–371.
280. Gorban A., Rossiev A., Makarenko N., Kuandykov Y., Dergachev V., Recovering data gaps through neural network methods, International Journal of Geomagnetism and Aeronomy, **3**, 2 (2002), 191–197.
281. Lewis, R.M., A unifying principle in statistical mechanics, J. Math. Phys., **8** (1967), 1448–1460.
282. Chorin, A.J., Hald O.H., Kupferman, R., Optimal prediction with memory, Physica D 166 (2002) 239–257.
283. Hoover, W.G., Time reversibility, computer simulation, and chaos, Advanced series in nonlinear dynamics, V. 13, World Scientific, Singapore, 1999.
284. Sone, Y., Kinetic theory and fluid dynamics, Birkhäuser, Boston, 2002.
285. McKean, H.P. Jr., J. Math. Phys. **8**, 547 (1967).
286. Montroll, E.W., Lebowitz, J.L. (Eds.), Studies in Statistical Mechanics, V.IX, North-Holland, 1981.
287. Del Río-Correa, J.L., García-Colín, L.S., Increase-in-entropy law, Phys. Rev. E **48** (1993), 819–828.
288. Leontovich, M.A., An Introduction to thermodynamics, GITTL Publ., Moscow, 1950 (in Russian).
289. Lebowitz, J.L., Bergmann, P.G., New approach to nonequilibrium processes, Phys. Rev., **99** (1955), 578–587.
290. Lebowitz, J.L., Bergmann, P.G., Irreversible Gibbsian Ensembles, Annals of Physics, 1:1, 1957.

291. Lebowitz, J.L., Stationary Nonequilibrium Gibbsian Ensembles, *Phys. Rev.*, **114** (1959), 1192–1202.
292. Lebowitz, J.L., Boltzmann's entropy and time's arrow, *Physics Today*, **46** 9 (1993), 32–38.
293. Leff, H.S., Rex, A.F. (Eds.), *Maxwell's Demon 2: Entropy, Classical and Quantum Information, Computing*, 2nd edition, IOP, Philadelphia, 2003.
294. Von Baeyer, H.C., *Maxwell's Demon: Why Warmth Disperses and Time Passes*, Random House, 1998.
295. Pour-El, M.B., Richards, J.I., *Computability in Analysis and Physics*, Springer Verlag, NY, 1989.
296. Copeland, B.J., The Church-Turing Thesis, In: *The Stanford Encyclopedia of Philosophy*, E.N. Zalta (Ed.) (Fall 2002 Edition), On-line: <http://plato.stanford.edu/archives/fall2002/entries/church-turing/>.
297. Feynman, R., *The Character of Physical Law*, Cox and Wyman, London, 1965. Lecture No. 5.
298. Gorban, A.N., Karlin, I.V., *Geometry of irreversibility: Film of nonequilibrium states*, The lecture given on the V Russian National Seminar "Modeling of Nonequilibrium systems", Krasnoyarsk, Oct. 18–20, 2002, Printed by Krasnoyarsk State Technical University Press, 2002. [In Russian].
299. Gorban, A.N., Bykov, V.I., Yablonskii, G.S., *Essays on chemical relaxation*, Novosibirsk: Nauka, 1986.
300. Verbitskii, V.I., Gorban, A.N., Utjubaev, G.Sh., Shokin, Yu.I., Moore effect in interval spaces, *Dokl. AN SSSR*. **304**, 1 (1989), 17–21.
301. Bykov, V.I., Verbitskii, V.I., Gorban, A.N., On one estimation of solution of Cauchy problem with uncertainty in initial data and right part, *Izv. vuzov, Ser. mat.*, N. 12 (1991), 5–8.
302. Verbitskii, V.I., Gorban, A.N., Simultaneously dissipative operators and their applications, *Sib. Mat. Jurnal*, **33**, 1 (1992), 26–31.
303. Gorban, A.N., Shokin, Yu.I., Verbitskii, V.I., Simultaneously dissipative operators and the infinitesimal Moore effect in interval spaces, Preprint (1997). Preprint online: <http://arXiv.org/abs/physics/9702021>.
