

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Expository books on mathematics and mathematicians</b>	<b>5</b>
2.1	Popular and expository books on mathematics . . . . .	6
2.1.1	R. Courant, H. Robbins, What Is Mathematics? Oxford University Press, New York, 1941. xix+521 pp. . . . .	6
2.1.2	A.D. Aleksandrov, A.N. Kolmogorov, M.A. Lavrent'ev, Mathematics: Its Content, Methods, and Meaning. Vol. I, Vol. II, Vol. III, The M.I.T. Press, Cambridge, Mass., 1963, xi+359 pp.; xi+377 pp.; xi+356 pp.. Translated by S.H. Gould and T. Bartha; S.H. Gould; K. Hirsch. . . . .	12
2.1.3	G. Pólya, How to Solve it. A New Aspect of Mathematical Method. Expanded version of the 1988 edition, with a new foreword by John H. Conway, Princeton Science Library, Princeton University Press, 2004. xxviii+253 pp. . . . .	15
2.1.4	G.H. Hardy, A Mathematician's Apology, With a foreword by C.P. Snow, Reprint of the 1967 edition, Canto, Cambridge University Press, Cambridge, 1992. . . . .	19
2.1.5	J.E. Littlewood, Littlewood's Miscellany, Edited and with a foreword by Béla Bollobás, Cambridge University Press, Cambridge, 1986. vi+200 pp. . . . .	21
2.1.6	Autobiographies of mathematicians . . . . .	22
2.1.7	H. Weyl, Symmetry. Reprint of the 1952 original. Princeton Science Library. Princeton University Press, Princeton, N.J., 1989. . . . .	27
2.1.8	D. Hilbert, S. Cohn-Vossen, Geometry and the Imagination, American Mathematical Society, 1, 1999. 357 pages . . . . .	37
2.2	Biographies of mathematicians and history of mathematics . . . . .	42
2.2.1	E.T. Bell, Men of Mathematics, Touchstone, 1986. 608 pages. . . . .	42

2.2.2	C. Reid, Hilbert, Springer-Verlag, New York-Berlin, 1970. xi+290 pp. . . . .	44
2.2.3	More biographies of mathematicians . . . . .	46
2.2.4	A. Weil, Number Theory. An Approach through History. From Hammurapi to Legendre. Birkhäuser Boston, MA, 1984. xxi+375 pp. . . . .	55
2.2.5	W. Scharlau, H. Opolka, From Fermat to Minkowski. Lectures on the Theory of Numbers and its Historical Development, Undergraduate Texts in Mathematics. Springer-Verlag, New York, 1985. xi+184 pp. . . . .	59
2.2.6	History of mathematics . . . . .	60
2.2.7	More mathematical history books . . . . .	63
2.2.8	J. Dieudonné, A History of Algebraic and Differential Topology 1900–1960, Reprint of the 1989 edition, Modern Birkhäuser Classics. Birkhäuser Boston, Inc., Boston, MA, 2009. xxii+648 pp. . .	72
2.2.9	History of Lie groups and related spaces . . . . .	73
2.2.10	F. Klein, Development of Mathematics in the 19th Century, With a preface and appendices by Robert Hermann, Translated from the German by M. Ackerman. Math Sci Press, Brookline, Mass., 1979. ix+630 pp. . . . .	76
<b>3</b>	<b>Analysis</b>	<b>79</b>
3.1	Calculus and real analysis . . . . .	79
3.1.1	G.H. Hardy, A Course of Pure Mathematics, Reprint of the (1952) tenth edition, Cambridge Mathematical Library, Cambridge University Press, Cambridge, 1992. xii+509 pp. . . . .	80
3.1.2	Calculus . . . . .	82
3.1.3	E.T. Whittaker and G.N. Watson, A Course of Modern Analysis, An Introduction to the General Theory of Infinite Processes and of Analytic Functions: with an Account of the Principal Transcendental Functions, Fourth edition. Reprinted, Cambridge University Press, New York, 1962, vii+608 pp. . . . .	85
3.1.4	Special functions . . . . .	85
3.1.5	W. Rudin, Real and Complex Analysis, Third edition, McGraw-Hill Book Co., New York, 1987. xiv+416 pp. . . . .	90
3.1.6	More books on real analysis . . . . .	90
3.1.7	Measure theory . . . . .	97
3.1.8	Analysis on general spaces . . . . .	100

3.1.9	G. Pólya, G. Szegő, Problems and Theorems in Analysis. Vol. I. Series, Integral calculus, Theory of Functions. Vol. II. Theory of Functions, Zeros, Polynomials, Determinants, Number Theory, Geometry, Grundlehren der mathematischen Wissenschaften, Classics in Mathematics, Springer-Verlag, Berlin, 1998. xii+392 pp. xx+389 pp. . . . .	104
3.1.10	Orthogonal polynomials . . . . .	106
3.1.11	Problem books . . . . .	107
3.1.12	G.H. Hardy, J.E. Littlewood, G. Pólya, Inequalities, Reprint of the 1952 edition, Cambridge Mathematical Library, Cambridge University Press, Cambridge, 1988. xii+324 pp. . . . .	110
3.2	Complex analysis . . . . .	114
3.2.1	H. Cartan, Elementary Theory of Analytic Functions of One or Several Complex Variables. Éditions Scientifiques Hermann, Paris; Addison-Wesley Publishing Co., Inc., Reading, Mass.-Palo Alto, Calif.-London, 1963. 228 pp. . . . .	115
3.2.2	L. Ahlfors, Complex Analysis, Third edition, International Series in Pure and Applied Mathematics, McGraw-Hill Book Co., New York, 1978. xi+331 pp. . . . .	115
3.2.3	R. Remmert, Theory of Complex Functions, Translated from the second German edition by Robert B. Burckel, Graduate Texts in Mathematics, 122, Readings in Mathematics, Springer-Verlag, New York, 1991. xx+453 pp. . . . .	116
3.2.4	More books on complex analysis . . . . .	117
3.2.5	Analytic and meromorphic functions, and conformal maps . . . . .	121
3.2.6	Several complex variables . . . . .	123
3.2.7	Sheaf theories . . . . .	126
3.2.8	H. Weyl, The Concept of a Riemann Surface, Translated from the third German edition by Gerald R. MacLane, ADIWES International Series in Mathematics, Addison-Wesley Publishing Co., Inc., Reading, Mass.-London, 1964. xi+191 pp. . . . .	128
3.2.9	More books on Riemann surfaces . . . . .	130
3.2.10	Quasiconformal mappings . . . . .	132
3.2.11	Teichmüller theory . . . . .	135
3.3	Harmonic analysis . . . . .	140
3.3.1	Y. Katznelson, An Introduction to Harmonic Analysis, 3rd Edition, Cambridge Mathematical Library, Cambridge University Press, 2004. xviii+314 pp. . . . .	141

