
References

1. Y. ABE, K. KOPFERMANN, *Toroidal groups. Line bundles, cohomology and quasi-Abelian varieties*, Lecture Notes in Mathematics 1759. Springer (2001).
2. J. M. ANCOCHEA-BERMUDEZ, R. CAMPOAMOR, Completable filiform Lie algebras, *Linear algebra and its applications* 367, 185-191 (2003).
3. J. M. ANCOCHEA-BERMUDEZ, M. GOZE, Classification des algèbres de Lie filiformes de dimension 8, *Arch. Math.* 50, 511-525 (1988).
4. S. ARIMA, Commutative group varieties, *J. Math. Soc. Japan* 12, 227-237 (1960).
5. R. BAER, Erweiterungen von Gruppen und ihren Isomorphismen, *Math. Zeit.* 38, 375-416 (1934).
6. R. BAER, Primary abelian groups and their automorphisms, *Amer. J. Math.* 59, 99-116 (1937).
7. C. BIRKENHAKE, H. LANGE, *Complex tori*, Progress in Mathematics 177, Birkhäuser 1999.
8. A. BOREL, *Linear Algebraic Groups*, Springer 1991.
9. N. BOURBAKI, *Éléments de mathématique. Fasc. XXXVII. Groupes et algèbres de Lie. Chapitre II: Algèbres de Lie libres. Chapitre III: Groupes de Lie*, Actualités Scientifiques et Industrielles, No. 1349. Hermann, Paris, 1972.
10. P. J. CAMERON, Permutation groups, p. 611-645 in *Handbook of combinatorics*, Graham, R. L. (ed.) et al., Vol. 1-2, Elsevier, Amsterdam (1995).
11. C. CHEVALLEY, *Theory of Lie groups I*, Princeton University Press 1946.
12. C. CHEVALLEY, *Théories des groupes de Lie II. Groupes Algébriques*, Hermann 1951.
13. C. CHEVALLEY, *Théorèmes généraux sur les algèbres de Lie*, Hermann 1955.
14. M. COWLING, A. H. DOOLEY, A. KORANYI, F. RICCI, H-Type Groups, *Adv. Math.* 87, 1-41 (1991).
15. D. VAN DANTZIG, Über topologisch homogene Kontinua, *Fund. Math.* **15**, 102-125 (1930).
16. F. DE GIOVANNI, C. MUSELLA, Y. P. SYSAK, Groups with almost modular subgroup lattice, *J. Algebra* **243**, 738-764 (2001).
17. I. DÉCHÈNE, Arithmetic of Generalized Jacobians, Algorithmic Number Theory Symposium - ANTS VII, volume 4076, Lecture Notes in Computer Science, pp. 421-435, Springer 2006.
18. M. DEMAZURE, P. GABRIEL, *Groupes Algébriques*, Masson & Cie 1991.

19. J. DIEUDONNÉ, Lie groups and Lie hyperalgebras over a field of characteristic $p > 0$ (VIII), Amer. J. Math. 80, 740-772 (1958).
20. J. DIXMIER, L'application exponentielle dans les groupes de Lie résolubles, Bull. Soc. Math. Fr. 85, 113-121 (1957).
21. A. ELDUQUE, A note on noncentral simple minimal nonabelian Lie algebras, Commun. Algebra 15, 1313-1318 (1987).
22. G. FALCONE, Frobenius Algebraic Groups, Forum Math. 12, 513-544 (2000).
23. G. FALCONE, M. A. VACCARO, Kronecker modules and reductions of a pair of bilinear forms, Acta Univ. Palacki. Olomuc., Fac. Rerum Nat., Math. 43, 55-60 (2004).
24. G. FALCONE, P. PLAUMANN, K. STRAMBACH, Monothetic Algebraic Groups, J. Austr. Math. Soc. 82, 315-324 (2007).
25. R. FARNSTEINER, On ad-semisimple Lie algebras, J. Algebra 83, 510-519 (1983).
26. A. FAUTLEROY, Defining normal subgroups of unipotent algebraic groups, Proc. Amer. Math. Soc. 50, 14-20 (1975).
27. H. FREUDENTHAL, DE VRIES, *Linear Lie Groups*, Pure and Applied Mathematics Vol. 35, Academic Press 1969.
28. L. FUCHS, *Infinite Abelian Groups II*, Academic Press 1973.
29. M. A. GAUGER, On the classification of metabelian Lie algebras, Trans. Amer. Math. Soc. 179, 293-328 (1973).
30. A. G. GEJN, Minimal nonabelian Lie algebras of prime characteristic, C. R. Acad. Bulg. Sci. 37, 1291-1293 (1984).
31. A. G. GEJN, Minimal noncommutative and minimal nonabelian algebras, Commun. Algebra 13, 305-328 (1985).
32. A. G. GEJN, S. V. KUZNETSOV, YU. N. MUKHIN, On minimal nonabelian Lie algebras (Russian), Mat. Zap. Sverdl. 8, No.3, 18-27 (1973).
33. J. R. GÓMEZ, A. JIMENEZ-MERCHÁN, Y. KHAKIMJANOV, Low-dimensional filiform Lie algebras, J. Pure Appl. Algebra 130, 133-158 (1998).
34. M. GOZE, J. M. ANCOCHEA, On the classification of rigid Lie algebras, J. Algebra 245, No.1, 68-91 (2001).
35. M. GOZE, Y. KHAKIMJANOV, Sur le algebres de Lie nilpotent admettant un tore de derivations, Manuscr. Math., No.2, 115-124 (1994).
36. M. GOZE, YU. KHAKIMJANOV, *Nilpotent Lie algebras*, Kluwer Academic Publishers (1996).
37. M. GOZE, YU. KHAKIMJANOV, Nilpotent and solvable Lie algebras, in *Handbook of Algebra*, vol. 2 (Ed. M. Hazewinkel), 615-663, Elsevier (2000).
38. G. HAVAS, J. S. RICHARDSON, Groups of exponent five and class four, Comm. Algebra 11, No.3, 287-304 (1983).
39. M. HAZEWINKEL, *Formal groups and applications*, Academic Press 1978.
40. G. HOCHSCHILD, *The structure of Lie groups*, Holden-Day 1965.
41. K. H. HOFMANN, Lie algebras with subalgebras of co-dimension one, Illinois J. Math. 9, 636-643 (1965).
42. K. H. HOFMANN, Über das Nilradikal lokal kompakter Gruppen, Math. Z. 91, 206-215 (1966).
43. K. H. HOFMANN, A. MORRIS, *The structure of compact groups. A primer for the student—a handbook for the expert*, Walter de Gruyter, Berlin 1998.
44. K. H. HOFMANN, P. S. MOSTERT, Splitting in Topological Groups, Mem. Am. Math. Soc. 43 (1963).