304. Gorban, A.N., Bykov, V.I., Yablonskii, G.S., Thermodynamic function analogue for reactions proceeding without interaction of various substances, *Chemical Engineering Science*, **41**, 11 (1986), 2739–2745.
305. Gorban, A.N., Verbitskii, V.I., Thermodynamic restriction and quasithermodynamic conditions in reaction kinetics, in: *Mathematical problems of chemical kinetics*, K.I. Zamaraev, G.S. Yablonskii (eds.), Nauka, Novosibirsk, 1989, 43–83.
306. Grassberger, P., On the Hausdorff Dimension of Fractal Attractors, *J. Stat. Phys.* **26** (1981), 173–179.
307. Grassberger, P. and Procaccia, I., Measuring the Strangeness of Strange Attractors, *Physica D* **9** (1983), 189–208.
308. Frederickson, P., Kaplan, J.L., Yorke, E.D., Yorke, J.A., The Lyapunov dimension of strange attractors. *J. Differ. Equations* **49** (1983), 185–207.
309. Ledrappier F., Young, L.-S., The metric entropy of diffeomorphisms: I. Characterization of measures satisfying Pesin's formula; II. Relations between entropy, exponents and dimensions, *Annals of Mathematics*, **122** (1985), 509–539, 540–574.

310. Hentschel, H.G.E., Procaccia, I., The infinite number of generalized dimensions of fractals and strange attractors, *Physica D: Nonlinear Phenomena*, **8** 3 (1983), 435–444.
311. Ilyashenko, Yu.S., On dimension of attractors of k -contracting systems in an infinite dimensional space, *Vest. Mosk. Univ. Ser. 1 Mat. Mekh.*, No. 3 (1983), 52–58.
312. Nicolis, C., Nicolis, G., Is there a climate attractor?, *Nature*, **311** (1984), 529–532.
313. Constantin, P., Foias, C., Temam, R., *Attractors representing turbulent flows*, *Memoirs of the American Mathematical Society*, V. 53, No. 314, Providence, 1985.
314. Dubois, T., Jauberteau, F., Temam, R., *Dynamic multilevel methods and the numerical simulation of turbulence*, Cambridge Univ. Press, Cambridge, 1999.
315. Landau, L.D., Lifshitz, E.M., *Fluid Mechanics* (Landau L.D. and Lifshitz E.M. *Course of Theoretical Physics*, V.6), Pergamon Press, Oxford, 1993.
316. Foias, C., Manley, O.P., Temam, R., An estimate of the Hausdorff dimension of the attractor for homogeneous decaying turbulence, *Physics Letters A*, **122** 3–4 (1987), 140–144.
317. Foias, C., Sell, G.R., Temam R., Inertial manifolds for dissipative nonlinear evolution equations, *Journal of Differential Equations*, **73** (1988), 309–353.
318. Temam R., *Infinite-dimensional dynamical systems in mechanics and physics*, *Applied Math. Sci.*, Vol 68, Springer Verlag, New York, 1988 (Second edition, 1997).
319. Málek, J., Prazák, D., Finite fractal dimension of the global attractor for a class of non-Newtonian fluids, *Applied Mathematics Letters*, **13**, 1 (2000), 105–110.
320. Doering, C.R., Wang, X., Attractor dimension estimates for two-dimensional shear flows, *Physica D: Nonlinear Phenomena* Volume 123, Issues 1–4, 15 November 1998, Pages 206–222.
321. Doering, C.R., Gibbon, J.D., Holm, D.D., Nicolaenko, B., Finite dimensionality in the complex Ginzburg–Landau equation, *Contemporary Mathematics*, **99**, 1989, 117–141.
322. Ghidaglia, J.M., Héron, B., Dimension of the attractors associated to the Ginzburg–Landau partial differential equation, *Physica D*, **28**, 3 (1987), 282–304.
323. Nicolaenko, B. Scheurer, B., Temam, R., Some global dynamical properties of the Kuramoto–Sivashinsky equations: Nonlinear stability and attractors, *Physica D*, **16**, 2 (1985), 155–183.
324. Duan, J., Ervin, V.J., Dynamics of a Nonlocal Kuramoto–Sivashinsky Equation, *J., Diff. Equ.*, **143** (1998), 243–266.
