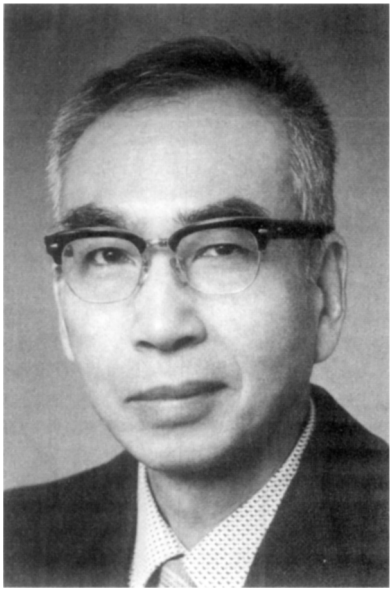
Otto Laporte



Tosio Kato

JOURNAL OF MATHEMATICAL ANALYSIS AND APPLICATIONS 127, 299–311 (1987)

Dedication

This issue of the *Journal of Mathematical Analysis and Applications* is dedicated to Professor Tosio Kato and to the memory of Professor Otto Laporte. Professor Kato is a well-known mathematician and Professor Laporte was a well-known physicist. When Professor Kato was offered a position at Berkeley he was having difficulty immigrating to the United States. When a group of colleagues in Ann Arbor learned of this, they persuaded Professor Laporte in his role of scientific attaché in Tokyo to see if he could help. Professor Laporte was successful and all American mathematics has greatly benefited from his successful efforts.

We the undersigned as well as the editors of *J.M.A.A.* thought it most appropriate to cite the above as an excellent example of unusual help for a mathematician from a physicist. The research of both Kato and Laporte speaks for itself. We wish Professor Kato all the best for his retirement years.

C. L. DOLPH
J. S. HOWLAND

Otto Laporte

CHRONOLOGY

1902	Born July 23, Mainz, Germany
1923	Analyzed iron and vanadium spectra. Enunciated Laporte rule
1924	Ph. D., University of Munich, under Arnold Sommerfeld. Thesis: "Exact Treatment of Scattering of EM Waves by a Sphere"
1924–1926	International Education Fellow; studied in Europe, Japan, and finally in the United States in the sectroscopy section of the National Bureau of Standards
1926	Joined University of Michigan faculty as instructor in physics
1927	Promoted to assistant professor
1928	On leave from University of Michigan; lectured ar Kyoto Imperial University
1933	On leave from University of Michigan; lectured at Tokyo University

0022-247X/87 $3.00

1935	Became naturalized U.S. citizen
1937	On leave from University of Michigan; lectured at Tokyo University
1945	Promoted to full professor
1946	Assumed charge of shock tube laboratory at University of Michigan
1949–1950	Scientific Intelligence Analyst, U.S. Army of Occupation, Heidelberg
1954–1955	Served as scientific attaché at American Embassy in Tokyo
1956	Cited by U.S. State Department as instrumental in securing atomic energy agreement between the United States and Japan
1961–1963	Returned to Tokyo as scientific advisor to the U.S. Ambassador
1965	Chairman, Division of Fluid Dynamics, American Physical Society
1968	Sabbatical leave in Munich
1971	Died March 28, Ann Arbor, Michigan Elected, posthumously, to the National Academy of Sciences

Bibliography of Otto Laporte

1923

Propagation of electromagnetic waves, *Ann. Phys.* **70** (1923), 595–616.
The arrangement of vanadium lines in multiplets, *Phys. Z.* **24** (1923), 510–515.

1924

The structure of the iron spectrum, Part I, *Z. Phys.* **23** (1924), 135–175.
The structure of the iron spectrum, Part II, *Z. Phys.* **26** (1924), 1–22.

1925

With G. Wentzel and A. Lande, Dashed and displaced terms in spectra, *Z. Phys.* **31** (1925), 335–338.
With W. F. Meggers, Rules of spectral structure, *J. Opt. Soc. Amer. Rev. Sci. Inst.* **11** (1925), 459–463. Primed terms in the spectra of the lighter elements, *Washington Acad. Sci. J.* **15** (1925), 409–413.

