Zentralblatt MATH

Mathematics Subject Classification 2010

Mathematics Subject Classification 2010
Zentralblatt MATH

Overview

00 General
01 History and biography
03 Mathematical logic and foundations
05 Combinatorics
06 Order, lattices, ordered algebraic structures
08 General algebraic systems
11 Number theory
12 Field theory and polynomials
13 Commutative algebra
14 Algebraic geometry
15 Linear and multilinear algebra; matrix theory
16 Associative rings and algebras
17 Nonassociative rings and algebras
18 Category theory, homological algebra
19 K-theory
20 Group theory and generalizations
22 Topological groups, Lie groups
26 Real functions
28 Measure and integration
30 Functions of a complex variable
31 Potential theory
32 Several complex variables and analytic spaces
33 Special functions
34 Ordinary differential equations
35 Partial differential equations
37 Dynamical systems and ergodic theory
39 Difference and functional equations
40 Sequences, series, summability
41 Approximations and expansions
42 Harmonic analysis on Euclidean spaces
43 Abstract harmonic analysis
44 Integral transforms, operational calculus
45 Integral equations
46 Functional analysis

47 Operator theory
49 Calculus of variations and optimal control; optimization
51 Geometry
52 Convex and discrete geometry
53 Differential geometry
54 General topology
55 Algebraic topology
57 Manifolds and cell complexes
58 Global analysis, analysis on manifolds
60 Probability theory and stochastic processes
62 Statistics
65 Numerical analysis
68 Computer science
70 Mechanics of particles and systems
74 Mechanics of deformable solids
76 Fluid mechanics
78 Optics, electromagnetic theory
80 Classical thermodynamics, heat transfer
81 Quantum theory
82 Statistical mechanics, structure of matter
83 Relativity and gravitational theory
85 Astronomy and astrophysics
86 Geophysics
90 Operations research, mathematical programming
91 Game theory, economics, social and behavioral sciences
92 Biology and other natural sciences
93 Systems theory, control
94 Information and communication, circuits
97 Mathematical education

This Mathematics Subject Classification was compiled by the Editorial Offices of both Mathematical Reviews and Zentralblatt MATH.

00-XX General

00-01 Instructional exposition (textbooks, tutorial papers, etc.)
00-02 Research exposition (monographs, survey articles)

00Axx General and miscellaneous specific topics

00A05 General mathematics
00A06 Mathematics for nonmathematicians (engineering, social sciences, etc.)
00A07 Problem books
00A08 Recreational mathematics [See also 97A20]
00A09 Popularization of mathematics
00A15 Bibliographies
00A17 External book reviews
00A20 Dictionaries and other general reference works
00A22 Formularies
00A30 Philosophy of mathematics [See also 03A05]
00A35 Methodology of mathematics, didactics [See also 97Cxx, 97Dxx]
00A65 Mathematics and music
00A66 Mathematics and visual arts, visualization
00A67 Mathematics and architecture
00A69 General applied mathematics (For physics, see 00A79 and Sections 70 through 86)
00A71 Theory of mathematical modeling
00A72 General methods of simulation
00A73 Dimensional analysis
00A79 Physics (use more specific entries from Sections 70 through 86 when possible)
00A99 Miscellaneous topics

00Bxx Conference proceedings and collections of papers

00B05 Collections of abstracts of lectures
00B10 Collections of articles of general interest
00B15 Collections of articles of miscellaneous specific content
00B20 Proceedings of conferences of general interest
00B25 Proceedings of conferences of miscellaneous specific interest
00B30 Festschriften
00B50 Volumes of selected translations
00B55 Miscellaneous volumes of translations
00B60 Collections of reprinted articles [See also 01A75]
00B99 None of the above, but in this section

01-XX History and biography [See also the classification number –03 in the other sections]

01-00 General reference works (handbooks, dictionaries, bibliographies, etc.)
01-01 Instructional exposition (textbooks, tutorial papers, etc.)
01-02 Research exposition (monographs, survey articles)
01-06 Proceedings, conferences, collections, etc.
01-08 Computational methods

01Axx History of mathematics and mathematicians

01A05 General histories, source books
01A07 Ethnomathematics, general
01A10 Paleolithic, Neolithic
01A12 Indigenous cultures of the Americas
01A13 Other indigenous cultures (non-European)
01A15 Indigenous European cultures (pre-Greek, etc.)
01A16 Egyptian
01A17 Babylonian
01A20 Greek, Roman
01A25 China
01A27 Japan
01A29 Southeast Asia
01A30 Islam (Medieval)
01A32 India
01A35 Medieval
01A40 15th and 16th centuries, Renaissance
01A45 17th century
01A50 18th century
01A55 19th century
01A60 20th century
01A61 Twenty-first century
01A65 Contemporary
01A67 Future prospectives

01A70 Biographies, obituaries, personalia, bibliographies

01A72 Schools of mathematics

01A73 Universities

01A74 Other institutions and academies

01A75 Collected or selected works; reprintings or translations of classics [See also 00B60]

01A80 Sociology (and profession) of mathematics

01A85 Historiography

01A90 Bibliographic studies

01A99 Miscellaneous topics

03-XX Mathematical logic and foundations

03-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

03-01 Instructional exposition (textbooks, tutorial papers, etc.)

03-02 Research exposition (monographs, survey articles)

03-03 Historical (must also be assigned at least one classification number from Section 01)

03-04 Explicit machine computation and programs (not the theory of computation or programming)

03-06 Proceedings, conferences, collections, etc.

03Axx Philosophical aspects of logic and foundations

03A05 Philosophical and critical (For philosophy of mathematics, see also 00A30)

03A10 Logic in the philosophy of science

03A99 None of the above, but in this section

03Bxx General logic

03B05 Classical propositional logic

03B10 Classical first-order logic

03B15 Higher-order logic and type theory

03B20 Subsystems of classical logic (including intuitionistic logic)

03B22 Abstract deductive systems

03B25 Decidability of theories and sets of sentences [See also 11U05, 12L05, 20F10]

03B30 Foundations of classical theories (including reverse mathematics) [See also 03F35]

03B35 Mechanization of proofs and logical operations [See also 68T15]

03B40 Combinatory logic and lambda-calculus [See also 68N18]

03B42 Logics of knowledge and belief (including belief change)

03B44 Temporal logic

03B45 Modal logic (including the logic of norms) (For knowledge and belief, see 03B42; for temporal logic, see 03B44; for provability logic, see also 03F45)

03B47 Substructural logics (including relevance, entailment, linear logic, Lambek calculus, BCK and BCI logics) (For proof-theoretic aspects see 03F52)

03B48 Probability and inductive logic [See also 60A05]

03B50 Many-valued logic

03B52 Fuzzy logic; logic of vagueness [See also 68T27, 68T37, 94D05]