325. Nicolaenko, B. Scheurer, B., Temam, R., Some global dynamical properties of a class of pattern formation equations, *Comm. Partial Diff. Equ.*, **14** (1989), 245–297.
326. Debussche, A., Dettori, L., On the Cahn–Hilliard equation with a logarithmic free energy, *Nonlinear Anal.*, **24** (1995), 1491–1514.
327. Li, D., Zhong, Ch., Global Attractor for the Cahn–Hilliard System with Fast Growing Nonlinearity, *Journal of Differential Equations*, **149** (1998), 191–210.
328. Miranville, A., Zelik, S., Robust exponential attractors for singularly perturbed phase-field type equations, *Electronic J., of Diff. Eqns.*, **2002** (2002), No. 63, 1–28

329. Miranville, A., Piétrus, A., Rakotoson, J.M., Dynamical aspect of a generalized Cahn–Hilliard equation based on a microforce balance, *Asymptotic Anal.*, **16** (1998), 315–345.
330. Grinfeld, M., Novick-Cohen, A., The viscous Cahn–Hilliard equation: Morse decomposition and structure of the global attractor, *Trans. Amer. Math. Soc.*, **351** (1999), 2375–2406.
331. Cahn, J.W., Hilliard, J.E., Free energy of a nonuniform systems. I. Interfacial free energy, *J. Chem. Phys.*, **28** (1958), 258–267.
332. Allen, S., Cahn, J.W., A microscopic theory for antiphase boundary motion and its application to antiphase domain coarsening, *Acta Metall.*, **27** (1979), 1084–1095.
333. Babin, A.V., Vishik, M.I., *Attractors of evolutionary equations (Studies in mathematics and its application, V. 25)*, Elsevier, NY, 1992.
334. Vishik, M.I., *Asymptotic behaviour of solutions of evolutionary equations*, Cambridge University Press, 1993.
335. Chepyzhov, V.V., Vishik M.I., *Attractors for equations of mathematical physics*, AMS Colloquium Publications, V. 49, American Mathematical Society, Providence, 2002.
336. Efendiev, M., Miranville, A., The dimension of the global attractor for dissipative reaction-diffusion systems, *Applied Mathematics Letters*, **16**, 3 (2003), 351–355.
337. Haraux, A, Two remarks on dissipative hyperbolic problems, in: *Nonlinear partial differential equations and their applications* (H. Brezis, J.L. Lions, eds), *Research Notes Maths.*, Vol. 112, Pitman, Boston, 1985, 161–179.
338. Ghidaglia, J.M., Temam, R., Attractors for damped nonlinear hyperbolic equations, *J. Math. Pures Appl.*, **66** (1987), 273–319.
339. Ladyzhenskaya, O.A., On finding the minimal global attractors for the Navier–Stokes equation and other PDEs, *Uspekhi Mat. Nauk*, **42** (1987), 25–60; Engl. transl. *Russian Math Surveys*, **42** (1987).
340. Constantin, P., Kevrekidis, I., Titi, E.S., Remarks on a Smoluchowski equation, *Discrete and Continuous Dynamical Systems*, **11** (2004), 101–112.
341. Foias, C., Sell, G.R., Titi, E.S., Exponential tracking and approximation of inertial manifolds for dissipative nonlinear equations *Journal of Dynamics and Differential Equations*, **1** (1989), 199–244.
342. Jones, D.A., Titi, E.S., C^1 Approximations of inertial manifolds for dissipative nonlinear equations, *Journal of Differential Equations*, **127**, 1 (1996), 54–86.
343. Robinson, J.C., Computing inertial manifolds, *Discrete and Continuous Dynamical Systems*, **8**, 4 (2002), 815–833.
344. Christofides, P.D., *Nonlinear and robust control of partial differential equation systems: Methods and applications to transport–reaction processes*, Birkhäuser, Boston, 2001.
345. Chepyzhov, V.V., Ilyin, A.A., A note on the fractal dimension of attractors of dissipative dynamical systems, *Nonlinear Analysis*, **44** (2001), 811–819.