1926

With C. C. Keiss, Displaced series in the spectrum of chromium, *Science* **63** (1926), 234–236.
Series and ionisation potentials in the iron spectrum, *Proc. Nat. Acad. Sci. U.S.A.* **12** (1926), 496–503.
Fundamental terms of spectra of first and second periods, *Z. Phys.* **39** (1926), 123–129.

Absorption spectra of the palladium and platinum group, *Phys. Rev.* **28** (1926), 642–664.
With A. SOMMERFELD, The spectroscopic significance of the magneton numbers in the iron group, *Z. Phys.* **40** (1926), 333–343.

1927

With J. R. LANG. Second spark spectrum of zinc, Zn III, *Phys. Rev.* **30** (1927), 378–386.
Screening constants from optimal data, *Phys. Rev.* **29** (1927), 650–654.

1928

Interpretation of paramagnetism in the iron group, *Z. Phys.* **47** (1928), 761–769.
With J. E. MACK AND R. J. LANG, Application of the X-ray laws to optical spactra of higher rank and the classification of Ga IV and Ge V, *Phys. Rev.* **31** (1928), 748–772.

1930

With D. R. INGLIS, Resonance separations in configurations of type p^5s and d^9s, *Phys. Rev.* **35** (1930), 1337–1341.

1931

With G. E. UHLENBECK, Application of spinor analysis to the Maxwell and Dirac equations, *Phys. Rev.* **37** (1931), 1380–1397.

1932

First spark spectrum of caesium (Cs II), *Phys. Rev.* **39** (1932), 458–466.
First spark spectrum of rubidium (Rb II), *Phys. Rev.* **38** (1932), 843–853.
Approximation of geometric optics as applied to a Dirac electron moving in a magnetic field, *Phys. Rev.* **42** (1932), 340–347.

1933

Kowalewski's top in quantum mechanics, *Phys. Rev.* **43** (1933), 548–551.

1937

Absorption coefficients for thermal neutrons, *Phys. Rev.* **52** (1937), 72–74.

1938

Elastic scattering of Yukawa particles. Part I. *Phys. Rev.* **54** (1938), 905–912.

1942

Term fomulae for the configuration d^5, *Phys. Rev.* **61** (1942), 302–304.
Degeneracies among terms of a configuration of equivalent electrons, *Phys. Rev.* **61** (1942), 305–308.

1943

With J. E. MACK, The spectrum of neutral tungsten, W. I., *Phys. Rev.* **63** (1943), 246–297.

1946

Rigorous solutions for the spanwise lift distribution of a certain class of airfoils, *Quart. Appl. Math.* **2** (1946), 232–250.

1948

Polyhedral harmonics, *Z. Naturforsch. A* **3** (1948), 447.

1953

With R. N. HOLLYER, JR., A. C. HUNTING, AND E. B. TURNER, Luminosity generated by shock waves, *Nature (London)* **171** (1953), 395.

1958

With W. R. JOHNSON, Interaction of cylindrical sound waves with a stationary shock wave, *Phys. Fluids* **1** (1958), 82.

With J. MEIXNER, The Kirchhoff–Young theory of the diffraction of electromagnetic waves, *Z. Phys.* **153** (1958), 129.

1964

With T. S. CHANG, Reflection of strong blast waves, *Phys. Fluids* **7** (1964), 1225.

1965

With SIR WILLIAM ROWAN HAMILTON, *Michigan Quart. Rev.* **4** (1965), 254.

1966

With R. G. FOWLER, Resistance of a plasma slab between juxtaposed disk electrodes, *Phys. Rev.* **148** (1966), 170.

1967

With R. G. FOWLER, Weber's mixed boundary-value problem in electrodynamics, *J. Math. Phys.* **8** (1967), 518.

1969

Spectroscopy by means of shock waves, *in* "Proceedings, Arnold Sommerfeld Centennial Memorial Meeting and of the International Symposium on the Physics of One- and Two-Electron Atoms, Munich, September 1968," North-Holland, Amsterdam.