03B53 Paraconsistent logics

03B55 Intermediate logics

03B60 Other nonclassical logic

03B62 Combined logics

03B65 Logic of natural languages [See also 68T50, 91F20]

03B70 Logic in computer science [See also 68-XX]

03B80 Other applications of logic

03B99 None of the above, but in this section

03Cxx Model theory

03C05 Equational classes, universal algebra [See also 08Axx, 08Bxx, 18C05]

03C07 Basic properties of first-order languages and structures

03C10 Quantifier elimination, model completeness andrelated topics

03C13 Finite structures [See also 68Q15, 68Q19]

03C15 Denumerable structures

03C20 Ultraproducts and related constructions

03C25 Model-theoretic forcing

03C30 Other model constructions

03C35 Categoricity and completeness of theories

03C40 Interpolation, preservation, definability

03C45 Classification theory, stability and related concepts [See also 03C48]

03C48 Abstract elementary classes and related topics [See also 03C45]

03C50 Models with special properties (saturated, rigid, etc.)

03C52 Properties of classes of models

03C55 Set-theoretic model theory

03C57 Effective and recursion-theoretic model theory [See also 03D45]

03C60 Model-theoretic algebra [See also 08C10, 12Lxx, 13L05]

03C62 Models of arithmetic and set theory [See also 03Hxx]

03C64 Model theory of ordered structures; o-minimality

03C65 Models of other mathematical theories

03C68 Other classical first-order model theory

03C70 Logic on admissible sets

03C75 Other infinitary logic

03C80 Logic with extra quantifiers and operators [See also 03B42, 03B44, 03B45, 03B48]

03C85 Second- and higher-order model theory

03C90 Nonclassical models (Boolean-valued, sheaf, etc.)

03C95 Abstract model theory

03C98 Applications of model theory [See also 03C60]

03C99 None of the above, but in this section

03Dxx Computability and recursion theory

03D03 Thue and Post systems, etc.

03D05 Automata and formal grammars in connection with logical questions [See also 68Q45, 68Q70, 68R15]

03D10 Turing machines and related notions [See also 68Q05]

03D15 Complexity of computation (including implicit computational complexity) [See also 68Q15, 68Q17]

03D20 Recursive functions and relations, subrecursive hierarchies

03D25 Recursively (computably) enumerable sets and degrees

03D28 Other Turing degree structures

03D30 Other degrees and reducibilities

03D32 Algorithmic randomness and dimension [See also 68Q30]

03D35 Undecidability and degrees of sets of sentences

03D40 Word problems, etc. [See also 06B25, 08A50, 20F10, 68R15]

03D45 Theory of numerations, effectively presented structures [See also 03C57; for intuitionistic and similar approaches see 03F55]

03D50 Recursive equivalence types of sets and structures, isols

03D55 Hierarchies

03D60 Computability and recursion theory on ordinals, admissible sets, etc.

03D65 Higher-type and set recursion theory

03D70 Inductive definability

03D75 Abstract and axiomatic computability and recursion theory

03D78 Computation over the reals (For constructive aspects, see 03F60)

03D80 Applications of computability and recursion theory

03D99 None of the above, but in this section

03Exx Set theory

03E02 Partition relations

03E04 Ordered sets and their cofinalities; pcf theory

03E05 Other combinatorial set theory

03E10 Ordinal and cardinal numbers

03E15 Descriptive set theory [See also 28A05, 54H05]

03E17 Cardinal characteristics of the continuum

03E20 Other classical set theory (including functions, relations, and set algebra)

03E25 Axiom of choice and related propositions

03E30 Axiomatics of classical set theory and its fragments

03E35 Consistency and independence results

03E40 Other aspects of forcing and Boolean-valued models

03E45 Inner models, including constructibility, ordinal definability, and core models

03E47 Other notions of set-theoretic definability

03E50 Continuum hypothesis and Martin's axiom [See also 03E57]

03E55 Large cardinals

03E57 Generic absoluteness and forcing axioms
[See also 03E50]

03E60 Determinacy principles

03E65 Other hypotheses and axioms

03E70 Nonclassical and second-order set theories

03E72 Fuzzy set theory

03E75 Applications of set theory

03E99 None of the above, but in this section

**03Fxx Proof theory and
constructive mathematics**

03F03 Proof theory, general

03F05 Cut-elimination and normal-form theorems

03F07 Structure of proofs

03F10 Functionals in proof theory

03F15 Recursive ordinals and ordinal notations

03F20 Complexity of proofs

03F25 Relative consistency and interpretations

03F30 First-order arithmetic and fragments

03F35 Second- and higher-order arithmetic and fragments [See also 03B30]

03F40 Gödel numberings and issues of incompleteness

03F45 Provability logics and related algebras (e.g., diagonalizable algebras)
[See also 03B45, 03G25, 06E25]

03F50 Metamathematics of constructive systems

03F52 Linear logic and other substructural logics [See also 03B47]

03F55 Intuitionistic mathematics

03F60 Constructive and recursive analysis
[See also 03B30, 03D45, 03D78, 26E40, 46S30, 47S30]

03F65 Other constructive mathematics
[See also 03D45]

03F99 None of the above, but in this section

03Gxx Algebraic logic

03G05 Boolean algebras [See also 06Exx]

03G10 Lattices and related structures
[See also 06Bxx]

03G12 Quantum logic [See also 06C15, 81P10]

03G15 Cylindric and polyadic algebras; relation algebras

03G20 Łukasiewicz and Post algebras
[See also 06D25, 06D30]

03G25 Other algebras related to logic
[See also 03F45, 06D20, 06E25, 06F35]

03G27 Abstract algebraic logic

03G30 Categorical logic, topoi [See also 18B25, 18C05, 18C10]

03G99 None of the above, but in this section

03Hxx Nonstandard models [See also 03C62]

03H05 Nonstandard models in mathematics
[See also 26E35, 28E05, 30G06, 46S20, 47S20, 54J05]

03H10 Other applications of nonstandard models (economics, physics, etc.)

03H15 Nonstandard models of arithmetic
[See also 11U10, 12L15, 13L05]

03H99 None of the above, but in this section

05-XX Combinatorics
(For finite fields, see 11Txx)

05-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

05-01 Instructional exposition
(textbooks, tutorial papers, etc.)

05-02 Research exposition (monographs, survey articles)

05-03 Historical (must also be assigned at least one classification number from Section 01)

05-04 Explicit machine computation and programs (not the theory of computation or programming)

05-06 Proceedings, conferences, collections, etc.