346. Marion, M., Temam, R., Nonlinear Galerkin methods, *SIAM J. Numer. Anal.*, **26** (1989), 1139–1157.
347. Jones, C., Kaper, T., Kopell, N., Tracking invariant manifolds up to exponentially small errors, *SIAM J. Math., Anal.* **27** (1996), 558–577.
348. Yinnian He, Mattheij, R.M.M., Stability and convergence for the reform post-processing Galerkin method, *Nonlinear Anal. Real World Appl.*, **4** (2000), 517–533.

349. Garsia-Archilla, B., Novo, J., Titi E.S., Postprocessing the Galerkin method: a novel approach to approximate inertial manifolds, *SIAM J. Numer. Anal.*, **35** (1998), 941–972.
350. Margolin, L.G., Titi, E.S., Wynne, S., The postprocessing Galerkin and non-linear Galerkin methods – a truncation analysis point of view, *SIAM, Journal of Numerical Analysis*, **41**, 2 (2003), 695–714.
351. Novo, J., Titi, E.S., Wynne, S., Efficient methods using high accuracy approximate inertial manifolds, *Numerische Mathematik*, **87** (2001), 523–554.
352. Fenichel, N., Geometric singular perturbation theory for ordinary differential equations, *J. Diff Eq.*, **31** (1979), 59–93
353. Jones, C.K.R.T., Geometric singular perturbation theory, in: *Dynamical Systems (Montecatini Terme, 1904)*, L. Arnold (ed.), *Lecture Notes in Mathematics*, **1609**, Springer-Verlag, Berlin, 1994, 44–118.
354. Bird, R.B., Wiest, J.M., Constitutive equations for polymeric liquids, *Annu. Rev. Fluid Mech.* **27** (1995), 169.
355. Warner, H.R., Kinetic theory and rheology of dilute suspensions of finitely extendible dumbbells, *Ind. Eng. Chem. Fundamentals* **11** (1972), 379.
356. Oseen, C.W., *Ark. f. Mat. Astr. og Fys.* **6** No. 29 (1910) 1.
357. Burgers, J.M., *Verhandelingen Koninkl. Ned. Akad. Wetenschap.* **16** (Sect. 1, Chap. 3) (1938), 113.
358. Rotne, J., Prager, S., Variational treatment of hydrodynamic interaction, *J. Chem. Phys.*, **50** (1969) 4831.
359. Yamakawa, H., Transport properties of polymer chain in dilute solution: Hydrodynamic interaction, *J. Chem. Phys.* **53** (1970), 436.
360. Noll, W., A mathematical theory of the mechanical behavior of continuous media, *Arch. Ratl. Mech. Anal.*, **2** (1958), 197.
361. Astarita, G., Marrucci, G., *Principles of non-Newtonian fluid mechanics*, McGraw-Hill, London, 1974.
362. Oldroyd, J.G., Non-Newtonian effects in steady motion of some idealized elastico-viscous liquids, *Proc. Roy. Soc. A245* (1958), 278.
363. Herrchen M., Öttinger, H.C., A detailed comparison of various FENE dumbbell models, *J. Non-Newtonian Fluid Mech.* **68** (1997), 17.
364. Kröger, M., Simple models for complex nonequilibrium fluids, *Physics Reports*, **390**, 6 (2004), 453–551.
365. Bird, R.B., Dotson, R.B., Jonson, N.J., Polymer solution rheology based on a finitely extensible bead-spring chain model, *J. Non-Newtonian Fluid Mech.* **7** (1980), 213–235; Corrigendum **8** (1981), 193,
366. Char B.W., et al., *Maple V Language Reference Manual*, Springer-Verlag, New York, 1991.
367. Kato, T., *Perturbation theory for linear operators*, Springer-Verlag, Berlin, 1976.
368. Thiffeault, J.-L., Finite extension of polymers in turbulent flow, *Physics Letters A* **308**, 5-6 (2003), 445–450.
369. Gorban, A.N., Gorban, P.A., Karlin I.V., Legendre integrators, post-processing and quasiequilibrium, *J. Non-Newtonian Fluid Mech.*, **120** (2004), 149–167. Preprint on-line: <http://arxiv.org/pdf/cond-mat/0308488>.