45. J. E. HUMPHREYS, *Linear Algebraic Groups*, 2nd ed., Springer 1981.
46. B. HUPPERT, *Endliche Gruppen I*, Springer 1983.
47. K. IWASAWA, Über die endlichen Gruppen und die Verbände ihrer Untergruppen, J. Fac. Sci. Imp. Univ. Tokyo. Sect. I. **4**, 171–199 (1941).
48. K. IWASAWA, On the structure of infinite M -groups, Jap. J. Math. **18**, 709–728 (1943).
49. N. JACOBSON, *Lie Algebras*, Interscience Publishers 1962.
50. N. JACOBSON, *Basic Algebra II*, W. H. Freeman and Company 1980.
51. T. KAMBAYASHI, M. MIYANISHI, M. TAKEUCHI, *Unipotent algebraic groups*, Lecture Notes in Mathematics, Vol. 414. Springer-Verlag, Berlin-New York 1974.
52. F. KÜMMICH, Topologisch quasihamiltonsche Gruppen, Arch. Math **29**, 392–397 (1977).
53. F. KÜMMICH, H. SCHEERER, Sottogruppi topologicamente quasi-normali dei gruppi localmente compatti, Rend. Sem. Mat. Univ. Padova **69**, 195–210 (1983).
54. T. Y. LAM, *Lectures on Modules and Rings*. Springer 1991.
55. D. H. LEE, *The structure of complex Lie groups*, CRC Research Notes in Mathematics **429**, Chapman & Hill 2002.
56. F. LEVSTEIN, A. TIRABOSCHI, Classes of 2-step nilpotent Lie algebras. Comm. Algebra, **27**, 2425–2440 (1999).
57. G. A. MILLER, H. C. MORENO, Non-abelian groups in which every subgroup is abelian, Trans. Amer. Math. Soc., **4**, 389–404 (1993).
58. D. MONTGOMERY, L. ZIPPIN, *Topological transformation groups* (Interscience Tracts in Pure and Applied Mathematics) Interscience Publishers 1955.
59. A. MORIMOTO, Non-compact Complex Lie groups without Non-constant Holomorphic Functions, Proceedings of the Conference of Complex Analysis Minneapolis, 256–272, Springer 1965.
60. A. MORIMOTO, On the classification of noncompact complex abelian Lie groups, Trans. Amer. Math. Soc., No.123, 200–228 (1966).
61. V. V. MOROZOV, Classification of Nilpotent Lie Algebras up to Dimension 6, Izv. Vyssh. Uchebn. Zaved., Mat. 1958, No.4(5), 161–171 (1958).
62. G. M. MUBARAKZJANOV, On solvable Lie algebra (Russian), Izv. Vyssh. Uchebn. Zaved., Mat. 1963, No.1(32), 114–123 (1963).
63. P. MÜLLER, On simple semiabelian p -adic Lie algebras, Comm. Algebra, **20**, 1041–1049 (1992).
64. D. MUMFORD, *Abelian Varieties*, Oxford University Press 1974.
65. J. NEUKIRCH, A. SCHMIDT, K. WINGBERG, *Cohomology of Number Fields*, Springer 2000.
66. E. A. O'BRIEN, M. VAUGHAN-LEE, The 2-generator restricted Burnside group of exponent 7, Internat. J. Algebra Comput. **12**, No.4, 575–592 (2002).
67. J. OESTERLÉ, Nombres de Tamagawa et groupes unipotents en caractéristique p , Invent. Math. **78**, 13–88 (1984).
68. A. L. ONISHCHIK, E. B. VINBERG, V. V. GORBATSEVICH, *Lie groups and Lie algebras III. Structure of Lie groups and Lie algebras*, Encyclopaedia of Mathematical Sciences **41**, Springer 1994.
69. F. OORT, YU. G. ZARHIN, Complex tori. Indag. Math. (N.S.) **7**, no. 4, 473–487 (1996).
70. P. PLAUMANN, K. STRAMBACH, G. ZACHER, Der Verband der zusammenhängenden Untergruppen einer kommutativen algebraischen Gruppe, Arch. Math. **85**, No.1, 37–48 (2005).