05Axx Enumerative combinatorics (For enumeration in graph theory, see 05C30)

05A05 Permutations, words, matrices

05A10 Factorials, binomial coefficients, combinatorial functions [See also 11B65, 33Cxx]

05A15 Exact enumeration problems, generating functions [See also 33Cxx, 33Dxx]

05A16 Asymptotic enumeration

05A17 Partitions of integers
[See also 11P81, 11P82, 11P83]

05A18 Partitions of sets

05A19 Combinatorial identities, bijective combinatorics

05A20 Combinatorial inequalities

05A30 q-calculus and related topics
[See also 33Dxx]

05A40 Umbral calculus

05A99 None of the above, but in this section

05Bxx Designs and configurations (For applications of design theory, see 94C30)

05B05 Block designs [See also 51E05, 62K10]

05B07 Triple systems

05B10 Difference sets (number-theoretic, group-theoretic, etc.) [See also 11B13]

05B15 Orthogonal arrays, Latin squares, Room squares

05B20 Matrices (incidence, Hadamard, etc.)

05B25 Finite geometries
[See also 51D20, 51Exx]

05B30 Other designs, configurations
[See also 51E30]

05B35 Matroids, geometric lattices
[See also 52B40, 90C27]

05B40 Packing and covering
[See also 11H31, 52C15, 52C17]

05B45 Tessellation and tiling problems
[See also 52C20, 52C22]

05B50 Polyominoes

05B99 None of the above, but in this section

05Cxx Graph theory (For applications of graphs, see 68R10, 81Q30, 81T15, 82B20, 82C20, 90C35, 92E10, 94C15)

05C05 Trees

05C07 Vertex degrees [See also 05E30]

05C10 Planar graphs; geometric and topological aspects of graph theory
[See also 57M15, 57M25]

05C12 Distance in graphs

05C15 Coloring of graphs and hypergraphs

05C17 Perfect graphs

05C20 Directed graphs (digraphs), tournaments

05C21 Flows in graphs

05C22 Signed and weighted graphs

05C25 Graphs and abstract algebra (groups, rings, fields, etc.) [See also 20F65]

05C30 Enumeration in graph theory

05C31 Graph polynomials

05C35 Extremal problems [See also 90C35]

05C38 Paths and cycles [See also 90B10]

05C40 Connectivity

05C42 Density (toughness, etc.)

05C45 Eulerian and Hamiltonian graphs

05C50 Graphs and linear algebra
(matrices, eigenvalues, etc.)

05C51 Graph designs and isomomorphic decomposition [See also 05B30]

05C55 Generalized Ramsey theory
[See also 05D10]

05C57 Games on graphs
[See also 91A43, 91A46]

05C60 Isomorphism problems (reconstruction conjecture, etc.) and homomorphisms (subgraph embedding, etc.)

05C62 Graph representations (geometric and intersection representations, etc.)
(For graph drawing, see also 68R10)

05C63 Infinite graphs

05C65 Hypergraphs

05C69 Dominating sets, independent sets, cliques

05C70 Factorization, matching, partitioning, covering and packing

05C72 Fractional graph theory, fuzzy graph theory

05C75 Structural characterization of families of graphs

05C76 Graph operations
(line graphs, products, etc.)

05C78 Graph labelling (graceful graphs, bandwidth, etc.)

05C80 Random graphs [See also 60B20]

05C81 Random walks on graphs

05C82 Small world graphs, complex networks
[See also 90Bxx, 91D30]

05C83 Graph minors

05C85 Graph algorithms
[See also 68R10, 68W05]

05C90 Applications [See also 68R10, 81Q30, 81T15, 82B20, 82C20, 90C35, 92E10, 94C15]

05C99 None of the above, but in this section

05Dxx Extremal combinatorics

05D05 Extremal set theory

05D10 Ramsey theory [See also 05C55]

05D15 Transversal (matching) theory

05D40 Probabilistic methods

05D99 None of the above, but in this section

05Exx Algebraic combinatorics

05E05 Symmetric functions and generalizations

05E10 Combinatorial aspects of representation theory [See also 20C30]

05E15 Combinatorial aspects of groups and algebras [See also 14Nxx, 22E45, 33C80]

05E18 Group actions on combinatorial structures

05E30 Association schemes, strongly regular graphs

05E40 Combinatorial aspects of commutative algebra

05E45 Combinatorial aspects of simplicial complexes

05E99 None of the above, but in this section

06-XX Order, lattices, ordered algebraic structures [See also 18B35]

06-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

06-01 Instructional exposition (textbooks, tutorial papers, etc.)

06-02 Research exposition (monographs, survey articles)

06-03 Historical (must also be assigned at least one classification number from Section 01)

06-04 Explicit machine computation and programs (not the theory of computation or programming)

06-06 Proceedings, conferences, collections, etc.

06Axx Ordered sets

06A05 Total order

06A06 Partial order, general

06A07 Combinatorics of partially ordered sets

06A11 Algebraic aspects of posets

06A12 Semilattices [See also 20M10; for topological semilattices see 22A26]

06A15 Galois correspondences, closure operators

06A75 Generalizations of ordered sets

06A99 None of the above, but in this section

06Bxx Lattices [See also 03G10]

06B05 Structure theory

06B10 Ideals, congruence relations

06B15 Representation theory

06B20 Varieties of lattices

06B23 Complete lattices, completions

06B25 Free lattices, projective lattices, word problems [See also 03D40, 08A50, 20F10]

06B30 Topological lattices, order topologies [See also 06F30, 22A26, 54F05, 54H12]

06B35 Continuous lattices and posets, applications [See also 06B30, 06D10, 06F30, 18B35, 22A26, 68Q55]

06B75 Generalizations of lattices

06B99 None of the above, but in this section

06Cxx Modular lattices, complemented lattices

06C05 Modular lattices, Desarguesian lattices

06C10 Semimodular lattices, geometric lattices

06C15 Complemented lattices, orthocomplemented lattices and posets [See also 03G12, 81P10]

06C20 Complemented modular lattices, continuous geometries

06C99 None of the above, but in this section

06Dxx Distributive lattices

06D05 Structure and representation theory

06D10 Complete distributivity

06D15 Pseudocomplemented lattices

06D20 Heyting algebras [See also 03G25]

06D22 Frames, locales (For topological questions see 54-XX)

06D25 Post algebras [See also 03G20]

06D30 De Morgan algebras, Łukasiewicz algebras [See also 03G20]

06D35 MV-algebras

06D50 Lattices and duality

06D72 Fuzzy lattices (soft algebras) and related topics

06D75 Other generalizations of distributive lattices

06D99 None of the above, but in this section

06Exx Boolean algebras (Boolean rings) [See also 03G05]

06E05 Structure theory

06E10 Chain conditions, complete algebras

06E15 Stone spaces (Boolean spaces) and related structures

06E20 Ring-theoretic properties [See also 16E50, 16G30]

06E25 Boolean algebras with additional operations (diagonalizable algebras, etc.) [See also 03G25, 03F45]

06E30 Boolean functions [See also 94C10]

06E75 Generalizations of Boolean algebras

06E99 None of the above, but in this section

06Fxx Ordered structures

06F05 Ordered semigroups and monoids [See also 20Mxx]

06F07 Quantales

06F10 Noether lattices

06F15 Ordered groups [See also 20F60]

06F20 Ordered abelian groups, Riesz groups, ordered linear spaces [See also 46A40]

06F25 Ordered rings, algebras, modules (For ordered fields, see 12J15; see also 13J25, 16W80)

06F30 Topological lattices, order topologies [See also 06B30, 22A26, 54F05, 54H12]

06F35 BCK-algebras, BCI-algebras [See also 03G25]

06F99 None of the above, but in this section

08-XX General algebraic systems

08-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

08-01 Instructional exposition (textbooks, tutorial papers, etc.)