3.3.2	More books on harmonic analysis and Fourier series . . . . .	142
3.3.3	A. Zygmund, <i>Trigonometric Series</i> . 2nd ed. Vols. I, II. Cambridge University Press, New York, 1959, Vol. I, xii+383 pp.; Vol. II. vii+354 pp. . . . .	147
3.3.4	Potential theory . . . . .	149
3.3.5	J. Garnett, <i>Bounded Analytic Functions</i> , Pure and Applied Mathematics, 96, Academic Press, Inc., New York-London, 1981. xvi+467 pp. . . . .	152
3.3.6	More books on Hardy spaces and function spaces . . . . .	153
3.3.7	E. Stein, <i>Singular Integrals and Differentiability Properties of Functions</i> , Princeton Mathematical Series, No. 30, Princeton University Press, 1970, xiv+290 pp. . . . .	157
3.3.8	G. Folland, <i>Harmonic Analysis in Phase Space</i> , Annals of Mathematics Studies, 122, Princeton University Press, Princeton, N.J., 1989. x+277 pp. . . . .	160
3.3.9	I. Daubechies, <i>Ten Lectures on Wavelets</i> , CBMS-NSF Regional Conference Series in Applied Mathematics, 61, Society for Industrial and Applied Mathematics (SIAM), Philadelphia, PA, 1992. xx+357 pp. . . . .	160
3.4	Functional analysis and operator theory . . . . .	162
3.4.1	S. Banach, <i>Theory of Linear Operations</i> , Translated from the French by F. Jellet, With comments by A. Peczycki and Cz. Bessaga, North-Holland Mathematical Library, 38, North-Holland Publishing Co., Amsterdam, 1987. x+237 pp. . . . .	163
3.4.2	More basic books on functional analysis . . . . .	164
3.4.3	More books on Banach spaces . . . . .	167
3.4.4	More books on Hilbert spaces . . . . .	169
3.4.5	L. Schwartz, <i>Théorie des Distributions</i> , Hermann, Paris, 1966, xiii+420 pp. . . . .	171
3.4.6	I.M. Gelfand, G.E. Shilov, <i>Generalized Functions</i> . Vol. 1. Properties and Operations, Vol. 2. Spaces of Fundamental and Generalized Functions, Vol. 3. Theory of Differential Equations, I.M. Gelfand, N.Ya. Vilenkin, Vol. 4. Applications of Harmonic Analysis, I.M. Gelfand, M.I. Graev, N.Ya. Vilenkin, Vol. 5. Integral Geometry and Representation Theory, Academic Press, New York-London, 1964, xviii+423 pp., x+261 pp., x+222 pp., xiv+384 pp., xvii+449 pp. . . . .	172

3.4.7	K. Yosida, Functional analysis, reprint of the sixth (1980) edition. Classics in Mathematics, Springer-Verlag, Berlin, 1995. xii+501 pp.	174
3.4.8	N. Dunford, J. Schwartz, Linear Operators, Part I, General Theory; Part II, Spectral theory. Selfadjoint operators in Hilbert space. Part III, Spectral operators, Wiley Classics Library, A Wiley-Interscience Publication, John Wiley & Sons, Inc., New York, 1988. xiv+858 pp., x+859–1923, xx+1925–2592. . . . .	175
3.4.9	Semigroups and functional analysis . . . . .	176
3.4.10	A. Connes, Noncommutative Geometry, Academic Press, Inc., San Diego, CA, 1994. xiv+661 pp. . . . .	178
3.4.11	Operator algebras . . . . .	179
3.4.12	H. Brezis, Analyse Fonctionnelle, Théorie et Applications, Collection Mathématiques Appliquées pour la Matrise. Masson, Paris, 1983. xiv+234 pp. . . . .	184
3.4.13	K. Deimling, Nonlinear Functional Analysis, Springer-Verlag, Berlin, 1985. xiv+450 pp. . . . .	185
<b>4</b>	<b>Algebra</b>	<b>187</b>
4.1	Abstract algebras and finite groups . . . . .	188
4.1.1	Linear algebra . . . . .	188
4.1.2	Advanced linear algebra and matrix algebra . . . . .	191
4.1.3	van der Waerden, Algebra. Vol. I., Algebra. Vol. II., Based in part on lectures by E. Artin and E. Noether, Translated from the fifth German edition by John R. Schulenberg, Springer-Verlag, New York, 1991. xiv+265 pp., xii+284 pp. . . . .	194
4.1.4	More books on abstract algebra . . . . .	196
4.1.5	I.R. Shafarevich, Basic Notions of Algebra, Springer, Berlin, 1990; Springer-Verlag, Berlin, 1997. iv+258 pp. . . . .	204
4.1.6	R. Carter, Simple Groups of Lie Type, Pure and Applied Mathematics, Vol. 28, Reprint of the 1972 original, Wiley Classics Library, A Wiley-Interscience Publication, John Wiley & Sons, Inc., New York, 1989. x+335 pp . . . . .	205
4.1.7	Finite groups . . . . .	206
4.1.8	Finite groups and their representation theories . . . . .	213
4.1.9	Representation theories and associate algebras . . . . .	214
4.1.10	Rings and modules . . . . .	216
4.2	Commutative algebras . . . . .	218
4.3	Homological algebra . . . . .	225