71. P. PLAUMANN, K. STRAMBACH, G. ZACHER, Complements of connected subgroups in algebraic groups, *Rend. Sem. Mat. Univ. Padova*, 115, 253-264 (2006).
72. G. PRASAD, A. S. RAPINCHUK, Irreducible Tori in Semisimple Groups, *Int. Math. Res. Not.* 23, 1229-1242 (2001).
73. L. RÉDEI, Das schiefe Produkt in der Gruppentheorie, *Comment. Math. Helvet.* 20, 225-267 (1947).
74. L. RÉDEI, *Algebra, Erster Teil*, Akademische Verlagsgesellschaft Geest & Portig, Leipzig 1959.
75. D. J. S. ROBINSON, *A Course in the Theory of Groups*, Springer 1980.
76. M. ROSENLICHT, Generalized Jacobian varieties, *Ann. of Math.* (2) 59, 505-530 (1954).
77. M. ROSENLICHT, Some basic theorems on algebraic groups, *Amer. J. Math.* LXXVIII, 2, 401-443 (1956).
78. M. ROSENLICHT, Commutative algebraic group varieties, *Princeton Math. Ser.* 12, 151-156 (1957).
79. M. ROSENLICHT, Extensions of vector groups by Abelian varieties, *Amer. J. Math.* LXXX, 3, 685-714 (1958).
80. M. ROSENLICHT, Toroidal algebraic groups, *Proc. Amer. Math. Soc.* 12, 984-988 (1961).
81. M. ROSENLICHT, The definition of field of definition, *Bol. Soc. Mat. Mex.*, II. Ser. 7, 39-46 (1962).
82. M. ROSENLICHT, Questions of rationality for solvable algebraic groups over nonperfect fields, *Annali di Mat.* IV, 61, 97-120 (1962).
83. M. ROSENLICHT, Another proof of a theorem on rational cross section, *Pac. J. Math.*, 20 N. 1, 129-133 (1967).
84. H. SALZMANN, Zur Klassifikation topologischer Ebenen III. *Abh. Math. Semin. Univ. Hamb.* 28, 250-261 (1965).
85. R. SCHARLAU, Paare alternierender Formen, *Math. Z.* 147, 13-19 (1976).
86. C. SCHEIDERER, Topologisch quasinormale Untergruppen zusammenhängender lokalkompakter Gruppen, *Monatsh. Math.* 98, 75-81 (1984).
87. C. SCHEIDERER, Quasi-normal subgroups of algebraic groups, *Arch. Math.* 45, 8-11 (1985).
88. R. SCHMIDT, *Subgroup Lattices of Groups*, de Gruyter 1994.
89. J. P. SERRE, *Groupes algébriques et corps de classes*, Actualités scientifiques et industrielles 1264. Publ. de l'Institut de Mathématique de l'Université de Nancago, Hermann 1959.
90. G. SHIMURA, On analytic families of polarized abelian varieties and automorphic functions, *Ann. of Math.* 78, 149-193 (1963).
91. T. A. SPRINGER, *Linear algebraic groups*, 2nd ed., Progress in Mathematics 9, Birkhäuser 1998.
92. E. L. STITZINGER, Minimal nonnilpotent solvable Lie algebras, *Proc. Am. Math. Soc.* 28, 47-49 (1971).
93. S. E. STONEHEWER, Permutable subgroups of infinite groups, *Math. Z.* 125, 1-16 (1972).
94. J. TITS, *Tabellen zu den einfachen Lie Gruppen und ihren Darstellungen*, Springer 1967.
95. V. S. VARADAJAN, *Lie groups, Lie algebras and their representations*, Prentice-Hall 1984.
96. S. WARNER, *Topological rings*, North-Holland Mathematics Studies 178, North-Holland 1993.

- 97. B. WEHRFRITZ, *Infinite Linear Groups. An account of the group-theoretic properties of infinite groups of matrices*, Ergebnisse der Mathematik und ihrer Grenzgebiete Band 76, Springer 1973.
- 98. A. WEIL, On algebraic groups of transformations, Am. J. Math. 77, 355-391 (1955).
- 99. A. WEIL, On algebraic groups and homogeneous spaces, Am. J. Math. 77, 493-512 (1955).
- 100. A. WEIL, *Foundations of algebraic geometry*, AMS Colloquium Publications Volume XXIX, 1962.
- 101. A. WEIL, *Courbes algébriques et variétés abéliennes*, Hermann, Paris 1971.
- 102. E. WITT, Zyklische Körper und Algebren der Charakteristik p vom Grade p^n . Struktur diskret bewerteter perfekter Körper mit vollkommenem Restklassenkörper der Charakteristik p , J. Reine Angew. Math. 176, 126-140 (1936).

Notation

k	a field	
k_s	separable closure of the field k	
$k^{\text{p}^{-\infty}}$	perfect closure of the field k	
G°	connected component of the algebraic or topological group G containing the identity	
$\mathfrak{z}^\circ G$	connected component of the centre of the group G	
$G(k)$	group of the k -rational elements of the algebraic k -group G	
\mathbf{G}_a	one-dimensional additive group	
\mathbf{G}_m	one-dimensional multiplicative group	
\mathfrak{W}	ring of Witt vectors	p. 34
\mathfrak{W}_n	n -dimensional Witt group	p. 11
$\mathfrak{J}_n(\alpha)$	n -dimensional unipotent group of maximal nilpotency class	p. 30
$\mathfrak{C}_n(\mathcal{S})$	n -dimensional unipotent chain	p. 52
$M_{n,m}$	set of $n \times m$ matrices	
GL_n	general linear group	
SL_n, PSL_n	special, projective special, linear group	
SO_n, SU_n	special orthogonal, special unitary group	
\mathbf{F}	Frobenius homomorphism $x \mapsto x^p$	
$k[\mathbf{F}]$	ring of p -polynomials	p. 7
$\langle M \rangle_{k[\mathbf{F}]}$	$k[\mathbf{F}]$ -module generated by the set M of polynomials with coefficients in k	

$x^y = y^{-1}xy$	for elements x, y in a group G	
$[x, y] = x^{-1}y^{-1}xy$	the commutator of the elements x, y in a group G	
$[H_1, H_2]$	the subgroup of G generated by the commutators $[h_1, h_2]$, $h_i \in H_i \leq G$, $i = 1, 2$	
$G_1 \vee G_2$	direct product with amalgamated central subgroup	p. 11
$G_1 \wedge G_2$	direct product with amalgamated factor group	p. 12
δ^1	coboundary operator	p. 13
δ^2	cocycle operator	p. 12
Φ_n	factor system of the extension \mathfrak{W}_{n+1} of \mathbf{G}_a by \mathfrak{W}_n	p. 52

Index

- adjoint representation, 8
- algebraic group over k , 4
- algebraic k -subgroup, 4
- aligned, 109
- almost direct product, 1
- analytic representation, 24
- Borel subgroup, 7
- chain, 9, 49
- co-aligned, 117
- complex torus, 2
- cross section, 14
- direct product with
 - amalgamated central subgroup, 11
 - amalgamated factor group, 12, 78
- dual numbers, 8
- explicit central extension, 13
- extra-special, 103
- factor system, 12
- filiform, 29
- formal group, 4
- Fratini subgroup, 86
- hamiltonian, 176
- Heisenberg Lie algebra, group, 106, 107
- Hurwitz relations, 24
- irrationality conditions, 24
- isogenous, 11
- k -chain, 49
- k -group, 4
- k -homomorphism, 4
- k -irreducible k -torus, 10
- k -isogeny, 11
- k -quasi-split algebraic group, 50
- k -split algebraic group, 7
- linear complex torus, 2
- maximal rank of a complex Lie group, 23
- nilradical of a Lie group, 1
- period matrix, 23
- pre-group, 15
- quasi-commutative, 44
- quasi-hamiltonian, 170
- quasi-normal, 168
- radical of a Lie group, 1
- rational representation, 24
- reductive Lie algebra, 110
- regular Lie algebra, 123
- semi-commutative Lie algebra, 101
- semi-simple Lie group, 1
- separable k -homomorphism, 5
- Shafarevich extension, 28
- simple formal group, 103
- super-hamiltonian algebraic group, 188
- super-hamiltonian Lie group, 196
- tangent bundle, 8
- toroidal, 3, 6
- uni-maximal, 86
- uni-minimal, 86
- Witt group, 9