08-02 Research exposition (monographs, survey articles)

08-03 Historical (must also be assigned at least one classification number from Section 01)

08-04 Explicit machine computation and programs (not the theory of computation or programming)

08-06 Proceedings, conferences, collections, etc.

08Axx Algebraic structures [See also 03C05]

08A02 Relational systems, laws of composition

08A05 Structure theory

08A30 Subalgebras, congruence relations

08A35 Automorphisms, endomorphisms

08A40 Operations, polynomials, primal algebras

08A45 Equational compactness

08A50 Word problems [See also 03D40, 06B25, 20F10, 68R15]

08A55 Partial algebras

08A60 Unary algebras

08A62 Finitary algebras

08A65 Infinitary algebras

08A68 Heterogeneous algebras

08A70 Applications of universal algebra in computer science

08A72 Fuzzy algebraic structures

08A99 None of the above, but in this section

08Bxx Varieties [See also 03C05]

08B05 Equational logic, Mal'cev (Mal'tsev) conditions

08B10 Congruence modularity, congruence distributivity

08B15 Lattices of varieties

08B20 Free algebras

08B25 Products, amalgamated products, and other kinds of limits and colimits [See also 18A30]

08B26 Subdirect products and subdirect irreducibility

08B30 Injectives, projectives

08B99 None of the above, but in this section

08Cxx Other classes of algebras

08C05 Categories of algebras [See also 18C05]

08C10 Axiomatic model classes [See also 03Cxx, in particular 03C60]

08C15 Quasivarieties

08C20 Natural dualities for classes of algebras [See also 06E15, 18A40, 22A30]

08C99 None of the above, but in this section

11-XX Number theory

11-00   General reference works (handbooks, dictionaries, bibliographies, etc.)

11-01   Instructional exposition (textbooks, tutorial papers, etc.)

11-02   Research exposition (monographs, survey articles)

11-03   Historical (must also be assigned at least one classification number from Section 01)

11-04   Explicit machine computation and programs (not the theory of computation or programming)

11-06   Proceedings, conferences, collections, etc.

11Axx   Elementary number theory (For analogues in number fields, see 11R04)

11A05   Multiplicative structure; Euclidean algorithm; greatest common divisors

11A07   Congruences; primitive roots; residue systems

11A15   Power residues, reciprocity

11A25   Arithmetic functions; related numbers; inversion formulas

11A41   Primes

11A51   Factorization; primality

11A55   Continued fractions (For approximation results, see 11J70) [See also 11K50, 30B70, 40A15]

11A63   Radix representation; digital problems (For metric results, see 11K16)

11A67   Other representations

11A99   None of the above, but in this section

11Bxx   Sequences and sets

11B05   Density, gaps, topology

11B13   Additive bases, including sumsets [See also 05B10]

11B25   Arithmetic progressions [See also 11N13]

11B30   Arithmetic combinatorics; higher degree uniformity

11B34   Representation functions

11B37   Recurrences (For applications to special functions, see 33-XX)

11B39   Fibonacci and Lucas numbers and polynomials and generalizations

11B50   Sequences (mod m)

11B57   Farey sequences; the sequences $1^k, 2^k, \cdots$

11B65   Binomial coefficients; factorials; q-identities [See also 05A10, 05A30]

11B68   Bernoulli and Euler numbers and polynomials

11B73   Bell and Stirling numbers

11B75   Other combinatorial number theory

11B83   Special sequences and polynomials

11B85   Automata sequences

11B99   None of the above, but in this section

11Cxx   Polynomials and matrices

11C08   Polynomials [See also 13F20]

11C20   Matrices, determinants [See also 15B36]

11C99   None of the above, but in this section

11Dxx   Diophantine equations [See also 11Gxx, 14Gxx]

11D04   Linear equations

11D07   The Frobenius problem

11D09   Quadratic and bilinear equations

11D25   Cubic and quartic equations

11D41   Higher degree equations; Fermat's equation

11D45   Counting solutions of Diophantine equations

11D57   Multiplicative and norm form equations

11D59   Thue-Mahler equations

11D61   Exponential equations

11D68   Rational numbers as sums of fractions

11D72   Equations in many variables [See also 11P55]

11D75   Diophantine inequalities [See also 11J25]

11D79   Congruences in many variables

11D85   Representation problems [See also 11P55]

11D88 p-adic and power series fields

11D99   None of the above, but in this section

11Exx   Forms and linear algebraic groups [See also 19Gxx] (For quadratic forms in linear algebra, see 15A63)

11E04   Quadratic forms over general fields

11E08   Quadratic forms over local rings and fields

11E10   Forms over real fields

11E12   Quadratic forms over global rings and fields

11E16 General binary quadratic forms

11E20 General ternary and quaternary quadratic forms; forms of more than two variables

11E25 Sums of squares and representations by other particular quadratic forms

11E39 Bilinear and Hermitian forms

11E41 Class numbers of quadratic and Hermitian forms

11E45 Analytic theory (Epstein zeta functions; relations with automorphic forms and functions)

11E57 Classical groups [See also 14Lxx, 20Gxx]

11E70 *K*-theory of quadratic and Hermitian forms

11E72 Galois cohomology of linear algebraic groups [See also 20G10]

11E76 Forms of degree higher than two

11E81 Algebraic theory of quadratic forms; Witt groups and rings [See also 19G12, 19G24]

11E88 Quadratic spaces; Clifford algebras [See also 15A63, 15A66]

11E95 *p*-adic theory

11E99 None of the above, but in this section

11Fxx Discontinuous groups and automorphic forms [See also 11R39, 11S37, 14Gxx, 14Kxx, 22E50, 22E55, 30F35, 32Nxx] (For relations with quadratic forms, see 11E45)

11F03 Modular and automorphic functions

11F06 Structure of modular groups and generalizations; arithmetic groups [See also 20H05, 20H10, 22E40]

11F11 Holomorphic modular forms of integral weight

11F12 Automorphic forms, one variable

11F20 Dedekind eta function, Dedekind sums

11F22 Relationship to Lie algebras and finite simple groups

11F23 Relations with algebraic geometry and topology

11F25 Hecke-Petersson operators, differential operators (one variable)

11F27 Theta series; Weil representation; theta correspondences

11F30 Fourier coefficients of automorphic forms

11F32 Modular correspondences, etc.