4.3.1	H. Cartan, S. Eilenberg, Homological Algebra, With an appendix by David A. Buchsbaum, Reprint of the 1956 original, Princeton Landmarks in Mathematics, Princeton University Press, Princeton, NJ, 1999. xvi+390 pp. . . . .	226
4.3.2	More books on homological algebra and related subjects . . . . .	228
<b>5</b>	<b>Geometry</b>	<b>233</b>
5.1	Differential geometry . . . . .	233
5.1.1	H. Hopf, Differential Geometry in the Large, Notes taken by Peter Lax and John Gray, With a preface by S. S. Chern, Lecture Notes in Mathematics, 1000, Springer-Verlag, Berlin, 1983. vii+184 pp. . . . .	234
5.1.2	Introduction to differential geometry and Riemannian geometry . . . . .	235
5.1.3	More advanced books on Riemannian geometry . . . . .	240
5.1.4	Special topics in differential geometry . . . . .	245
5.1.5	M. Gromov, Metric Structures for Riemannian and Non-Riemannian Spaces, Based on the 1981 French original, With appendices by M. Katz, P. Pansu and S. Semmes, Translated from the French by Sean Michael Bates, Progress in Mathematics, 152, Birkhäuser Boston, Inc., Boston, MA, 1999. xx+585 pp. . . . .	253
5.1.6	M. Bridson, A. Haefliger, Metric Spaces of Non-positive Curvature, Grundlehren der Mathematischen Wissenschaften, 319, Springer-Verlag, Berlin, 1999. xxii+643 pp. . . . .	255
5.1.7	S. Helgason, Differential Geometry, Lie Groups, and Symmetric Spaces, Corrected reprint of the 1978 original, Graduate Studies in Mathematics, 34, American Mathematical Society, Providence, RI, 2001. xxvi+641 pp. . . . .	256
5.2	Geometric analysis . . . . .	258
5.2.1	R. Schoen, S.T. Yau, Lectures on Differential Geometry, International Press, 1994. v+235 pp. . . . .	259
5.2.2	T. Aubin, Nonlinear Analysis on Manifolds, Monge Ampère equations, Grundlehren der Mathematischen Wissenschaften, 252, Springer-Verlag, New York, 1982. xii+204 pp. . . . .	260
5.2.3	More books on geometric analysis . . . . .	260
5.2.4	M. Gromov, Partial Differential Relations, Ergebnisse der Mathematik und ihrer Grenzgebiete (3), 9, Springer-Verlag, Berlin, 1986. x+363 pp. . . . .	264
5.2.5	H. Federer, Geometric Measure Theory, Die Grundlehren der mathematischen Wissenschaften, Band 153, Springer-Verlag New York Inc., New York, 1969, xiv+676 pp. . . . .	265

5.2.6	More books on geometric measure theory . . . . .	266
5.2.7	Calculus of variation . . . . .	267
5.2.8	Fractal geometry . . . . .	270
5.3	Complex geometry and complex analysis . . . . .	272
5.3.1	L. Hörmander, An Introduction to Complex Analysis in Several Variables, Third edition, North-Holland Publishing Co., Amsterdam, 1990. xii+254 pp. . . . .	272
5.3.2	More books on complex geometry . . . . .	273
5.3.3	C.L. Siegel, Topics in Complex Function Theory. Vol. I. Elliptic Functions and Uniformization Theory. Vol. II. Automorphic Functions and Abelian Integrals. Vol. III. Abelian Functions and Modular Functions of Several Variables, Interscience Tracts in Pure and Applied Mathematics, No. 25, Wiley-Interscience, 1969. ix+186 pp., 1988. xii+193 pp., 1989. x+244 pp. . . . .	276
5.4	Algebraic geometry . . . . .	277
5.4.1	A. Grothendieck, The <i>Éléments de géométrie algébrique</i> , Inst. Hautes Études Sci. Publ. Math., 1960–1967. . . . .	279
5.4.2	I. Shafarevich, Basic Algebraic Geometry. 1. Varieties in Projective Space. 2. Schemes and Complex Manifolds. Second edition, Springer-Verlag, Berlin, 1994. xx+303 pp., xiv+269 pp. . . . .	281
5.4.3	D. Mumford, The Red book of Varieties and Schemes, Second, expanded edition. Includes the Michigan lectures (1974) on curves and their Jacobians, With contributions by Enrico Arbarello. Lecture Notes in Mathematics, 1358. Springer-Verlag, Berlin, 1999. x+306 pp. . . . .	283
5.4.4	R. Hartshorne, Algebraic Geometry, Graduate Texts in Mathematics, No. 52, Springer-Verlag, New York-Heidelberg, 1977. xvi+496 pp. . . . .	285
5.4.5	P. Griffiths, J. Harris, Principles of Algebraic Geometry, Pure and Applied Mathematics, Wiley-Interscience, New York, 1978. xii+813 pp. . . . .	286
5.4.6	Introduction to algebraic geometry and algebraic curves . . . . .	288
5.4.7	Topology of algebraic varieties . . . . .	289
5.4.8	Symplectic geometry and symplectic topology . . . . .	290
5.4.9	D. Mumford, J. Fogarty, F. Kirwan, Geometric invariant theory, Third edition, <i>Ergebnisse der Mathematik und ihrer Grenzgebiete</i> (2), 34, Springer-Verlag, Berlin, 1994. xiv+292 pp. . . . .	293
5.4.10	Classification of varieties and moduli spaces . . . . .	294