Lecture Notes in Mathematics

For information about earlier volumes
please contact your bookseller or Springer
LNM Online archive: springerlink.com

- Vol. 1755: J. Azéma, M. Émery, M. Ledoux, M. Yor (Eds.), Séminaire de Probabilités XXXV (2001)
- Vol. 1756: P. E. Zhidkov, Korteweg de Vries and Nonlinear Schrödinger Equations: Qualitative Theory (2001)
- Vol. 1757: R. R. Phelps, Lectures on Choquet's Theorem (2001)
- Vol. 1758: N. Monod, Continuous Bounded Cohomology of Locally Compact Groups (2001)
- Vol. 1759: Y. Abe, K. Kopfermann, Toroidal Groups (2001)
- Vol. 1760: D. Filipović, Consistency Problems for Heath-Jarrow-Morton Interest Rate Models (2001)
- Vol. 1761: C. Adelmann, The Decomposition of Primes in Torsion Point Fields (2001)
- Vol. 1762: S. Cerrai, Second Order PDE's in Finite and Infinite Dimension (2001)
- Vol. 1763: J.-L. Loday, A. Frabetti, F. Chapoton, F. Gochot, Dialgebras and Related Operads (2001)
- Vol. 1764: A. Cannas da Silva, Lectures on Symplectic Geometry (2001)
- Vol. 1765: T. Kerler, V. V. Lyubashenko, Non-Semisimple Topological Quantum Field Theories for 3-Manifolds with Corners (2001)
- Vol. 1766: H. Hennion, L. Hervé, Limit Theorems for Markov Chains and Stochastic Properties of Dynamical Systems by Quasi-Compactness (2001)
- Vol. 1767: J. Xiao, Holomorphic Q Classes (2001)
- Vol. 1768: M. J. Pflaum, Analytic and Geometric Study of Stratified Spaces (2001)
- Vol. 1769: M. Alberich-Carramiñana, Geometry of the Plane Cremona Maps (2002)
- Vol. 1770: H. Gluesing-Luerssen, Linear Delay-Differential Systems with Commensurate Delays: An Algebraic Approach (2002)
- Vol. 1771: M. Émery, M. Yor (Eds.), Séminaire de Probabilités 1967-1980. A Selection in Martingale Theory (2002)
- Vol. 1772: F. Burstall, D. Ferus, K. Leschke, F. Pedit, U. Pinkall, Conformal Geometry of Surfaces in S^4 (2002)
- Vol. 1773: Z. Arad, M. Muzychuk, Standard Integral Table Algebras Generated by a Non-real Element of Small Degree (2002)
- Vol. 1774: V. Runde, Lectures on Amenability (2002)
- Vol. 1775: W. H. Meeks, A. Ros, H. Rosenberg, The Global Theory of Minimal Surfaces in Flat Spaces. Martina Franca 1999. Editor: G. P. Pirola (2002)
- Vol. 1776: K. Behrend, C. Gomez, V. Tarasov, G. Tian, Quantum Cohomology. Cetraro 1997. Editors: P. de Bartolomeis, B. Dubrovin, C. Reina (2002)
- Vol. 1777: E. García-Río, D. N. Kupeli, R. Vázquez-Lorenzo, Osserman Manifolds in Semi-Riemannian Geometry (2002)
- Vol. 1778: H. Kiechle, Theory of K-Loops (2002)
- Vol. 1779: I. Chueshov, Monotone Random Systems (2002)
- Vol. 1780: J. H. Bruinier, Borcherds Products on $O(2,1)$ and Chern Classes of Heegner Divisors (2002)
- Vol. 1781: E. Bolthausen, E. Perkins, A. van der Vaart, Lectures on Probability Theory and Statistics. Ecole d'Été de Probabilités de Saint-Flour XXIX-1999. Editor: P. Bernard (2002)
- Vol. 1782: C.-H. Chu, A. T.-M. Lau, Harmonic Functions on Groups and Fourier Algebras (2002)
- Vol. 1783: L. Grüne, Asymptotic Behavior of Dynamical and Control Systems under Perturbation and Discretization (2002)
- Vol. 1784: L. H. Eliasson, S. B. Kuksin, S. Marmi, J.-C. Yoccoz, Dynamical Systems and Small Divisors. Cetraro, Italy 1998. Editors: S. Marmi, J.-C. Yoccoz (2002)
- Vol. 1785: J. Arias de Reyna, Pointwise Convergence of Fourier Series (2002)
- Vol. 1786: S. D. Cutkosky, Monomialization of Morphisms from 3-Folds to Surfaces (2002)
- Vol. 1787: S. Caenepeel, G. Militaru, S. Zhu, Frobenius and Separable Functors for Generalized Module Categories and Nonlinear Equations (2002)
- Vol. 1788: A. Vasil'ev, Moduli of Families of Curves for Conformal and Quasiconformal Mappings (2002)
- Vol. 1789: Y. Sommerhäuser, Yetter-Drinfel'd Hopf algebras over groups of prime order (2002)
- Vol. 1790: X. Zhan, Matrix Inequalities (2002)
- Vol. 1791: M. Knebusch, D. Zhang, Manis Valuations and Prüfer Extensions I: A new Chapter in Commutative Algebra (2002)
- Vol. 1792: D. D. Ang, R. Gorenflo, V. K. Le, D. D. Trong, Moment Theory and Some Inverse Problems in Potential Theory and Heat Conduction (2002)
- Vol. 1793: J. Cortés Monforte, Geometric, Control and Numerical Aspects of Nonholonomic Systems (2002)
- Vol. 1794: N. Pytheas Fogg, Substitution in Dynamics, Arithmetics and Combinatorics. Editors: V. Berthé, S. Ferenczi, C. Mauduit, A. Siegel (2002)
- Vol. 1795: H. Li, Filtered-Graded Transfer in Using Non-commutative Gröbner Bases (2002)
- Vol. 1796: J.M. Melenk, hp-Finite Element Methods for Singular Perturbations (2002)
- Vol. 1797: B. Schmidt, Characters and Cyclotomic Fields in Finite Geometry (2002)
- Vol. 1798: W.M. Oliva, Geometric Mechanics (2002)
- Vol. 1799: H. Pajot, Analytic Capacity, Rectifiability, Menger Curvature and the Cauchy Integral (2002)
- Vol. 1800: O. Gabber, L. Ramero, Almost Ring Theory (2003)
- Vol. 1801: J. Azéma, M. Émery, M. Ledoux, M. Yor (Eds.), Séminaire de Probabilités XXXVI (2003)
- Vol. 1802: V. Capasso, E. Merzbach, B. G. Ivanoff, M. Dozzi, R. Dalang, T. Mountford, Topics in Spatial Stochastic Processes. Martina Franca, Italy 2001. Editor: E. Merzbach (2003)