11F33 Congruences for modular and *p*-adic modular forms [See also 14G20, 22E50]

11F37 Forms of half-integer weight; nonholomorphic modular forms

11F41 Automorphic forms on GL(2); Hilbert and Hilbert-Siegel modular groups and their modular and automorphic forms; Hilbert modular surfaces [See also 14J20]

11F46 Siegel modular groups; Siegel and Hilbert-Siegel modular and automorphic forms

11F50 Jacobi forms

11F52 Modular forms associated to Drinfel'd modules

11F55 Other groups and their modular and automorphic forms (several variables)

11F60 Hecke-Petersson operators, differential operators (several variables)

11F66 Langlands L-functions; one variable Dirichlet series and functional equations

11F67 Special values of automorphic *L*-series, periods of modular forms, cohomology, modular symbols

11F68 Dirichlet series in several complex variables associated to automorphic forms; Weyl group multiple Dirichlet series

11F70 Representation-theoretic methods; automorphic representations over local and global fields

11F72 Spectral theory; Selberg trace formula

11F75 Cohomology of arithmetic groups

11F80 Galois representations

11F85 *p*-adic theory, local fields [See also 14G20, 22E50]

11F99 None of the above, but in this section

11Gxx Arithmetic algebraic geometry (Diophantine geometry) [See also 11Dxx, 14Gxx, 14Kxx]

11G05 Elliptic curves over global fields [See also 14H52]

11G07 Elliptic curves over local fields [See also 14G20, 14H52]

11G09 Drinfel'd modules; higher-dimensional motives, etc. [See also 14L05]

11G10 Abelian varieties of dimension > 1 [See also 14Kxx]

11G15 Complex multiplication and moduli of abelian varieties [See also 14K22]

11G16 Elliptic and modular units [See also 11R27]

11G18 Arithmetic aspects of modular and Shimura varieties [See also 14G35]

11G20 Curves over finite and local fields [See also 14H25]

11G25 Varieties over finite and local fields [See also 14G15, 14G20]

11G30 Curves of arbitrary genus or genus ≠ 1 over global fields [See also 14H25]

11G32 Dessins d'enfants, Belyĭ theory

11G35 Varieties over global fields [See also 14G25]

11G40 L-functions of varieties over global fields; Birch-Swinnerton-Dyer conjecture [See also 14G10]

11G42 Arithmetic mirror symmetry [See also 14J33]

11G45 Geometric class field theory [See also 11R37, 14C35, 19F05]

11G50 Heights [See also 14G40, 37P30]

11G55 Polylogarithms and relations with K-theory

11G99 None of the above, but in this section

11Hxx Geometry of numbers (For applications in coding theory, see 94B75)

11H06 Lattices and convex bodies [See also 11P21, 52C05, 52C07]

11H16 Nonconvex bodies

11H31 Lattice packing and covering [See also 05B40, 52C15, 52C17]

11H46 Products of linear forms

11H50 Minima of forms

11H55 Quadratic forms (reduction theory, extreme forms, etc.)

11H56 Automorphism groups of lattices

11H60 Mean value and transfer theorems

11H71 Relations with coding theory

11H99 None of the above, but in this section

11Jxx Diophantine approximation, transcendental number theory [See also 11K60]

11J04 Homogeneous approximation to one number

11J06 Markov and Lagrange spectra and generalizations

11J13 Simultaneous homogeneous approximation, linear forms

11J17 Approximation by numbers from a fixed field

11J20 Inhomogeneous linear forms

11J25 Diophantine inequalities [See also 11D75]

11J54 Small fractional parts of polynomials and generalizations

11J61 Approximation in non-Archimedean valuations

11J68 Approximation to algebraic numbers

11J70 Continued fractions and generalizations [See also 11A55, 11K50]

11J71 Distribution modulo one [See also 11K06]

11J72 Irrationality; linear independence over a field

11J81 Transcendence (general theory)

11J82 Measures of irrationality and of transcendence

11J83 Metric theory

11J85 Algebraic independence; Gel'fond's method

11J86 Linear forms in logarithms; Baker's method

11J87 Schmidt Subspace Theorem and applications

11J89 Transcendence theory of elliptic and abelian functions

11J91 Transcendence theory of other special functions

11J93 Transcendence theory of Drinfel'd and t-modules

11J95 Results involving abelian varieties

11J97 Analogues of methods in Nevanlinna theory (work of Vojta et al.)

11J99 None of the above, but in this section

11Kxx Probabilistic theory: distribution modulo 1; metric theory of algorithms

11K06 General theory of distribution modulo 1 [See also 11J71]

11K16 Normal numbers, radix expansions, Pisot numbers, Salem numbers, good lattice points, etc. [See also 11A63]

11K31 Special sequences

11K36 Well-distributed sequences and other variations

11K38 Irregularities of distribution, discrepancy [See also 11Nxx]

11K41 Continuous, *p*-adic and abstract analogues

11K45 Pseudo-random numbers; Monte Carlo methods

11K50 Metric theory of continued fractions [See also 11A55, 11J70]

11K55 Metric theory of other algorithms and expansions; measure and Hausdorff dimension [See also 11N99, 28Dxx]

11K60 Diophantine approximation [See also 11Jxx]

11K65 Arithmetic functions [See also 11Nxx]

11K70 Harmonic analysis and almost periodicity

11K99 None of the above, but in this section

11Lxx Exponential sums and character sums (For finite fields, see 11Txx)

11L03 Trigonometric and exponential sums, general

11L05 Gauss and Kloosterman sums; generalizations

11L07 Estimates on exponential sums

11L10 Jacobsthal and Brewer sums; other complete character sums

11L15 Weyl sums

11L20 Sums over primes

11L26 Sums over arbitrary intervals

11L40 Estimates on character sums

11L99 None of the above, but in this section

11Mxx Zeta and *L*-functions: analytic theory

11M06 $\zeta(s)$ and $L(s, \chi)$

11M20 Real zeros of $L(s, \chi)$; results on $L(1, \chi)$

11M26 Nonreal zeros of $\zeta(s)$ and $L(s, \chi)$; Riemann and other hypotheses

11M32 Multiple Dirichlet series and zeta functions and multizeta values

11M35 Hurwitz and Lerch zeta functions

11M36 Selberg zeta functions and regularized determinants; applications to spectral theory, Dirichlet series, Eisenstein series, etc. Explicit formulas