5.4.11	Algebraic curves . . . . .	297
5.4.12	Algebraic surfaces . . . . .	299
5.4.13	W. Fulton, Intersection Theory, Second edition, Ergebnisse der Mathematik und ihrer Grenzgebiete. 3. Folge, Springer-Verlag, Berlin, 1998. xiv+470 pp. . . . .	302
5.4.14	R. Lazarsfeld, Positivity in Algebraic Geometry. I. Classical Set- ting: Line Bundles and Linear Series; II. Positivity for Vector Bun- dles, and Multiplier Ideals, Ergebnisse der Mathematik und ihrer Grenzgebiete. 3. Folge, Springer-Verlag, Berlin, 2004. xviii+387 pp., xviii+385 pp. . . . .	305
5.4.15	Toric varieties . . . . .	306
5.5	Convex geometry and discrete geometry . . . . .	309
5.5.1	R.T. Rockafellar, Convex Analysis, Princeton Mathematical Se- ries, No. 28, Princeton University Press, Princeton, N.J., 1970. xviii+451 pp. . . . .	309
5.5.2	Convex functions and convex geometry . . . . .	311
<b>6</b>	<b>Topology</b>	<b>315</b>
6.1	More classical topology . . . . .	316
6.1.1	P. Alexandroff, H. Hopf, Topologie I. Berlin, Springer, 1935. xiii+ 636 pp. . . . .	316
6.1.2	K. Kuratowski, Topology. Vol. I., Vol. II., New edition, Revised and augmented, Translated from the French by J. Jaworowski Aca- demic Press, New York-London; Państwowe Wydawnictwo Naukowe, Warsaw, 1966. xx+560 pp., 1968. xiv+608 pp. . . . .	318
6.1.3	More books on topology . . . . .	318
6.1.4	Fixed point theory . . . . .	321
6.1.5	Dimension theory . . . . .	322
6.2	Algebraic topology . . . . .	323
6.2.1	J. Milnor, J. Stasheff, Characteristic Classes, Annals of Mathe- matics Studies, No. 76, Princeton University Press, 1974. vii+331 pp. . . . .	324
6.2.2	S. Eilenberg, N. Steenrod, Foundations of Algebraic Topology, Prince- ton University Press, 1952. xv+328 pp. . . . .	325
6.2.3	More books on algebraic topology . . . . .	326
6.2.4	D. Rolfsen, Knots and Links, Corrected reprint of the 1976 original, Mathematics Lecture Series, 7, Publish or Perish, Inc., Houston, TX, 1990. xiv+439 pp. . . . .	328
6.2.5	More knots and their invariants books . . . . .	329



6.3	Generalized cohomology theory and homotopy theories . . . . .	332
6.3.1	J. Adams, Stable Homotopy and Generalised Homology, Chicago Lectures in Mathematics, University of Chicago Press, Chicago, Ill.-London, 1974. x+373 pp. . . . .	332
6.3.2	<i>K</i> -theory . . . . .	333
6.3.3	K. Brown, Cohomology of Groups, Graduate Texts in Mathematics, 87, Corrected reprint of the 1982 original, Graduate Texts in Mathematics, 87, Springer-Verlag, New York, 1994. x+306 pp. . .	335
6.3.4	G.W. Whitehead, Elements of Homotopy Theory, Graduate Texts in Mathematics, 61, Springer-Verlag, New York-Berlin, 1978. xxi+744 pp. . . . .	337
6.4	Differential topology . . . . .	338
6.4.1	J. Milnor, Morse Theory, Based on lecture notes by M. Spivak and R. Wells, Annals of Mathematics Studies, No. 51, Princeton University Press, Princeton, N.J., 1963. vi+153 pp. . . . .	339
6.4.2	Differential topology . . . . .	340
6.4.3	R. Bott, L. Tu, Differential Forms in Algebraic Topology, Graduate Texts in Mathematics, 82, Springer-Verlag, New York-Berlin, 1982. xiv+331 pp. . . . .	341
6.4.4	W.V.D. Hodge, The Theory and Applications of Harmonic Integrals, Reprint of the 1941 original, With a foreword by Michael Atiyah, Cambridge Mathematical Library, Cambridge University Press, Cambridge, 1989. xiv+284 pp. . . . .	342
6.4.5	M. Goresky, R. MacPherson, Stratified Morse theory, Ergebnisse der Mathematik und ihrer Grenzgebiete (3), 14, Springer-Verlag, Berlin, 1988. xiv+272 pp. . . . .	343
6.5	Geometric topology . . . . .	345
6.5.1	W. Thurston, The Geometry and Topology of Three-Manifolds, Lecture notes at Princeton University, 1978–1980. . . . .	345
6.5.2	Four dimensional manifolds . . . . .	350
6.5.3	Geometric topology and surgery theory . . . . .	351
<b>7</b>	<b>Number theory</b>	<b>355</b>
7.1	Number theory . . . . .	356
7.1.1	G.H. Hardy, E. Wright, An Introduction to the Theory of Numbers, Sixth edition, Revised by D. R. Heath-Brown and J. H. Silverman, With a foreword by Andrew Wiles, Oxford University Press, Oxford, 2008. xxii+621 pp. . . . .	356
7.1.2	Books on basic number theory . . . . .	357