- Vol. 1803: G. Dolzmann, Variational Methods for Crystalline Microstructure – Analysis and Computation (2003)
- Vol. 1804: I. Cherednik, Ya. Markov, R. Howe, G. Lusztig, Iwahori-Hecke Algebras and their Representation Theory, Martina Franca, Italy 1999. Editors: V. Baldoni, D. Barbasch (2003)
- Vol. 1805: F. Cao, Geometric Curve Evolution and Image Processing (2003)
- Vol. 1806: H. Broer, I. Hoveijn, G. Lunther, G. Vegter, Bifurcations in Hamiltonian Systems. Computing Singularities by Gröbner Bases (2003)
- Vol. 1807: V. D. Milman, G. Schechtman (Eds.), Geometric Aspects of Functional Analysis. Israel Seminar 2000-2002 (2003)
- Vol. 1808: W. Schindler, Measures with Symmetry Properties (2003)
- Vol. 1809: O. Steinbach, Stability Estimates for Hybrid Coupled Domain Decomposition Methods (2003)
- Vol. 1810: J. Wengenroth, Derived Functors in Functional Analysis (2003)
- Vol. 1811: J. Stevens, Deformations of Singularities (2003)
- Vol. 1812: L. Ambrosio, K. Deckelnick, G. Dziuk, M. Mimura, V. A. Solonnikov, H. M. Soner, Mathematical Aspects of Evolving Interfaces. Madeira, Funchal, Portugal 2000. Editors: P. Colli, J. F. Rodrigues (2003)
- Vol. 1813: L. Ambrosio, L. A. Caffarelli, Y. Brenier, G. Buttazzo, C. Villani, Optimal Transportation and its Applications, Martina Franca, Italy 2001. Editors: L. A. Caffarelli, S. Salsa (2003)
- Vol. 1814: P. Bank, F. Baudoin, H. Föllmer, L.C.G. Rogers, M. Soner, N. Touzi, Paris-Princeton Lectures on Mathematical Finance 2002 (2003)
- Vol. 1815: A. M. Vershik (Ed.), Asymptotic Combinatorics with Applications to Mathematical Physics. St. Petersburg, Russia 2001 (2003)
- Vol. 1816: S. Albeverio, W. Schachermayer, M. Tala-grand, Lectures on Probability Theory and Statistics. Ecole d'Été de Probabilités de Saint-Flour XXX-2000. Editor: P. Bernard (2003)
- Vol. 1817: E. Koelink, W. Van Assche (Eds.), Orthogonal Polynomials and Special Functions. Leuven 2002 (2003)
- Vol. 1818: M. Bildhauer, Convex Variational Problems with Linear, nearly Linear and/or Anisotropic Growth Conditions (2003)
- Vol. 1819: D. Masser, Yu. V. Nesterenko, H. P. Schlickewei, W. M. Schmidt, M. Waldschmidt, Diophantine Approximation. Cetraro, Italy 2000. Editors: F. Amoroso, U. Zannier (2003)
- Vol. 1820: F. Hiai, H. Kosaki, Means of Hilbert Space Operators (2003)
- Vol. 1821: S. Teufel, Adiabatic Perturbation Theory in Quantum Dynamics (2003)
- Vol. 1822: S.-N. Chow, R. Conti, R. Johnson, J. Mallet-Paret, R. Nussbaum, Dynamical Systems. Cetraro, Italy 2000. Editors: J. W. Macki, P. Zecca (2003)
- Vol. 1823: A. M. Anile, W. Allegretto, C. Ringhofer, Mathematical Problems in Semiconductor Physics. Cetraro, Italy 1998. Editor: A. M. Anile (2003)
- Vol. 1824: J. A. Navarro González, J. B. Sancho de Salas, \mathcal{C}^∞ – Differentiable Spaces (2003)
- Vol. 1825: J. H. Bramble, A. Cohen, W. Dahmen, Multiscale Problems and Methods in Numerical Simulations, Martina Franca, Italy 2001. Editor: C. Canuto (2003)
- Vol. 1826: K. Dohmen, Improved Bonferroni Inequalities via Abstract Tubes. Inequalities and Identities of Inclusion-Exclusion Type. VIII, 113 p. 2003.
- Vol. 1827: K. M. Pilgrim, Combinations of Complex Dynamical Systems. IX, 118 p. 2003.
- Vol. 1828: D. J. Green, Gröbner Bases and the Computation of Group Cohomology. XII, 138 p. 2003.
- Vol. 1829: E. Altman, B. Gaujal, A. Hordijk, Discrete-Event Control of Stochastic Networks: Multimodularity and Regularity. XIV, 313 p. 2003.
- Vol. 1830: M. I. Gil', Operator Functions and Localization of Spectra. XIV, 256 p. 2003.
- Vol. 1831: A. Connes, J. Cuntz, E. Guentner, N. Higson, J. E. Kaminker, Noncommutative Geometry, Martina Franca, Italy 2002. Editors: S. Doplicher, L. Longo (2004)
- Vol. 1832: J. Azéma, M. Émery, M. Ledoux, M. Yor (Eds.), Séminaire de Probabilités XXXVII (2003)
- Vol. 1833: D.-Q. Jiang, M. Qian, M.-P. Qian, Mathematical Theory of Nonequilibrium Steady States. On the Frontier of Probability and Dynamical Systems. IX, 280 p. 2004.
- Vol. 1834: Yo. Yomdin, G. Comte, Tame Geometry with Application in Smooth Analysis. VIII, 186 p. 2004.
- Vol. 1835: O.T. Izhboldin, B. Kahn, N.A. Karpenko, A. Vishik, Geometric Methods in the Algebraic Theory of Quadratic Forms. Summer School, Lens, 2000. Editor: J.-P. Tignol (2004)
- Vol. 1836: C. Năstăsescu, F. Van Oystaeyen, Methods of Graded Rings. XIII, 304 p. 2004.
- Vol. 1837: S. Tavaré, O. Zeitouni, Lectures on Probability Theory and Statistics. Ecole d'Été de Probabilités de Saint-Flour XXXI-2001. Editor: J. Picard (2004)
- Vol. 1838: A.J. Ganesh, N.W. O'Connell, D.J. Wischik, Big Queues. XII, 254 p. 2004.
- Vol. 1839: R. Gohm, Noncommutative Stationary Processes. VIII, 170 p. 2004.
- Vol. 1840: B. Tsirelson, W. Werner, Lectures on Probability Theory and Statistics. Ecole d'Été de Probabilités de Saint-Flour XXXII-2002. Editor: J. Picard (2004)
- Vol. 1841: W. Reichel, Uniqueness Theorems for Variational Problems by the Method of Transformation Groups (2004)
- Vol. 1842: T. Johnsen, A. L. Knutsen, K_3 Projective Models in Scrolls (2004)
- Vol. 1843: B. Jefferies, Spectral Properties of Noncommuting Operators (2004)
- Vol. 1844: K.F. Siburg, The Principle of Least Action in Geometry and Dynamics (2004)
- Vol. 1845: Min Ho Lee, Mixed Automorphic Forms, Torus Bundles, and Jacobi Forms (2004)
- Vol. 1846: H. Ammari, H. Kang, Reconstruction of Small Inhomogeneities from Boundary Measurements (2004)
- Vol. 1847: T.R. Bielecki, T. Björk, M. Jeanblanc, M. Rutkowski, J.A. Scheinkman, W. Xiong, Paris-Princeton Lectures on Mathematical Finance 2003 (2004)
- Vol. 1848: M. Abate, J. E. Fornæss, X. Huang, J. P. Rosay, A. Tumanov, Real Methods in Complex and CR Geometry, Martina Franca, Italy 2002. Editors: D. Zaitsev, G. Zampieri (2004)
- Vol. 1849: Martin L. Brown, Heegner Modules and Elliptic Curves (2004)
- Vol. 1850: V. D. Milman, G. Schechtman (Eds.), Geometric Aspects of Functional Analysis. Israel Seminar 2002-2003 (2004)
- Vol. 1851: O. Catoni, Statistical Learning Theory and Stochastic Optimization (2004)
- Vol. 1852: A.S. Kechris, B.D. Miller, Topics in Orbit Equivalence (2004)
- Vol. 1853: Ch. Favre, M. Jonsson, The Valutive Tree (2004)