11M38 Zeta and *L*-functions in characteristic *p*

11M41 Other Dirichlet series and zeta functions (For local and global ground fields, see 11R42, 11R52, 11S40, 11S45; for algebro-geometric methods, see 14G10; see also 11E45, 11F66, 11F70, 11F72)

11M45 Tauberian theorems [See also 40E05]

11M50 Relations with random matrices

11M55 Relations with noncommutative geometry

11M99 None of the above, but in this section

11Nxx Multiplicative number theory

11N05 Distribution of primes

11N13 Primes in progressions [See also 11B25]

11N25 Distribution of integers with specified multiplicative constraints

11N30 Turán theory [See also 30Bxx]

11N32 Primes represented by polynomials; other multiplicative structure of polynomial values

11N35 Sieves

11N36 Applications of sieve methods

11N37 Asymptotic results on arithmetic functions

11N45 Asymptotic results on counting functions for algebraic and topological structures

11N56 Rate of growth of arithmetic functions

11N60 Distribution functions associated with additive and positive multiplicative functions

11N64 Other results on the distribution of values or the characterization of arithmetic functions

11N69 Distribution of integers in special residue classes

11N75 Applications of automorphic functions and forms to multiplicative problems [See also 11Fxx]

11N80 Generalized primes and integers

11N99 None of the above, but in this section

11Pxx Additive number theory; partitions

11P05 Waring's problem and variants

11P21 Lattice points in specified regions

11P32 Goldbach-type theorems; other additive questions involving primes

11P55 Applications of the Hardy-Littlewood method [See also 11D85]

11P70 Inverse problems of additive number theory, including sumsets

11P81 Elementary theory of partitions [See also 05A17]

11P82 Analytic theory of partitions

11P83 Partitions; congruences and congruential restrictions

11P84 Partition identities; identities of Rogers-Ramanujan type

11P99 None of the above, but in this section

11Rxx Algebraic number theory: global fields (For complex multiplication, see 11G15)

11R04 Algebraic numbers; rings of algebraic integers

11R06 PV-numbers and generalizations; other special algebraic numbers; Mahler measure

11R09 Polynomials (irreducibility, etc.)

11R11 Quadratic extensions

11R16 Cubic and quartic extensions

11R18 Cyclotomic extensions

11R20 Other abelian and metabelian extensions

11R21 Other number fields

11R23 Iwasawa theory

11R27 Units and factorization

11R29 Class numbers, class groups, discriminants

11R32 Galois theory

11R33 Integral representations related to algebraic numbers; Galois module structure of rings of integers [See also 20C10]

11R34 Galois cohomology
[See also 12Gxx, 19A31]

11R37 Class field theory

11R39 Langlands-Weil conjectures, nonabelian class field theory [See also 11Fxx, 22E55]

11R42 Zeta functions and *L*-functions of number fields [See also 11M41, 19F27]

11R44 Distribution of prime ideals
[See also 11N05]

11R45 Density theorems

11R47 Other analytic theory [See also 11Nxx]

11R52 Quaternion and other division algebras: arithmetic, zeta functions

11R54 Other algebras and orders, and their zeta and *L*-functions [See also 11S45, 16Hxx, 16Kxx]

11R56 Adèle rings and groups

11R58 Arithmetic theory of algebraic function fields [See also 14-XX]

11R60 Cyclotomic function fields (class groups, Bernoulli objects, etc.)

11R65 Class groups and Picard groups of orders

11R70 *K*-theory of global fields [See also 19Fxx]

11R80 Totally real fields [See also 12J15]

11R99 None of the above, but in this section

11Sxx Algebraic number theory: local and *p*-adic fields

11S05 Polynomials

11S15 Ramification and extension theory

11S20 Galois theory

11S23 Integral representations

11S25 Galois cohomology
[See also 12Gxx, 16H05]

11S31 Class field theory; *p*-adic formal groups [See also 14L05]

11S37 Langlands-Weil conjectures, nonabelian class field theory [See also 11Fxx, 22E50]

11S40 Zeta functions and *L*-functions [See also 11M41, 19F27]

11S45 Algebras and orders, and their zeta functions [See also 11R52, 11R54, 16Hxx, 16Kxx]

11S70 *K*-theory of local fields [See also 19Fxx]

11S80 Other analytic theory (analogues of beta and gamma functions, *p*-adic integration, etc.)

11S82 Non-Archimedean dynamical systems [See mainly 37Pxx]

11S85 Other nonanalytic theory

11S90 Prehomogeneous vector spaces

11S99 None of the above, but in this section

11Txx Finite fields and commutative rings (number-theoretic aspects)

11T06 Polynomials

11T22 Cyclotomy

11T23 Exponential sums

11T24 Other character sums and Gauss sums

11T30 Structure theory

11T55 Arithmetic theory of polynomial rings over finite fields

11T60 Finite upper half-planes

11T71 Algebraic coding theory; cryptography

11T99 None of the above, but in this section

11Uxx Connections with logic

11U05 Decidability [See also 03B25]

11U07 Ultraproducts [See also 03C20]

11U09 Model theory [See also 03Cxx]

11U10 Nonstandard arithmetic
[See also 03H15]

11U99 None of the above, but in this section

11Yxx Computational number theory [See also 11-04]

11Y05 Factorization

11Y11 Primality

11Y16 Algorithms; complexity [See also 68Q25]

11Y35 Analytic computations

11Y40 Algebraic number theory computations

11Y50 Computer solution of Diophantine equations

11Y55 Calculation of integer sequences

11Y60 Evaluation of constants

11Y65 Continued fraction calculations

11Y70 Values of arithmetic functions; tables

11Y99 None of the above, but in this section

11Zxx Miscellaneous applications of number theory

11Z05 Miscellaneous applications of number theory

11Z99 None of the above, but in this section

12-XX Field theory and polynomials

12-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

12-01 Instructional exposition (textbooks, tutorial papers, etc.)

12-02 Research exposition (monographs, survey articles)

12-03 Historical (must also be assigned at least one classification number from Section 01)

12-04 Explicit machine computation and programs (not the theory of computation or programming)

12-06 Proceedings, conferences, collections, etc.

12Dxx Real and complex fields

12D05 Polynomials: factorization

12D10 Polynomials: location of zeros (algebraic theorems) (For the analytic theory, see 26C10, 30C15)

12D15 Fields related with sums of squares (formally real fields, Pythagorean fields, etc.) [See also 11Exx]

12D99 None of the above, but in this section

12Exx General field theory

12E05 Polynomials (irreducibility, etc.)