1970

On Kepler ellipses starting from a point in space, *Amer. J. Phys.* **38** (1970), 837.

1971

With M. J. YODER, Low temperature shock waves in moledular hydrogen, *in* "Eighth International Shock Tube Symposium, Imerial College of Science and Technology, London, July 1971," preprint.

1972

With T. S. CHANG, Curved characteristics behind blast waves, *Phys. Fluids* **15** (1972), 502.

Tosio Kato

CHRONOLOGY

1917	Born August 25, Kanuma City, Tochighi-ken, Japan
1941	B. S., University of Tokyo
1951	Ph. D., University of Tokyo. Dissertation title: "On the Convergence of the Perturbation Method"
1951	Appointed Assistant Professor of Physics, University of Tokyo
1954	Acting Assistant Professor of Mathematics, University of California, Berkeley
1955	Visited New York University, American University, and National Bureau of Standards
1957	Visited Berkeley and California Institute of Technology
1958	Promoted to Professor of Physics, University of Tokyo
1962	Appointed Professor of Mathematics, University of California, Spring 1962
1966–1967	Miller Research Professor
1969–1970	Visiting Professor, Mathematical Institute, Oxford University
1980	Awarded Wiener Prize in Applied Mathematics by The American Mathematical Society

BIBLIOGRAPHY OF TOSIO KATO

1941

On the pair creation by γ-rays in the field of an electron, *Proc. Phys.-Math. Soc. Japan* **23** (1941), 867–869.

On the pair creation by γ-rays in the field of an electron, *Japan. J. Phys.* **14** (1941), 45–61.

1946

With K. ISHIGURO, On the velocity of a circular plate dropping in a ciruclar tube *Proc. Phys. Soc. Japann* **1** (1946), 11–16. [Japanese]

1948

Examples in which the perturbation method fails, *Progr. Theoret. Phys.* **3** (1948), 313.
With K. KODAIRA, On the admissible wave functions, *Progr. Theoret. Phys.* **3** (1948), 439.

1949

On the upper and lower bounds of eigenvalues, *Proc. Phys. Soc. Japan* **4**, (1949), 334–339.
On the convergence of the perturbation method, I, *Progr. Theoret. Phys.* **4** (1949), 514–523.

1950

Upper and lower bounds of eigenvalues, *Phys. Rev.* **77** (1950), 413.
On the convergence of the perturbation method, II, 1, *Progr. Theoret. Phys.* **5** (1950), 95–101.
On the convergence of the perturbation method, II, 2, *Progr. Theoret. Phys.* **5** (1950), 207–212.
Perturbation theory for linear operators, *Sûgaku* (Mathematics) **2** (1950), 201–208. [Japanese]
On the adiabatic theorem of quantum mechanics, *J. Phys. Soc. Japan* **5** (1950), 435–439.
Variational methods in collision problems, *Phys. Rev.* **80** (1950), 475.
Eigenvalue problem based on variational methods, *in* "Theory of Applied Partial Differential Equations" (T. Inui, Ed.), Iwanami Shoten, 1950. [Japanese]

1951

Approximate calculation by variational methods, *Proc. Phys. Soc. Japan* **6** (1951), 8–22. [Japanese]
Fundamental properties of Hamiltonian operators of Schrödinger type, *Trans. Amer. Math. Soc.* **70** (1951), 195–211.
On the existence of solutions of the helium wave equation, *Trans. Amer. Math. Soc.* **70** (1951), 212–218.
On the convergence of the perturbation method, *J. Fac. Sci. Univ. Tokyo Sect. I* **6**, Part 3 (1951), 145–226.
Note on Schwinger's variational method, *Progr. Theoret. Phys.* **6** (1951), 295–305.
Upper and lower bounds of scattering phases, *Progr. Theoret. Phys.* **6** (1951), 394–407.