- Vol. 1854: O. Saeki, Topology of Singular Fibers of Differential Maps (2004)
- Vol. 1855: G. Da Prato, P.C. Kunstmann, I. Lasiecka, A. Lunardi, R. Schnaubelt, L. Weis, Functional Analytic Methods for Evolution Equations. Editors: M. Iannelli, R. Nagel, S. Piazzera (2004)
- Vol. 1856: K. Back, T.R. Bielecki, C. Hipp, S. Peng, W. Schachermayer, Stochastic Methods in Finance, Bressanone/Brixen, Italy, 2003. Editors: M. Fritelli, W. Runggaldier (2004)
- Vol. 1857: M. Émery, M. Ledoux, M. Yor (Eds.), Séminaire de Probabilités XXXVIII (2005)
- Vol. 1858: A.S. Cherny, H.-J. Engelbert, Singular Stochastic Differential Equations (2005)
- Vol. 1859: E. Letellier, Fourier Transforms of Invariant Functions on Finite Reductive Lie Algebras (2005)
- Vol. 1860: A. Borisyuk, G.B. Ermentrout, A. Friedman, D. Terman, Tutorials in Mathematical Biosciences I. Mathematical Neurosciences (2005)
- Vol. 1861: G. Benettin, J. Henrard, S. Kuksin, Hamiltonian Dynamics – Theory and Applications, Cetraro, Italy, 1999. Editor: A. Giorgilli (2005)
- Vol. 1862: B. Helffer, F. Nier, Hypoelliptic Estimates and Spectral Theory for Fokker-Planck Operators and Witten Laplacians (2005)
- Vol. 1863: H. Führ, Abstract Harmonic Analysis of Continuous Wavelet Transforms (2005)
- Vol. 1864: K. Efsthathiou, Metamorphoses of Hamiltonian Systems with Symmetries (2005)
- Vol. 1865: D. Applebaum, B.V.R. Bhat, J. Kustermans, J. M. Lindsay, Quantum Independent Increment Processes I. From Classical Probability to Quantum Stochastic Calculus. Editors: M. Schürmann, U. Franz (2005)
- Vol. 1866: O.E. Barndorff-Nielsen, U. Franz, S. Gohm, B. Kümmerer, S. Thorbjørnsen, Quantum Independent Increment Processes II. Structure of Quantum Lévy Processes, Classical Probability, and Physics. Editors: M. Schürmann, U. Franz, (2005)
- Vol. 1867: J. Sneyd (Ed.), Tutorials in Mathematical Biosciences II. Mathematical Modeling of Calcium Dynamics and Signal Transduction. (2005)
- Vol. 1868: J. Jorgenson, S. Lang, $\text{Pos}_n(\mathbb{R})$ and Eisenstein Series. (2005)
- Vol. 1869: A. Dembo, T. Funaki, Lectures on Probability Theory and Statistics. Ecole d'Été de Probabilités de Saint-Flour XXXIII-2003. Editor: J. Picard (2005)
- Vol. 1870: V.I. Gurariy, W. Lusky, Geometry of Müntz Spaces and Related Questions. (2005)
- Vol. 1871: P. Constantin, G. Gallavotti, A.V. Kazhikhov, Y. Meyer, S. Ukai, Mathematical Foundation of Turbulent Viscous Flows, Martina Franca, Italy, 2003. Editors: M. Cannone, T. Miyakawa (2006)
- Vol. 1872: A. Friedman (Ed.), Tutorials in Mathematical Biosciences III. Cell Cycle, Proliferation, and Cancer (2006)
- Vol. 1873: R. Mansuy, M. Yor, Random Times and Enlargements of Filtrations in a Brownian Setting (2006)
- Vol. 1874: M. Yor, M. Émery (Eds.), In Memoriam Paul-André Meyer - Séminaire de Probabilités XXXIX (2006)
- Vol. 1875: J. Pitman, Combinatorial Stochastic Processes. Ecole d'Été de Probabilités de Saint-Flour XXXII-2002. Editor: J. Picard (2006)
- Vol. 1876: H. Herrlich, Axiom of Choice (2006)
- Vol. 1877: J. Steuding, Value Distributions of L -Functions (2007)
- Vol. 1878: R. Cerf, The Wulff Crystal in Ising and Percolation Models, Ecole d'Été de Probabilités de Saint-Flour XXXIV-2004. Editor: Jean Picard (2006)
- Vol. 1879: G. Slade, The Lace Expansion and its Applications, Ecole d'Été de Probabilités de Saint-Flour XXXIV-2004. Editor: Jean Picard (2006)
- Vol. 1880: S. Attal, A. Joye, C.-A. Pillet, Open Quantum Systems I, The Hamiltonian Approach (2006)
- Vol. 1881: S. Attal, A. Joye, C.-A. Pillet, Open Quantum Systems II, The Markovian Approach (2006)
- Vol. 1882: S. Attal, A. Joye, C.-A. Pillet, Open Quantum Systems III, Recent Developments (2006)
- Vol. 1883: W. Van Assche, F. Marcellàn (Eds.), Orthogonal Polynomials and Special Functions, Computation and Application (2006)
- Vol. 1884: N. Hayashi, E.I. Kaikina, P.I. Naumkin, I.A. Shishmarev, Asymptotics for Dissipative Nonlinear Equations (2006)
- Vol. 1885: A. Telcs, The Art of Random Walks (2006)
- Vol. 1886: S. Takamura, Splitting Deformations of Degenerations of Complex Curves (2006)
- Vol. 1887: K. Habermann, L. Habermann, Introduction to Symplectic Dirac Operators (2006)
- Vol. 1888: J. van der Hoeven, Transseries and Real Differential Algebra (2006)
- Vol. 1889: G. Osipenko, Dynamical Systems, Graphs, and Algorithms (2006)
- Vol. 1890: M. Bunge, J. Funk, Singular Coverings of Toposes (2006)
- Vol. 1891: J.B. Friedlander, D.R. Heath-Brown, H. Iwaniec, J. Kaczorowski, Analytic Number Theory, Cetraro, Italy, 2002. Editors: A. Perelli, C. Viola (2006)
- Vol. 1892: A. Baddeley, I. Bárány, R. Schneider, W. Weil, Stochastic Geometry, Martina Franca, Italy, 2004. Editor: W. Weil (2007)
- Vol. 1893: H. Hanßmann, Local and Semi-Local Bifurcations in Hamiltonian Dynamical Systems, Results and Examples (2007)
- Vol. 1894: C.W. Groetsch, Stable Approximate Evaluation of Unbounded Operators (2007)
- Vol. 1895: L. Molnár, Selected Preserver Problems on Algebraic Structures of Linear Operators and on Function Spaces (2007)
- Vol. 1896: P. Massart, Concentration Inequalities and Model Selection, Ecole d'Été de Probabilités de Saint-Flour XXXIII-2003. Editor: J. Picard (2007)
- Vol. 1897: R. Doney, Fluctuation Theory for Lévy Processes, Ecole d'Été de Probabilités de Saint-Flour XXXV-2005. Editor: J. Picard (2007)
- Vol. 1898: H.R. Beyer, Beyond Partial Differential Equations, On linear and Quasi-Linear Abstract Hyperbolic Evolution Equations (2007)
- Vol. 1899: Séminaire de Probabilités XL. Editors: C. Donati-Martin, M. Émery, A. Rouault, C. Stricker (2007)
- Vol. 1900: E. Bolthausen, A. Bovier (Eds.), Spin Glasses (2007)
- Vol. 1901: O. Wittenberg, Intersections de deux quadriques et pinceaux de courbes de genre 1, Intersections of Two Quadrics and Pencils of Curves of Genus 1 (2007)
- Vol. 1902: A. Isaev, Lectures on the Automorphism Groups of Kobayashi-Hyperbolic Manifolds (2007)
- Vol. 1903: G. Kresin, V. Maz'ya, Sharp Real-Part Theorems (2007)
- Vol. 1904: P. Giesl, Construction of Global Lyapunov Functions Using Radial Basis Functions (2007)