12E10 Special polynomials

12E12 Equations

12E15 Skew fields, division rings [See also 11R52, 11R54, 11S45, 16Kxx]

12E20 Finite fields (field-theoretic aspects)

12E25 Hilbertian fields; Hilbert's irreducibility theorem

12E30 Field arithmetic

12E99 None of the above, but in this section

12Fxx Field extensions

12F05 Algebraic extensions

12F10 Separable extensions, Galois theory

12F12 Inverse Galois theory

12F15 Inseparable extensions

12F20 Transcendental extensions

12F99 None of the above, but in this section

12Gxx Homological methods (field theory)

12G05 Galois cohomology [See also 14F22, 16Hxx, 16K50]

12G10 Cohomological dimension

12G99 None of the above, but in this section

12Hxx Differential and difference algebra

12H05 Differential algebra [See also 13Nxx]

12H10 Difference algebra [See also 39Axx]

12H20 Abstract differential equations [See also 34Mxx]

12H25 p-adic differential equations [See also 11S80, 14G20]

12H99 None of the above, but in this section

12Jxx Topological fields

12J05 Normed fields

12J10 Valued fields

12J12 Formally p-adic fields

12J15 Ordered fields

12J17 Topological semifields

12J20 General valuation theory
[See also 13A18]

12J25 Non-Archimedean valued fields
[See also 30G06, 32P05, 46S10, 47S10]

12J27 Krasner-Tate algebras [See mainly
32P05; see also 46S10, 47S10]

12J99 None of the above, but in this section

12Kxx Generalizations of fields

12K05 Near-fields [See also 16Y30]

12K10 Semifields [See also 16Y60]

12K99 None of the above, but in this section

12Lxx Connections with logic

12L05 Decidability [See also 03B25]

12L10 Ultraproducts [See also 03C20]

12L12 Model theory [See also 03C60]

12L15 Nonstandard arithmetic
[See also 03H15]

12L99 None of the above, but in this section

**12Yxx Computational aspects of field theory
and polynomials**

12Y05 Computational aspects of field theory
and polynomials

12Y99 None of the above, but in this section

13-XX Commutative algebra

13-00 General reference works (handbooks,
dictionaries, bibliographies, etc.)

13-01 Instructional exposition
(textbooks, tutorial papers, etc.)

13-02 Research exposition (monographs,
survey articles)

13-03 Historical (must also be assigned at least
one classification number from Section
01)

13-04 Explicit machine computation and pro-
grams (not the theory of computation or
programming)

13-06 Proceedings, conferences, collections,
etc.

13Axx General commutative ring theory

13A02 Graded rings [See also 16W50]

13A05 Divisibility; factorizations
[See also 13F15]

13A15 Ideals; multiplicative ideal theory

13A18 Valuations and their generalizations
[See also 12J20]

13A30 Associated graded rings of ideals (Rees
ring, form ring), analytic spread and re-
lated topics

13A35 Characteristic p methods (Frobenius en-
domorphism) and reduction to charac-
teristic p; tight closure [See also 13B22]

13A50 Actions of groups on commutative rings;
invariant theory [See also 14L24]

13A99 None of the above, but in this section

13Bxx Ring extensions and related topics

13B02 Extension theory

13B05 Galois theory

13B10 Morphisms

13B21 Integral dependence; going up, going
down

13B22 Integral closure of rings and ideals
[See also 13A35]; integrally closed rings,
related rings (Japanese, etc.)

13B25 Polynomials over commutative rings
[See also 11C08, 11T06, 13F20, 13M10]

13B30 Rings of fractions and localization
[See also 16S85]

13B35 Completion [See also 13J10]

13B40 Étale and flat extensions; Henselization;
Artin approximation
[See also 13J15, 14B12, 14B25]

13B99 None of the above, but in this section

13Cxx Theory of modules and ideals

13C05 Structure, classification theorems

13C10 Projective and free modules and ideals
[See also 19A13]

13C11 Injective and flat modules and ideals

13C12 Torsion modules and ideals

13C13 Other special types

13C14 Cohen-Macaulay modules
[See also 13H10]

13C15 Dimension theory, depth, related rings
(catenary, etc.)

13C20 Class groups [See also 11R29]

13C40 Linkage, complete intersections and de-
terminantal ideals [See also 14M06,
14M10, 14M12]

13C60 Module categories

13C99 None of the above, but in this section

13Dxx Homological methods (For noncommutative rings, see 16Exx; for general categories, see 18Gxx)

13D02 Syzygies, resolutions, complexes

13D03 (Co)homology of commutative rings and algebras (e.g., Hochschild, André-Quillen, cyclic, dihedral, etc.)

13D05 Homological dimension

13D07 Homological functors on modules (Tor, Ext, etc.)

13D09 Derived categories

13D10 Deformations and infinitesimal methods [See also 14B10, 14B12, 14D15, 32Gxx]

13D15 Grothendieck groups, *K*-theory [See also 14C35, 18F30, 19Axx, 19D50]

13D22 Homological conjectures (intersection theorems)

13D30 Torsion theory [See also 13C12, 18E40]

13D40 Hilbert-Samuel and Hilbert-Kunz functions; Poincaré series

13D45 Local cohomology [See also 14B15]

13D99 None of the above, but in this section

13Exx Chain conditions, finiteness conditions

13E05 Noetherian rings and modules

13E10 Artinian rings and modules, finite-dimensional algebras

13E15 Rings and modules of finite generation or presentation; number of generators

13E99 None of the above, but in this section

13Fxx Arithmetic rings and other special rings

13F05 Dedekind, Prüfer, Krull and Mori rings and their generalizations

13F07 Euclidean rings and generalizations

13F10 Principal ideal rings

13F15 Rings defined by factorization properties (e.g., atomic, factorial, half-factorial) [See also 13A05, 14M05]

13F20 Polynomial rings and ideals; rings of integer-valued polynomials [See also 11C08, 13B25]

13F25 Formal power series rings [See also 13J05]

13F30 Valuation rings [See also 13A18]

13F35 Witt vectors and related rings

13F40 Excellent rings

13F45 Seminormal rings

13F50 Rings with straightening laws, Hodge algebras

13F55 Stanley-Reisner face rings; simplicial complexes [See also 55U10]

13F60 Cluster algebras

13F99 None of the above, but in this section

13Gxx Integral domains

13G05 Integral domains

13G99 None of the above, but in this section

13Hxx Local rings and semilocal rings

13H05 Regular local rings

13H10 Special types (Cohen-Macaulay, Gorenstein, Buchsbaum, etc.) [See also 14M05]

13H15 Multiplicity theory and related topics [See also 14C17]

13H99 None of the above, but in this section

13Jxx Topological rings and modules [See also 16W60, 16W80]

13J05 Power series rings [See also 13F25]

13J07 Analytical algebras and rings [See also 32B05]