7.1.3	H. Davenport, <i>The Higher Arithmetic. An Introduction to the Theory of Numbers</i> , Eighth edition, With editing and additional material by James H. Davenport, Cambridge University Press, Cambridge, 2008. x+239 pp. . . . .	361
7.1.4	H. Hasse, <i>Number Theory</i> , Translated from the third German edition and with a preface by Horst Günter Zimmer. <i>Grundlehren der Mathematischen Wissenschaften</i> , 229. Springer-Verlag, Berlin-New York, 1980. xvii+638 pp. . . . .	362
7.1.5	A. Borevich, I. Shafarevich, <i>Number Theory</i> , Translated from the Russian by Newcomb Greenleaf, <i>Pure and Applied Mathematics</i> , Vol. 20, Academic Press, New York-London, 1966, x+435 pp. . . .	362
7.1.6	A.Y. Khinchin, <i>Three Pearls of Number Theory</i> , Translated from the Russian by F. Bagemihl, H. Komm, and W. Seidel, Reprint of the 1952 translation, Dover Publications, Inc., Mineola, NY, 1998. 64 pp. . . . .	363
7.1.7	E. Artin, <i>Galois Theory</i> , <i>Notre Dame Mathematical Lectures</i> , No. 2, Edited and with a supplemental chapter by Arthur N. Milgram, Reprint of the 1944 second edition, Dover Publications, Inc., Mineola, N.Y., 1998. iv+82 pp. . . . .	364
7.2	<i>Algebraic number theory</i> . . . . .	365
7.2.1	D. Hilbert, <i>The Theory of Algebraic Number Fields</i> , Translated from the German and with a preface by Iain T. Adamson, With an introduction by Franz Lemmermeyer and Norbert Schappacher, Springer-Verlag, Berlin, 1998. xxxvi+350 pp. . . . .	365
7.2.2	E. Hecke, <i>Lectures on the Theory of Algebraic Numbers</i> , Translated from the German by George U. Brauer, Jay R. Goldman and R. Kotzen, <i>Graduate Texts in Mathematics</i> , 77, Springer-Verlag, New York-Berlin, 1981. xii+239 pp. . . . .	366
7.2.3	J.W.S. Cassels, A. Fröhlich, <i>Algebraic Number Theory</i> , Proceedings of the instructional conference held at the University of Sussex, Brighton, September 1–17, 1965, Academic Press, London; Thompson Book Co., Inc., Washington, D.C., 1967, xviii+366 pp. . . . .	367
7.2.4	S. Lang, <i>Algebraic Number Theory</i> , Second edition, <i>Graduate Texts in Mathematics</i> , 110, Springer-Verlag, New York, 1994. xiv+357 pp.	368
7.2.5	More books on algebraic number theory . . . . .	368
7.2.6	Computational algebraic number theory . . . . .	370

7.2.7	J.P. Serre, <i>Local Fields</i> , Translated from the French by Marvin Jay Greenberg, Graduate Texts in Mathematics, 67, Springer-Verlag, New York-Berlin, 1979. viii+241 pp. . . . .	371
7.2.8	Galois cohomology . . . . .	372
7.2.9	Geometry of numbers . . . . .	373
7.3	Analytic number theory . . . . .	374
7.3.1	E.C. Titchmarsh, <i>The Theory of the Riemann Zeta-Function</i> , Second edition. Edited and with a preface by D. R. Heath-Brown, The Clarendon Press, Oxford University Press, New York, 1986. x+412 pp. . . . .	375
7.3.2	More books on the Riemann zeta function . . . . .	375
7.3.3	Analytic number theory . . . . .	377
7.3.4	Additive number theory . . . . .	380
7.3.5	Multiplicative number theory . . . . .	381
7.4	Transcendental number theory . . . . .	382
7.5	Arithmetic algebraic geometry . . . . .	384
7.5.1	G. Shimura, <i>Introduction to the Arithmetic Theory of Automorphic Functions</i> , Iwanami Shoten, Publishers, Tokyo; Princeton University Press, Princeton, N.J., 1971. xiv+267 pp. . . . .	384
7.5.2	J.P. Serre, <i>A Course in Arithmetic</i> , Translated from the French, Graduate Texts in Mathematics, No. 7, Springer-Verlag, New York-Heidelberg, 1973. viii+115 pp. . . . .	385
7.5.3	J. Silverman, <i>The Arithmetic of Elliptic Curves</i> , Graduate Texts in Mathematics, 106, Second edition, Graduate Texts in Mathematics, 106, Springer, Dordrecht, 2009. xx+513 pp. . . . .	385
7.5.4	D. Mumford, <i>Abelian Varieties</i> . With appendices by C. P. Ramanujam and Yuri Manin, Corrected reprint of the second (1974) edition, Tata Institute of Fundamental Research Studies in Mathematics, 5, Hindustan Book Agency, New Delhi, 2008. xii+263 pp. . . . .	387
7.5.5	Abelian varieties and theta functions . . . . .	387
7.5.6	Diophantine geometry . . . . .	389
7.5.7	Étale cohomology . . . . .	390
7.5.8	Quadratic forms . . . . .	391
7.5.9	More books on number theory . . . . .	393
7.6	Modular forms and automorphic representations . . . . .	395