Vol. 1905: C. Prévôt, M. Röckner, A Concise Course on Stochastic Partial Differential Equations (2007)

Vol. 1906: T. Schuster, The Method of Approximate Inverse: Theory and Applications (2007)

Vol. 1907: M. Rasmussen, Attractivity and Bifurcation for Nonautonomous Dynamical Systems (2007)

Vol. 1908: T.J. Lyons, M. Caruana, T. Lévy, Differential Equations Driven by Rough Paths, Ecole d'Été de Probabilités de Saint-Flour XXXIV-2004 (2007)

Vol. 1909: H. Akiyoshi, M. Sakuma, M. Wada, Y. Yamashita, Punctured Torus Groups and 2-Bridge Knot Groups (I) (2007)

Vol. 1910: V.D. Milman, G. Schechtman (Eds.), Geometric Aspects of Functional Analysis. Israel Seminar 2004-2005 (2007)

Vol. 1911: A. Bressan, D. Serre, M. Williams, K. Zumbrun, Hyperbolic Systems of Balance Laws. Cetraro, Italy 2003. Editor: P. Marcati (2007)

Vol. 1912: V. Berinde, Iterative Approximation of Fixed Points (2007)

Vol. 1913: J.E. Marsden, G. Misiołek, J.-P. Ortega, M. Perlmutter, T.S. Ratiu, Hamiltonian Reduction by Stages (2007)

Vol. 1914: G. Kutyniok, Affine Density in Wavelet Analysis (2007)