1952

An elementary proof of the Legendre expansion theorem, *Sûgaku* (Mathematics) **4** (1952), 100–101. [Japanese]
Notes on some inequalities for linear operators, *Match. Ann.* **125** (1952), 208–212.
Note on the least eigenvalue of the Hill equation, *Quart. Appl. Math.* **10** (1952), 292–294.
On the perturbation theory of closed linear operators, *J. Math. Soc. Japan* **4** (1952), 323–337.

1953

With K. ISHIGURO, The reflection and transmission of a multi-layer film, *J. Phys. Soc. Japan* **8** (1953), 77–81.
Perturbation theory of semi-bounded operators, *Math. Ann.* **125** (1953), 435–447.
Integration of the equation of evolution in a Banach space, *J. Math. Soc. Japan* **5** (1953), 208–234.

On some appoximate methods concerning the operators T^*T. *Math. Ann.* **126** (1953), 253–262.

Eigenvalue problem, *in* "A Course of Modern Physics," Kobundo, Tokyo, (1953). [Japanese]

1954

On the semi-groups generated by Kolmogoroff's differential equations, *J. Math. Soc. Japan* **6** (1954), 1–15.

1955

"Quadratic Forms in Hilbert Spaces and Asymptotic Perturbation Series," Technical Report 7, University of California, 1955.

"Notes on Projections and Perturbation Theory," Technical Report 9, University of California, 1955.

1956

On linear differential equations in Banach spaces, *Comm. Pure Appl. Math.* **9** (1956), 479–486.

With O. TAUSSKY, Commutators of A and A^*, *J. Washington Acad. Sci.* **46** (1956), 38–40.

1957

On the Hilbert matrix, *Proc. Amer. Math. Soc.* **8** (1957), 73–81.

With T. IKEBE, Application of variational method to the Thomas–Fermi equation, *J. Phys. Soc. Japan* **12** (1957), 201–203.

On finite-dimensional perturbations of self-adjoint operators, *J. Math. Soc. Japan* **9** (1957), 239–249.

Perturbation of continuous spectra by trace class operators, *Proc. Japan Acad.* **33** (1957), 260–264.

On the eigenfunctions of many-particle systems in quantum mechanics, *Comm. Pure Appl. Math.* **10** (1957), 151–177.

With H. FUJITA, Y. NAKATA, AND M. NEWMAN, Estimation of the frequencies of thin elastic plates with free edges, *J. Res. Nat. Bur. Standards* **59**, Research PaPer 2784 (1957), 169–186.

Scattering operator and perturbation of continuous spectra, *Sûgaku* (Mathematics) **9** (1957), 75–84. [Japanese]

An aspect of the theory of partial differential equations, *Su Kagaku* (Science) **27** (1957), 246–251. [Japanese]

"Kansu Kukan-Ron" (Introduction to Functional Analysis), Kyoritsu, Tokyo, 1957.

"Calculus of Variations and its Applications," Iwanami Course on Applied Mathematics, Iwanami Shoten, Tokyo, 1957. [Japanese]

1958

With H. FUJITA, On a theorem for estimating eigenvalues, *J. Phys. Soc. Japan* **13** (1958), 215–219.

Continuous spectra and S-matrices, *Su Kagaku* (Science) **28** (1958), 436–440.

On positive eigenvectors of positive infinite matrices, *Comm. Pure Appl. Math.* **11** (1958), 573–586.

Perturbation theory for nullity, deficiency and other quantities of linear operators, *J. Analyse Math.* **6** (1958), 261–322.

Mathematics of scattering operators, *Soryusiron Kenkyu* (Studies on the theory of elementary particles) **18** (1958), 375–382. [Japanese]

1959

Non-existence of bound states with positive energy, *J. Phys. Soc. Japan* **14** (1959), 382.

With H. FUJITA, Maximum principles for vorticity in viscous fluid, *J. Phys. Soc. Japan* **14** (1959), 545.

Growth properties of solutions of the reduced wave equation with a variable coefficient. *Comm. Pure Appl. Math.* **12** (1959), 403–425.