7.6.1	R. Fricke, F. Klein, Vorlesungen über die Theorie der automorphen Funktionen. Band 1: Die gruppentheoretischen Grundlagen. Band II: Die funktionentheoretischen Ausführungen und die Anwendungen. Bibliotheca Mathematica Teubneriana, Bande 3, 4, Johnson Reprint Corp., New York; B. G. Teubner Verlagsgesellschaft, Stuttgart art 1965. Band I: xiv+634 pp.; Band II: xiv+668 pp. . . . .	396
7.6.2	I.M. Gelfand, M. Graev, I.I. Pyatetskii-Shapiro, Representation Theory and Automorphic Functions, W. B. Saunders Co., Philadelphia, Pa.-London-Toronto, Ont. 1969. xvi+426 pp. . . . .	399
7.6.3	H. Jacquet, R. Langlands, Automorphic Forms on $GL(2)$ , Lecture Notes in Mathematics, Vol. 114, Springer-Verlag, Berlin-New York, 1970. vii+548 pp. . . . .	400
7.6.4	More books on modular forms and automorphic forms . . . . .	401
7.6.5	R. Langlands, On the Functional Equations Satisfied by Eisenstein Series, Lecture Notes in Mathematics, Vol. 544, Springer-Verlag, Berlin-New York, 1976. v+337 pp. . . . .	402
7.6.6	A. Borel, W. Casselman, Automorphic Forms, Representations and $L$ -functions. Part 1, Part 2, Proceedings of Symposia in Pure Mathematics, XXXIII. American Mathematical Society, Providence, R.I., 1979. x+322 pp., vii+382 pp. . . . .	403
7.6.7	More books on modular forms, automorphic representations and cohomology of arithmetic groups . . . . .	404
7.6.8	Hypergeometric series and theory of partitions . . . . .	405
<b>8</b>	<b>Differential equations</b>	<b>407</b>
8.1	Ordinary differential equations . . . . .	407
8.1.1	E. Coddington, N. Levinson, Theory of Ordinary Differential Equations, McGraw-Hill Book Company, Inc., New York-Toronto-London, 1955. xii+429 pp. . . . .	408
8.1.2	More books on ordinary differential equations . . . . .	409
8.1.3	V.I. Arnold, Ordinary Differential Equations, Translated from the third Russian edition by Roger Cooke, Springer Textbook, Springer-Verlag, Berlin, 1992. 334 pp. . . . .	410
8.1.4	More books on ordinary differential equations and dynamical systems	411
8.2	Linear differential operators . . . . .	413
8.2.1	L. Evans, Partial Differential Equations, Graduate Studies in Mathematics, 19, Second edition, Graduate Studies in Mathematics, 19, American Mathematical Society, Providence, RI, 2010. xxii+749 pp.	413

8.2.2	L. Hörmander, Linear Partial Differential Operators, Springer Verlag, Berlin-New York, 1976. vii+285 pp. . . . .	414
8.2.3	More books on linear differential equations . . . . .	416
8.2.4	Inverse problems . . . . .	418
8.2.5	Critical point theory and minimax methods . . . . .	419
8.2.6	D. Gilbarg, N. Trudinger, Elliptic Partial Differential Equations of Second Order, Reprint of the 1998 edition, Classics in Mathematics, Springer-Verlag, Berlin, 2001. xiv+517 pp. . . . .	421
8.2.7	More books on elliptic differential equations . . . . .	421
8.2.8	Pseudodifferential operators . . . . .	423
8.2.9	Parabolic equations . . . . .	425
8.2.10	R. Adams, John J.H. Fournier, Sobolev Spaces, Second edition, Pure and Applied Mathematics (Amsterdam), 140, Elsevier/Academic Press, Amsterdam, 2003. xiv+305 pp. . . . .	427
8.2.11	More books on Sobolev spaces . . . . .	427
8.2.12	T. Kato, Perturbation Theory for Linear Operators, Reprint of the 1980 edition, Classics in Mathematics, Springer-Verlag, Berlin, 1995. . . . .	428
8.3	Nonlinear differential equations . . . . .	429
8.3.1	More geometric nonlinear differential equations . . . . .	429
8.3.2	Nonlinear differential equations and fluid mechanics . . . . .	432
<b>9</b>	<b>Lie theories</b>	<b>439</b>
9.1	Lie groups and Lie algebras . . . . .	440
9.1.1	C. Chevalley, Theory of Lie Groups. I, Fifteenth printing, Princeton Mathematical Series, 8, Princeton Landmarks in Mathematics, Princeton University Press, Princeton, NJ, 1999. xii+217 pp. . . .	440
9.1.2	J.P. Serre, Complex Semisimple Lie Algebras, Translated from the French by G.A. Jones, Reprint of the 1987 edition, Springer Monographs in Mathematics, Springer-Verlag, Berlin, 2001. x+74 pp. .	441
9.1.3	N. Bourbaki, Lie Groups and Lie Algebras. Chapters 4–6, Translated from the 1968 French original by Andrew Pressley. Elements of Mathematics (Berlin), Springer-Verlag, Berlin, 2002. xii+300 pp. . . . .	442
9.1.4	More books on Lie algebras and Lie groups . . . . .	443
9.1.5	A. Borel, Linear Algebraic Groups, Second edition, Graduate Texts in Mathematics, 126, Springer-Verlag, New York, 1991. xii+288 pp.	445
9.1.6	More books on algebraic groups, algebraic geometry and number theory . . . . .	446