Vol. 1915: T. Bıyıkçoğlu, J. Leydold, P.F. Stadler, Laplacian Eigenvectors of Graphs. Perron-Frobenius and Faber-Krahn Type Theorems (2007)

Vol. 1916: C. Villani, F. Rezakhanlou, Entropy Methods for the Boltzmann Equation. Editors: F. Golse, S. Olla (2008)

Vol. 1917: I. Veselić, Existence and Regularity Properties of the Integrated Density of States of Random Schrödinger (2008)

Vol. 1918: B. Roberts, R. Schmidt, Local Newforms for $\mathrm{GSp}(4)$ (2007)

Vol. 1919: R.A. Carmona, I. Ekeland, A. Kohatsu-Higa, J.-M. Lasry, P.-L. Lions, H. Pham, E. Taflin, Paris-Princeton Lectures on Mathematical Finance 2004. Editors: R.A. Carmona, E. Çinlar, I. Ekeland, E. Jouini, J.A. Scheinkman, N. Touzi (2007)

Vol. 1920: S.N. Evans, Probability and Real Trees. Ecole d'Été de Probabilités de Saint-Flour XXXV-2005 (2008)

Vol. 1921: J.P. Tian, Evolution Algebras and their Applications (2008)

Vol. 1922: A. Friedman (Ed.), Tutorials in Mathematical BioSciences IV. Evolution and Ecology (2008)

Vol. 1923: J.P.N. Bishwal, Parameter Estimation in Stochastic Differential Equations (2008)

Vol. 1924: M. Wilson, Littlewood-Paley Theory and Exponential-Square Integrability (2008)

Vol. 1925: M. du Sautoy, L. Woodward, Zeta Functions of Groups and Rings (2008)

Vol. 1926: L. Barreira, V. Claudia, Stability of Nonautonomous Differential Equations (2008)

Vol. 1927: L. Ambrosio, L. Caffarelli, M.G. Crandall, L.C. Evans, N. Fusco, Calculus of Variations and Non-Linear Partial Differential Equations. Cetraro, Italy 2005. Editors: B. Dacorogna, P. Marcellini (2008)

Vol. 1928: J. Jonsson, Simplicial Complexes of Graphs (2008)

Vol. 1929: Y. Mishura, Stochastic Calculus for Fractional Brownian Motion and Related Processes (2008)

Vol. 1930: J.M. Urbano, The Method of Intrinsic Scaling. A Systematic Approach to Regularity for Degenerate and Singular PDEs (2008)

Vol. 1931: M. Cowling, E. Frenkel, M. Kashiwara, A. Valette, D.A. Vogan, Jr., N.R. Wallach, Representation Theory and Complex Analysis. Venice, Italy 2004. Editors: E.C. Tarabusi, A. D'Agnolo, M. Picardello (2008)

Vol. 1932: A.A. Agrachev, A.S. Morse, E.D. Sontag, H.J. Sussmann, V.I. Utkin, Nonlinear and Optimal Control Theory. Cetraro, Italy 2004. Editors: P. Nistri, G. Stefani (2008)

Vol. 1933: M. Petkovic, Point Estimation of Root Finding Methods (2008)

Vol. 1934: C. Donati-Martin, M. Émery, A. Rouault, C. Stricker (Eds.), Séminaire de Probabilités XLI (2008)

Vol. 1935: A. Unterberger, Alternative Pseudodifferential Analysis (2008)

Vol. 1936: P. Magal, S. Ruan (Eds.), Structured Population Models in Biology and Epidemiology (2008)

Vol. 1937: G. Capriz, P. Giovine, P.M. Mariano (Eds.), Mathematical Models of Granular Matter (2008)

Vol. 1938: D. Auroux, F. Catanese, M. Manetti, P. Seidel, B. Siebert, I. Smith, G. Tian, Symplectic 4-Manifolds and Algebraic Surfaces. Cetraro, Italy 2003. Editors: F. Catanese, G. Tian (2008)

Vol. 1939: D. Boffi, F. Brezzi, L. Demkowicz, R.G. Durán, R.S. Falk, M. Fortin, Mixed Finite Elements, Compatibility Conditions, and Applications. Cetraro, Italy 2006. Editors: D. Boffi, L. Gastaldi (2008)

Vol. 1940: J. Banasiak, V. Capasso, M.A.J. Chaplain, M. Lachowicz, J. Miękisz, Multiscale Problems in the Life Sciences. From Microscopic to Macroscopic. Będlewo, Poland 2006. Editors: V. Capasso, M. Lachowicz (2008)

Vol. 1941: S.M.J. Haran, Arithmetical Investigations. Representation Theory, Orthogonal Polynomials, and Quantum Interpolations (2008)

Vol. 1942: S. Albeverio, F. Flandoli, Y.G. Sinai, SPDE in Hydrodynamic. Recent Progress and Prospects. Cetraro, Italy 2005. Editors: G. Da Prato, M. Röckner (2008)

Vol. 1943: A. Carpio, O. Dorn, M. Moscoso, F. Natterer, G. Papanicolaou, M.L. Rapún, A. Teta, Inverse Problems and Imaging. Martina Franca, Italy 2002. Editor: L.L. Bonilla (2008)

Vol. 1944: A. Di Bartolo, G. Falcone, P. Plaumann, K. Strambach, Algebraic Groups and Lie Groups with Few Factors (2008)

Recent Reprints and New Editions

Vol. 1702: J. Ma, J. Yong, Forward-Backward Stochastic Differential Equations and their Applications. 1999 – Corr. 3rd printing (2007)

Vol. 830: J.A. Green, Polynomial Representations of GL_n , with an Appendix on Schensted Correspondence and Littelmann Paths by K. Erdmann, J.A. Green and M. Schoker 1980 – 2nd corr. and augmented edition (2007)

Vol. 1693: S. Simons, From Hahn-Banach to Monotonicity (Minimax and Monotonicity 1998) – 2nd exp. edition (2008)

Vol. 470: R.E. Bowen, Equilibrium States and the Ergodic Theory of Anosov Diffeomorphisms. With a preface by D. Ruelle. Edited by J.-R. Chazottes. 1975 – 2nd rev. edition (2008)

Vol. 523: S.A. Albeverio, R.J. Høegh-Krohn, S. Mazzucchi, Mathematical Theory of Feynman Path Integral. 1976 – 2nd corr. and enlarged edition (2008)