Partial differential equations in quantum mechanics, *Sûgaku* (Mathematics) **10**, (1959), 212–219. [Japanese]

Remarks on pseudo-resolvents and infinitesimal generators of semigroups, *Proc. Japan Acad.* **35** (1959), 467–468.

With S. T. KURODA, A remark on the unitary property of the scattering operator, *Nuovo Cimento* **14** (1959), 1102–1107.

1960

Estimation of iterated matrices, with application to the von Neumann condition, *Numer. Math.* **2** (1960), 22–29.

Note on fractional powers of linear operators, *Proc. Japan Acad.* **36** (1960), 94–96.

Perturbation Methods, Part B., Chapter 1; Calculus of Variations, Part C; *in* "Mathematics for Natural Scientists" (K. Terazawa, Ed.), Iwanami Shoten, Tokyo, 1960. [Japanese]

1961

Fractional powers of dissipative operators, *J. Math. Soc. Japan* **13** (1961), 246–274.

Abstract evolution equations of parabolic type in Banach and Hilbert spaces, *Nagoya J. Math.* **19** (1961), 93–125.

A generalization of the Heinz inequality, *Proc. Japan Acad.* **37** (1961), 305–308.

With K. YOSIDA, "Ooyosugaku Ensyu, I" "Exercises in Applied Mathematics"), Shokabo, Tokyo, 1961. [Japanese]

1962

With T. IKEBE, Uniqueness of the self-adjoint extension of singular elliptic differential operators, *Arch. Rational Mech. Anal.* **9** (1962), 77–92.

Fractional powers of dissipative operators, II, *J. Math. Soc. Japan* **14** (1962), 242–248.

With H. TANABE, On the abstract evolution equation, *Osaka Math. J.* **14** (1962), 107–133.

On the commutation relation $AB - BA = C$, *Arch. Rational Mech. Anal.* **10** (1962), 273–275.

With H. FUJITA, On the nonstationary Navier Stokes system, *Rend. Sem. Mat. Univ. Padova* **32** (1962), 243–260.

1964

Demicontinuity, hemicontinuity and monotonicity. *Bull. Amer. Math. Soc.* **70** (1964), 548–550.

With H. FUJITA, On the Navier-Stokes initial value problem I, *Arch. Rational Mech. Anal.* **16** (1964), 269–315.

Semi-groups and temporally inhomogeneous evolution equations, ditto, Centro Internazionale Matematico Estivo, Rome, 1964.

1965

Nonlinear evolution equations in Banach spaces, Proc. Sympos. Appl. Math. Vol. 17, pp. 50–67, Amer. Math. Soc., Providence, RI, 1965.

Wave operators and unitary equivalence, *Pacific J. Math.* **15** (1965), 171–180.

Some mapping theorems for the numerical range, *Proc. Japan Acad.* **41** (1965), 652–655.

1966

Wave operators and similarity for some non-selfadjoint operators, *Math. Ann.* **162** (1966), 258–279.

"Perturbation Theory for Linear Operators," Springer-Verlag, New York, 1966.

1967

With H. TANABE, On the analyticity of solutions of evolution equations, *Osaka J. Math.* **4** (1967), 1–4.

On classical solutions of the two-dimensional non-stationary Euler equation, *Arch. Rational Mech. Anal.* **25** (1967), 188–200.

Some mathematical problems in quantum mechanics, *Progr. Theoret. Phys. Suppl.* **40** (1967), 3–19.

Demicontinuity, hemicontinuity and mononicity, II, *Bull. Amer. Math. Soc.* **73** (1967), 886–889.

Similarity for sequences of projections, *Bull. Amer. Math. Soc.* **73** (1967), 904–905.

Nonlinear semigroups and evolution equations, *J. Math. Soc. Japan* **19** (1967), 508–520.

Scattering theory with two Hilbert spaces, *J. Funct. Anal.* **1** (1967), 342–369.

1968

Smooth operators and commutators, *Studia Math.* **31** (1968), 535–546.