9.1.7	Algebraic invariant theories and representations of algebraic groups	450
9.1.8	E. Artin, Geometric Algebra, Reprint of the 1957 original, Wiley Classics Library, A Wiley-Interscience Publication, John Wiley & Sons, Inc., New York, 1988. x+214 pp. . . . .	452
9.1.9	J. Tits, Buildings of Spherical Type and Finite BN-pairs, Lecture Notes in Mathematics, Vol. 386, Springer-Verlag, Berlin-New York, 1974. x+299 pp. . . . .	453
9.1.10	More books on buildings and finite geometries . . . . .	454
9.1.11	Applications of Lie theories to differential equations . . . . .	457
9.1.12	Discrete subgroups of Lie groups and algebraic groups . . . . .	463
9.1.13	J.P. Serre, Trees, Translated from the French by John Stillwell, Springer-Verlag, Corrected 2nd printing of the 1980 English translation, Springer Monographs in Mathematics, Springer-Verlag, Berlin, 2003. x+142 pp. . . . .	466
9.1.14	Discrete subgroups of low rank Lie groups and algebraic groups . .	467
9.1.15	Combinatorial groups and geometric group theory . . . . .	469
9.1.16	Coxeter groups . . . . .	474
9.1.17	Transformation groups . . . . .	475
9.1.18	V. Kac, Infinite-dimensional Lie Algebras, Third edition, Cambridge University Press, Cambridge, 1990. xxii+400 pp. . . . .	479
9.1.19	Loop groups, quantum groups, Hopf algebras and vertex operator algebras . . . . .	479
9.1.20	Applications of Lie groups in sciences . . . . .	482
9.2	Representation theory . . . . .	483
9.2.1	J.P. Serre, Linear Representations of Finite Groups, Translated from the second French edition by Leonard L. Scott, Graduate Texts in Mathematics, Vol. 42, Springer-Verlag, New York-Heidelberg, 1977. x+170 pp. . . . .	484
9.2.2	I.G. Macdonald, Symmetric Functions and Hall Polynomials, Oxford Mathematical Monographs, The Clarendon Press, Oxford University Press, New York, 1979. viii+180 pp. . . . .	484
9.2.3	Representation theory of the symmetric group . . . . .	485
9.2.4	H. Weyl, The Classical Groups. Their Invariants and Representations, Fifteenth printing, Princeton Landmarks in Mathematics, Princeton University Press, Princeton, NJ, 1997. xiv+320 pp. . .	487
9.2.5	Representation theories of Lie groups . . . . .	489
<b>10</b>	<b>Mathematical physics, dynamical systems and ergodic theory</b>	<b>495</b>
10.1	Classical mathematical physics . . . . .	495

10.1.1	R. Courant, D. Hilbert, <i>Methods of Mathematical Physics</i> . Vol. I., Vol. II., Interscience Publishers, Inc., New York, 1953. xv+561 pp., 1962. xxii+830 pp. . . . .	496
10.1.2	H. Weyl, <i>The Theory of Groups and Quantum Mechanics</i> , from the 2d rev., German ed., by H. P. Robertson, Dover Publications, 1949. 448 pp. . . . .	497
10.1.3	L.D. Landau, E.M. Lifshitz, <i>Course of Theoretical Physics</i> . Vol. 1. <i>Mechanics</i> , Third edition, Pergamon Press, Oxford-New York-Toronto, Ont., 1976. xxvii+169 pp. . . . .	499
10.2	More modern mathematical physics . . . . .	503
10.2.1	General relativity and gravitation . . . . .	503
10.2.2	S. Hawking, G. Ellis, <i>The Large Scale Structure of Space-time</i> , Cambridge Monographs on Mathematical Physics, No. 1, Cambridge University Press, London-New York, 1973. xi+391 pp. . . .	506
10.2.3	Statistical mechanics . . . . .	509
10.2.4	Quantum field theory . . . . .	511
10.2.5	V.I. Arnold, <i>Mathematical Methods of Classical Mechanics</i> , Second edition, Graduate Texts in Mathematics, 60, Springer-Verlag, New York, 1989. xvi+508 pp. . . . .	512
10.2.6	M. Reed, B. Simon, <i>Methods of Modern Mathematical Physics</i> . I. <i>Functional Analysis</i> . Second edition; II. <i>Fourier Analysis, Self-adjointness</i> ; III. <i>Methods of Modern Mathematical Physics</i> ; IV. <i>Analysis of Operators</i> , Academic Press, Inc., New York, 1980. xv+400 pp., 1975. xv+361 pp., 1979. xv+463 pp., 1978. xv+396 pp. . . . .	514
10.2.7	Scattering theory . . . . .	515
10.3	Dynamical systems . . . . .	518
10.3.1	Dynamics and celestial mechanics . . . . .	518
10.3.2	Dynamical systems . . . . .	519
10.3.3	Infinite-dimensional dynamical systems . . . . .	526
10.3.4	R. Thom, <i>Structural Stability and Morphogenesis</i> . An Outline of a General Theory of Models, Translated from the French by D. H. Fowler, With a foreword by C. H. Waddington, Advanced Book Classics, Addison-Wesley Publishing Company, Advanced Book Program, Redwood City, CA, 1989. xxxvi+348 pp. . . . .	529
10.3.5	Functional-differential equations . . . . .	530
10.3.6	Complex dynamics . . . . .	530
10.4	Ergodic theory . . . . .	533