370. Perkins, Th.T., Smith, D.E., Chu, S., Single polymer dynamics in an elongational flow, *Science*, **276**, 5321 (1997), 2016–2021.
371. De Gennes, P.G., Molecular individualism, *Science*, **276**, 5321 (1997), 1999–2000.

372. Smith, D.E., Babcock, H.P., Chu, S., Single-polymer dynamics in steady shear flow. *Science* **283** (1999), 1724–1727.
373. Arnold, V.I., Varchenko, A.N., Gussein-Zade, S.M., Singularities of differentiable maps, Birkhäuser, Boston, 1985-1988. 2 vol.
374. Langer, J.S., Bar-on, M., Miller, H.D., New computational method in the theory of spinodal decomposition, *Phys. Rev. A*, **11**, 4 (1975), 1417–1429.
375. Grant, M., San Miguel, M., Vinals, J., Gunton, J.D., Theory for the early stages of phase separation: The long-range-force limit, *Phys. Rev. B*, **31**, 5 (1985), 3027–3039.
376. Kumaran, V., Fredrickson, G.H., Early stage spinodal decomposition in viscoelastic fluids, *J. Chem. Phys.*, **105**, 18 (1996), 8304–8313.
377. Darwin, Ch., On the origin of species by means of natural selection, or preservation of favoured races in the struggle for life: A Facsimile of the First Edition, Harvard, 1964. <http://www.literature.org/authors/darwin-charles/the-origin-of-species/>
378. Haldane, J.B.S., *The Causes of Evolution*, Princeton Science Library, Princeton University Press, 1990.
379. Mayr, E., *Animal Species and Evolution*. Cambridge, MA: Harvard University Press, 1963.
380. Ewens, W.J., *Mathematical Population Genetics*. Springer-Verlag, Berlin, 1979.
381. Rozonoer, L.I., Sedyh, E.I., On the mechanisms of evolution of self-reproduction systems, 1, *Automation and Remote Control*, **40**, 2 (1979), 243–251; 2, *ibid.*, **40**, 3 (1979), 419–429; 3, *ibid.*, **40**, 5 (1979), 741–749.
382. Gorban, A.N., Dynamical systems with inheritance, in: Some problems of community dynamics, R.G. Khlebopros (ed.), Institute of Physics RAS, Siberian Branch, Krasnoyarsk, 1980 [in Russian].
383. Semevsky, F.N., Semenov S.M., *Mathematical modeling of ecological processes*, Gidrometeoizdat, Leningrad, 1982 [in Russian].
384. Gorban, A.N., Khlebopros, R.G., *Demon of Darwin: Idea of optimality and natural selection*, Nauka (FizMatGiz), Moscow, 1988 [in Russian].
385. Zakharov, V.E., L'vov, V.S., Starobinets, S.S., Turbulence of spin-waves beyond threshold of their parametric-excitation, *Uspekhi Fizicheskikh Nauk* **114**, 4 (1974), 609–654; English translation *Sov. Phys. - Usp.* **17**, 6 (1975), 896–919.
386. Zakharov, V.E., L'vov, V.S., Falkovich, G.E., *Kolmogorov spectra of turbulence*, vol. 1 *Wave Turbulence*. Springer, Berlin, 1992.
387. L'vov, V.S., *Wave turbulence under parametric excitation applications to magnets*, Springer, Berlin, Heidelberg, 1994.
388. Ezersky A.B., Rabinovich M.I., Nonlinear-wave competition and anisotropic spectra of spatiotemporal chaos of Faraday ripples, *Europhysics Letters* **13**, 3 (1990), 243–249.
389. Krawiecki, A, Sukiennicki, A., Marginal synchronization of spin-wave amplitudes in a model for chaos in parallel pumping, *Physica Status Solidi B—Basic Research* **236**, 2 (2003), 511–514.
390. Vorobev, V.M., Selection of normal variables for unstable conservative media, *Zhurnal Tekhnicheskoi Fiziki*, **62**, 8 (1992), 172–175.
391. Seminozhenko, V.P., Kinetics of interacting quasiparticles in strong external fields. *Phys. Reports*, **91**, 3 (1982), 103–182.