1969

Some results on potential scattering, *in* "Proceedings of the International Conference on Functional Analysis and Related Topics, Tokyo, April 1969," pp. 206–215. Single channel scattering, mimeo, Lecture Notes, Courant Institute of Mathematical Sciences, New York University, 1969.

1970

Linear evolution equations of "hyperbolic" type, *J. Fac. Sci. Univ. Tokyo* **17** (1970), 241–258.

Note on the differentiability of nonlinear semigroups, *in* "Global Analysis, Proceedings, Symposia in Pure Mathematics," pp. 91–94, Amer. Math. Soc., Providence, RI, 1970.

A characterization of holomorphic semigroups, *Proc. Amer. Math. Soc.* **25** (1970), 495–498.

Accretive operators and nonlinear evolution equations in Banach spaces, *in* "Proceedings, Symposium on Nonlinear Functional Analysis," pp. 138–161, Amer. Math. Soc., Providence, RI, 1970.

With S. T. KURODA, Theory of simple scattering and eigenfunction expansions, *in* "Functional Analysis and Related Fields" ((F. Browder, Ed.), pp. 99–131, Springer-Verlag, New York/Berlin, 1970.

With P. HESS, Perturbation of closed operators and their adjoints, *Comment. Math. Helv.* **45** (1970), 524–529.

1971

With S. T. KURODA, The abstract theory of scattering, *Rocky Mountain J. Math.* **1** (1971), 127–171.

With J. B. MCLEOD, The functional differential equation $y'(x) = ay(\lambda x) + by(x)$, *Bull. Amer. Math. Soc.* **77** (1971), 891–937.

On an inequality of Hardy, Littlewood, and Polya, *Adv. in Math.* **7** (1971), 217–218.

Scattering theory and perturbation of continuous spectra, *in* "Proceedings of the International Congress of Mathematicians, Nice, 1970," Vol. 1, pp. 135–140. Gauthier-Villars, Paris, 1971.

Scattering theory, *in* Studies in Applied Mathematics Vol. 7, pp. 90–115, Math. Assoc. Amer., New York, 1971.

1972

Nonstationary flows of viscous and ideal fluids in R^3, *J. Funct. Anal.* **9** (1972), 296–305.

With P. FITZPATRICK AND P. HESS, Local boundedness of monotone-type operators, *Proc. Japan Acad.* **48** (1972), 275–277.

Asymptotic behaviour of solutions of the functional equation $y'(x) = ay(\lambda x) + by(x)$, *in* "Delay and Functional Differential Equations and Their Applications," pp. 197–217, Academic Press, New York/London, 1972.

Schrödinger operators with singular potentials, *Israel J. Math.* **13** (1972), 135–148.

1973

Continuity of the map $S \to |S|$ for linear operators, *Proc. Japan Acad.* **49** (1972), 157–160.

A remark on the preceding paper by Chernoff, *J. Funct. Anal.* **3** (1973), 415–417.

Linear evolution equations of "hyperbolic" type, II, *J. Math. Soc. Japan* **25** (1973), 648–666.

With P. ALSHOLM, Scattering with long range potentials, *in* Proceedings of Symposia in Pure Mathematics, Vol. 23, pp. 393–399, Amer. Math. Soc., Providence, RI, 1973.

1974

A second look at the essential selfadjointness of the Schrödinger operators, *in* "Physical Reality and Mathematical Description" (Enz and Mehra, Eds.), pp. 193–201, Reidel, Dordrecht, 1974.

On the Trotter–Lie product formula, *Proc. Japan Acad.* **50** (1974), 694–698.

1975

Quasi-linear equations of evolution, with applications to partial differential equations, Lecture Notes in Mathematics Vol. 448, pp. 25–70, Springer-Verlag, New York/Berlin, 1975.

The Cauchy problem for quasi-linear symmetric hyperbolic systems, *Arch. Rational Mech. Anal.* **58** (1975), 181–205.

On a coerciveness theorem by Schulenberger and Wilcox, *Indiana Univ. Math. J.* **24** (1975), 979–985.

On a matrix limit theorem, *Linear and Multilinear Algebra* **3** (1975), 67–71.