<b>11 Discrete mathematics and combinatorics</b>	<b>537</b>
11.1 Combinatorics	537
11.1.1 R. Stanley, Enumerative Combinatorics, Vol. I., Vol. 2., With a foreword by Gian-Carlo Rota, The Wadsworth & Brooks/Cole Mathematics Series, 1986. xiv+306 pp., 1999. xii+581 pp.	538
11.1.2 Polytopes, convex polytopes and geometric arrangements	539
11.1.3 Gröbner bases	541
11.1.4 Matroid theory	542
11.1.5 L. Lovász, Combinatorial Problems and Exercises, Corrected reprint of the 1993 second edition, AMS Chelsea Publishing, Providence, RI, 2007. 642 pp.	544
11.2 Discrete mathematics	545
11.2.1 J. Conway, N. Sloane, Sphere Packings, Lattices and Groups, Third edition, With additional contributions by E. Bannai, R. E. Borcherds, J. Leech, S. P. Norton, A. M. Odlyzko, R. A. Parker, L. Queen and B. B. Venkov, Grundlehren der Mathematischen Wissenschaften, 290. Springer-Verlag, New York, 1999. lxxiv+703 pp.	545
11.2.2 Graph theory	546
11.2.3 Graphs and their spectra	551
11.2.4 Random graphs	552
<b>12 Probability and applications</b>	<b>553</b>
12.1 Probability	553
12.1.1 A.N. Kolmogorov, Foundations of the Theory of Probability, Translation edited by Nathan Morrison, with an added bibliography by A. T. Bharucha-Reid, Chelsea Publishing Co., New York, 1956. viii+84 pp. Translation of Grundbegriffe der Wahrscheinlichkeits-rechnung, Springer, Berlin, 1933.	554
12.1.2 W. Feller, An Introduction to Probability Theory and its Applications, Vol. I, Vol. II. Third edition, John Wiley & Sons, Inc., New York-London-Sydney, 1968. xviii+509 pp., 1971, xxiv+669 pp.	555
12.1.3 More classical books on probability	556
12.1.4 More modern books on probability	558
12.1.5 Probability and analysis	559
12.1.6 More specialized books in probability	560
12.1.7 Random walks	562
12.2 Stochastic analysis	564



12.2.1	J.L. Doob, <i>Stochastic Processes</i> , Reprint of the 1953 original, Wiley Classics Library, A Wiley-Interscience Publication, John Wiley & Sons, Inc., New York, 1990. viii+654 pp. . . . .	565
12.2.2	Brownian motions and stochastic processes . . . . .	567
12.2.3	Stochastic calculus and equations . . . . .	572
12.2.4	Large deviations . . . . .	574
12.2.5	Malliavin calculus . . . . .	575
12.3	Applications of probability . . . . .	576
12.3.1	Probabilistic methods and applications . . . . .	576
12.3.2	Random matrices . . . . .	580
<b>13</b>	<b>Foundations of math, computer science, numerical math</b>	<b>583</b>
13.1	Mathematical logic . . . . .	583
13.1.1	Mathematical logic . . . . .	584
13.1.2	D. Hofstadter, Gödel, Escher, Bach: an Eternal Golden Braid, Basic Books, Inc., Publishers, New York, 1979. xxi+777 pp. . . . .	585
13.1.3	B. Russell, <i>Introduction to Mathematical Philosophy</i> , Reprint of the 1920 second edition, Dover Publications, Inc., New York, 1993. viii+208 pp. . . . .	586
13.1.4	Set theory . . . . .	586
13.1.5	Model theory, non-standard analysis, recursive functions . . . . .	591
13.2	Computer science . . . . .	594
13.2.1	D. Knuth, <i>The Art of Computer Programming</i> . Vol. 1-IV, Second printing, Addison-Wesley Publishing Co., 1969. xxi+634 pp. . . . .	595
13.2.2	R. Graham, D. Knuth, O. Patashnik, <i>Concrete Mathematics</i> . A Foundation for Computer Science, Second edition, Addison-Wesley Publishing Company, Reading, MA, 1994. xiv+657 pp. . . . .	595
13.2.3	T. Cover, J. Thomas, <i>Elements of Information Theory</i> , Second edition, Wiley-Interscience [John Wiley & Sons], Hoboken, NJ, 2006. xxiv+748 pp. . . . .	596
13.2.4	N. Wiener, <i>Cybernetics, or Control and Communication in the Animal and the Machine</i> , Actualités Sci. Ind., no. 1053, Hermann et Cie., Paris; The Technology Press, Cambridge, Mass.; John Wiley & Sons, Inc., New York, 1948. 194 pp. . . . .	597
13.2.5	M. Petkovsek, H. Wilf, D. Zeilberger, <i>A = B</i> , With a foreword by Donald E. Knuth, With a separately available computer disk, A K Peters, Ltd., Wellesley, MA, 1996. xii+212 pp. . . . .	599

13.2.6	I. MacWilliams, N. Sloane, The Theory of Error-correcting Codes, I, II, North-Holland Mathematical Library, Vol. 16. North-Holland Publishing Co., Amsterdam-New York-Oxford, 1977. pp. i–xv and 1–369, pp. i–ix and 370–762. . . . .	600
13.2.7	More books on coding theory . . . . .	601
13.2.8	Algorithm and automata . . . . .	602
13.3	Game theory and optimization . . . . .	604
13.3.1	J. von Neumann, O. Morgenstern, Theory of Games and Economic Behavior, Fourth printing of the 2004 sixtieth-anniversary edition, With an introduction by Harold W. Kuhn and an afterword by Ariel Rubinstein, Princeton University Press, Princeton, NJ, 2007. xxxii+739 pp. . . . .	605
13.3.2	More books on game theory and optimization . . . . .	606
13.4	Numerical analysis and matrix computation . . . . .	610
13.4.1	Numerical analysis . . . . .	611
13.4.2	Finite element methods and finite difference methods . . . . .	617
13.4.3	Approximation theory . . . . .	620
	<b>Appendix A: Books in Chinese version</b>	<b>623</b>
	<b>Appendix B: Books reprinted in the mainland of China</b>	<b>631</b>
	<b>Index of books</b>	<b>643</b>