392. Haken, H., *Synergetics, an introduction. Nonequilibrium phase transitions and self-organization in physics, chemistry and biology*, Springer, Berlin, Heidelberg, New York, 1978.
393. Bourbaki, N., *Elements of mathematics - Integration I*, Springer, Berlin, Heidelberg, New York, 2003.
394. Smale, S., Structurally stable systems are not dense, *Amer. J. Math.*, **88** (1966), 491–496.
395. Birkhoff, G.D., *Dynamical systems*, AMS Colloquium Publications, Providence, 1927. Online: http://www.ams.org/online_bks/coll9/
396. Hasselblatt, B., Katok, A. (Eds.), *Handbook of Dynamical Systems*, Vol. 1A, Elsevier, 2002.
397. Katok, A., Hasselblatt, B., *Introduction to the Modern Theory of Dynamical Systems*, *Encyclopedia of Math. and its Applications*, Vol. 54, Cambridge University Press, 1995.
398. Levin, L.A., Randomness conservation inequalities; Information and independence in mathematical theories, *Information and Control*, **61**, 1 (1984), 15–37.
399. Gause, G.F., *The struggle for existence*, Williams and Wilkins, Baltimore, 1934. Online: <http://www.ggausa.com/Contgau.htm>.
400. Volterra, V., *Lecons sur la théorie mathématique de la lutte pour la vie*, Gauthier-Villars, Paris, 1931.
401. Gromov, M., A dynamical model for synchronisation and for inheritance in micro-evolution: a survey of papers of A.Gorban, The talk given in the IHES seminar, “Initiation to functional genomics: biological, mathematical and algorithmical aspects”, Institut Henri Poincaré, November 16, 2000.
402. Kuzenkov, O.A., Weak solutions of the Cauchy problem in the set of Radon probability measures, *Differential Equations*, **36**, 11 (2000), 1676–1684.
403. Kuzenkov, O.A., A dynamical system on the set of Radon probability measures, *Differential Equations*, **31**, 4 (1995), 549–554.
404. Diekmann, O. A beginner’s guide to adaptive dynamics, in: *Mathematical modelling of population dynamics*, Banach Center Publications, V. 63, Institute of Mathematics Polish Academy of Sciences, Warszawa, 2004, 47–86.
405. Blekhnman, I.I., *Synchronization in science and technology*. ASME Press, N.Y., 1988.
406. Pikovsky, A., Rosenblum, M., Kurths, J., *Synchronization: A Universal Concept in Nonlinear Science*, Cambridge University Press, 2002.
407. Josić, K., Synchronization of chaotic systems and invariant manifolds, *Nonlinearity* **13** (2000) 1321–1336.
408. Mosekilde, E., Maistrenko, Yu., Postnov, D., *Chaotic synchronization: Applications to living systems*, World Scientific, Singapore, 2002.
409. Cooper, S., Minimally disturbed, multi-cycle, and reproducible synchrony using a eukaryotic “baby machine”, *Bioessays* **24** (2002), 499–501.
410. Lielens, G., Halin, P., Jaumin, I., Keunings, R., Legat, V., New closure approximations for the kinetic theory of finitely extensible dumbbells, *J. Non-Newtonian Fluid Mech.* **76** (1998), 249–279.
411. Ilg, P., Karlin, I.V., Öttinger, H.C., Generating moment equations in the Doi model of liquid-crystalline polymers, *Phys. Rev. E*, **60** (1999), 5783–5787.
412. Phan-Thien, N., Goh, C.G., Atkinson, J.D., The motion of a dumbbell molecule in a torsional flow is unstable at high Weissenberg number, *J. Non-Newtonian Fluid Mech.* **18**, 1 (1985), 1–17.

413. Goh, C.G., Phan-Thien, N., Atkinson, J.D., On the stability of a dumbbell molecule in a continuous squeezing flow, *Journal of Non-Newtonian Fluid Mechanics*, **18**, 1 (1985), 19–23.
414. Karlin, I.V., Ilg, P., Öttinger, H.C., Invariance principle to decide between micro and macro computation, in: *Recent Developments in Mathematical and Experimental Physics, Volume C: Hydrodynamics and Dynamical Systems*, Ed. F. Uribe, Kluwer, Dordrecht, 2002, 45–52.