1976

Functional analysis for quantum mechanics, *Kagaku* (Science), **46** (1976), 50–55. [Japanese]

Boundedness of some pseudo-differential operators, *Osaka J. Math.* **13** (1976), 1–9.

Singular perturbation and semigroup theory, *in* "Proceedings of the Conference held at the University of Paris-Sud, Orsay, June 12–13, 1975," Lecture Notes in Mathematics Vol. 565, pp. 104–112, Springer-Verlag, New York/Berlin, 1976.

Stationary theory of scattering, "Proceedings of the International Symposium 50 Years of the Schrödinger Equation, Vienna, June 10–12, 1976," pp. 73–94, Acta Phys. Austriaca *Suppl.* Vol. 17,SSpringer, Vienna, 1977.

Linear and quasi-linear equations of evolution of hyperbolic type, *Hyperbolicity* **2** (1976), 125–191.

"Perturbation Theory for Linear Operators," 2nd ed., Springer-Verlag, New York, 1976.

1977

Two-space scattering theory, with applications to many-body problems, *J. Fac. Sci. Univ. Tokyo, Sect. IA* **24** (1977), 503–514.

With T. HUGHES AND J. MARSDEN, Well-posed, quasi-linear second-order hyperbolic systems with applications to nonlinear elastodynamics and general relativity, *Arch. Rational Mech. Anal.* **63** (1977), 273–294.

1978

With K. MASUDA, Trotter's product formula for nonlinear semigroups generated by the subdifferentials of convex functionals, *J. Mat. Soc. Japan* **30** (1978), 169–178.

On some Schrödinger operators with a singular complex potential, *Ann. Scuola Norm. Sup. Ser. IV* **5** (1978), 105–114.

Remarks on Schrödinger operators with vector potentials, *Integral Equations Operator Theory* **1** (1978), 103–113.

Monotonicity theorems in scattering theory, *Hadronic J.* **1** (1978), 134–154.

Trotter's product formula for an arbitrary pair of selfadjoint contraction semigroups, *in* "Topics in Functional Analysis," Advances in Mathematics Supplementary Studies Vol. 3, pp. 185–195, Academic Press, New York/London, 1978.

Trotter's product formula for some nonlinear semigroups, *in* "Sympsium on Nonlinear Semigroups: Nonlinear Evolution Equations," pp. 155–162, Academic Press, New York/London, 1978.

With A. JENSEN, Asymptotic behavior of the scattering phase for exterior domains, *Comm. Partial Differential Equations* **3** (1978), 1165–1195.

1979

With H. BREZIS, Remarks on the Schrödinger operator with singular complex potentials, *J. Math. Pures Appl.* **58** (1979), 137–151.

On the Korteweg–de Vries equation, *Manuscripta Math.* **28** (1979), 89–99.

On the Cook–Kuroda criterion in scattering theory, *Comm. Math. Phys.* **67** (1979), 85–90.

With A. JENSEN, Spectral properties of Schrödinger operators and time-decay of the wave functions, *Duke Math. J.* **46** (1979), 583–611.

With R. HERSH, High-accuracy stable difference schemes for well-posed initial-value problems. *SIAM J. Numer. Anal.* **16** (1979), 679–682.

Spectral order and a matrix limit theorem, *Linear and Multilinear Algebra* **8** (1979), 15–21.

1980

Blow-up of solutions of some nonlinear hyperbolic equations, *Comm. Pure Appl. Math.* **33** (1980), 501–509.

With P. HESS, On some linear and nonlinear eigenvalue problems with an indefinite weight function, *Comm. Partial Differential Equations* **5** (1980), 999–1030.

1981

With J. S. HOWLAND, On a theorem of Ismagilov, *J. Funct. Anal.* **41** (1981), 37–39.

With I. SATAKE, An algebraic theory of Landau–Kolmogorov inequalities, *Tôhoku Math. J. (2)* **33** (1981), 421–428.

Remarks on the selfadjointness and related problems for differential operators, *in* "Spectral Theory of Differential Operators, Proc. Conference at the University of Alabama in Birmingham, 1981," Math. Studies Vol. 55, pp. 253–266, North-Holland, Amsterdam/New York, 1981.

The Cauchy problem for the Korteweg–de Vries equation, College de France Seminar Vol. 1, Pitman, New York, 1981.

1982

"A Spectral Mapping Theorem for the Exponential Function, and Some Counterexamples, MRS Technical Report 2316, Univ. of Wisconsin, 1982.

Superconvecity of the spectral radius, and convexity of the spectral bound and the type, *Math. Z.* **180** (1982), 265–273.

With W. ARENDT AND P. CHERNOFF, A generalization of dissipativity and positive semigroups, *J. Operator Theory* **8** (1982), 167–180.

With J. COHEN, S. FRIEDLAND, AND F. KELLY, Eigenvalue inequalities for products of matrix exponentials, *Linear Algebra Appl.* **45** (1982), 55–95.

"A Short Introduction to Perturbation Theory for Linear Operators," Springer, New York/Berlin, 1982.

1983

On the Cauchy problem for the (generalized) Korteweg–de Vries equation, Advances in Mathematics Suppl. Stud. Vol. 8, Academic Press, New York/London, 1983.

Holomorphic families of Dirac operators, *Mat. Z.* **183** (1983), 399–406.

Quasi-linear equations of evolutions in nonreflexive Banach spaces, *in* "Nonlinear Partial Differential Equations in Applied Science, Proceedings, U.S.–Japan Seminar, Tokyo, 1981," pp. 61–72, North-Holland, Amsterdam/New York/Oxford, 1983.

1984

With C. LAI, Nonlinear evolution equations and the Euler flow, *J. Funct. Anal.* **56** (1984), 15–28.

Remarks on the holomorphic families of Schrödinger and Dirac operators, *in* "Differential Equations, Proceedings, Conf. University of Alabama at Birmingham, 1983," (I. W. Knowles and R. T. Lewis, Eds.), pp. 341–352, North-Holland, Amsterdam/New York, 1984.

With J. BEALS AND A. MAJDA, Remarks on the breakdown of smooth solutions for the 3-D Euler equations, *Comm. Math. Phys.* **94** (1984), 61–66.

Nonselfadjoint Schrödinger operators with singular first-order coefficients, *Proc. Roy. Soc. Edinburgh Sect. A* **96** (1984), 323–329.

Remarks on zero viscosity limit for nonstationary Navier–Stokes flows with boundary, "Seminar on Nonlinear Partial Differential Equations pp. 85–98, (S. S. Chern, Ed.), Math. Sci. Res. Inst. Publications, Springer, New York, 1984.

Strong L^p solutions of the Navier–Stokes equation in R_m, with applications to weak solutions, *Math. Z.* **187** (1984), 471–480.

Locally coercive nonlinear equations, with applications to some periodic solutions, *Duke Math. J.* **51** (1984), 923–939.

1986

Nonlinear equations of evolution of Banach spaces, *in* Proc. Sympos. Pure Math. Vol. 45, part 2, pp. 9–23, Amer. Math. Soc., Providence, RI, 1986.

Remarks on the Euler and Navier–Stokes equations in R^2, *in* Proc. Sympos. Pure Math. Vol. 45, part 2, pp. 1–7, Amer. Math. Soc., Providence, RI, 1986.

L^p-theory of Schrödinger operators with singular potential, *in* "Aspects of Positivity in Functional Analysis," pp. 63–78, North-Holland, Amsterdam/New York, 1986.

Nonlinear evolution equations and analyticity, I, *Ann. Inst. H. Poincaré* **3** No. 6, (1986), 455–467.

Well-posedness of the Euler and Navier–Stokes equations in the Lebesgue spaces $L^p_s(R^2)$, *Rev. Math. Ibero-Amer.* **2** No. 1, (1986), 73–88.

On nonlinear Schrödinger equations, *Ann. Inst. H. Poincaré*, in press.