13J10 Complete rings, completion [See also 13B35]

13J15 Henselian rings [See also 13B40]

13J20 Global topological rings

13J25 Ordered rings [See also 06F25]

13J30 Real algebra [See also 12D15, 14Pxx]

13J99 None of the above, but in this section

13Lxx Applications of logic to commutative algebra [See also 03Cxx, 03Hxx]

13L05 Applications of logic to commutative algebra [See also 03Cxx, 03Hxx]

13L99 None of the above, but in this section

13Mxx Finite commutative rings (For number-theoretic aspects, see 11Txx)

13M05 Structure

13M10 Polynomials

13M99 None of the above, but in this section

synopa13NxxDifferential algebra [See also 12H05, 14F10]

13N05 Modules of differentials

13N10 Rings of differential operators and their modules [See also 16S32, 32C38]

13N15 Derivations

13N99 None of the above, but in this section

13Pxx Computational aspects and applications [See also 14Qxx, 68W30]

13P05 Polynomials, factorization [See also 12Y05]

13P10 Gröbner bases; other bases for ideals and modules (e.g., Janet and border bases)

13P15 Solving polynomial systems; resultants

13P20 Computational homological algebra [See also 13Dxx]

13P25 Applications of commutative algebra (e.g., to statistics, control theory, optimization, etc.)

13P99 None of the above, but in this section

14-XX Algebraic geometry

14-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

14-01 Instructional exposition (textbooks, tutorial papers, etc.)

14-02 Research exposition (monographs, survey articles)

14-03 Historical (must also be assigned at least one classification number from Section 01)

14-04 Explicit machine computation and programs (not the theory of computation or programming)

14-06 Proceedings, conferences, collections, etc.

14Axx Foundations

14A05 Relevant commutative algebra [See also 13-XX]

14A10 Varieties and morphisms

14A15 Schemes and morphisms

14A20 Generalizations (algebraic spaces, stacks)

14A22 Noncommutative algebraic geometry [See also 16S38]

14A25 Elementary questions

14A99 None of the above, but in this section

14Bxx Local theory

14B05 Singularities [See also 14E15, 14H20, 14J17, 32Sxx, 58Kxx]

14B07 Deformations of singularities [See also 14D15, 32S30]

14B10 Infinitesimal methods [See also 13D10]

14B12 Local deformation theory, Artin approximation, etc. [See also 13B40, 13D10]

14B15 Local cohomology [See also 13D45, 32C36]

14B20 Formal neighborhoods

14B25 Local structure of morphisms: étale, flat, etc. [See also 13B40]

14B99 None of the above, but in this section

14Cxx Cycles and subschemes

14C05 Parametrization (Chow and Hilbert schemes)

14C15 (Equivariant) Chow groups and rings; motives

14C17 Intersection theory, characteristic classes, intersection multiplicities [See also 13H15]

14C20 Divisors, linear systems, invertible sheaves

14C21 Pencils, nets, webs [See also 53A60]

14C22 Picard groups

14C25 Algebraic cycles

14C30 Transcendental methods, Hodge theory [See also 14D07, 32G20, 32J25, 32S35], Hodge conjecture

14C34 Torelli problem [See also 32G20]

14C35 Applications of methods of algebraic K-theory [See also 19Exx]

14C40 Riemann-Roch theorems [See also 19E20, 19L10]

14C99 None of the above, but in this section

14Dxx Families, fibrations

14D05 Structure of families (Picard-Lefschetz, monodromy, etc.)

14D06 Fibrations, degenerations

14D07 Variation of Hodge structures [See also 32G20]

14D10 Arithmetic ground fields (finite, local, global)

14D15 Formal methods; deformations [See also 13D10, 14B07, 32Gxx]

14D20 Algebraic moduli problems, moduli of vector bundles (For analytic moduli problems, see 32G13)

14D21 Applications of vector bundles and moduli spaces in mathematical physics (twistor theory, instantons, quantum field theory)

14D22 Fine and coarse moduli spaces

14D23 Stacks and moduli problems

14D24 Geometric Langlands program: algebro-geometric aspects [See also 22E57]

14D99 None of the above, but in this section

14Exx Birational geometry

14E05 Rational and birational maps

14E07 Birational automorphisms, Cremona group and generalizations

14E08 Rationality questions [See also 14M20]

14E15 Global theory and resolution of singularities [See also 14B05, 32S20, 32S45]

14E16 McKay correspondence

14E18 Arcs and motivic integration

14E20 Coverings [See also 14H30]

14E22 Ramification problems [See also 11S15]

14E25 Embeddings

14E30 Minimal model program (Mori theory, extremal rays)

14E99 None of the above, but in this section

14Fxx (Co)homology theory [See also 13Dxx]

14F05 Sheaves, derived categories of sheaves and related constructions [See also 14H60, 14J60, 18F20, 32Lxx, 46M20]

14F10 Differentials and other special sheaves; D-modules; Bernstein-Sato ideals and polynomials [See also 13Nxx, 32C38]

14F17 Vanishing theorems [See also 32L20]

14F18 Multiplier ideals

14F20 Étale and other Grothendieck topologies and cohomologies

14F22 Brauer groups of schemes [See also 12G05, 16K50]

14F25 Classical real and complex cohomology

14F30 p-adic cohomology, crystalline cohomology

14F35 Homotopy theory; fundamental groups [See also 14H30]

14F40 de Rham cohomology [See also 14C30, 32C35, 32L10]

14F42 Motivic cohomology; motivic homotopy theory

14F43 Other algebro-geometric (co)homologies (e.g., intersection, equivariant, Lawson, Deligne (co)homologies)

14F45 Topological properties

14F99 None of the above, but in this section

14Gxx Arithmetic problems. Diophantine geometry [See also 11Dxx, 11Gxx]

14G05 Rational points

14G10 Zeta-functions and related questions [See also 11G40] (Birch-Swinnerton-Dyer conjecture)

14G15 Finite ground fields

14G17 Positive characteristic ground fields

14G20 Local ground fields

14G22 Rigid analytic geometry

14G25 Global ground fields

14G27 Other nonalgebraically closed ground fields

14G32 Universal profinite groups (relationship to moduli spaces, projective and moduli towers, Galois theory)

14G35 Modular and Shimura varieties [See also 11F41, 11F46, 11G18]

14G40 Arithmetic varieties and schemes; Arakelov theory; heights [See also 11G50, 37P30]

14G50 Applications to coding theory and cryptography [See also 94A60, 94B27, 94B40]

14G99 None of the above, but in this section

14Hxx Curves

14H05 Algebraic functions; function fields [See also 11R58]

14H10 Families, moduli (algebraic)

14H15 Families, moduli (analytic) [See also 30F10, 32Gxx]

14H20 Singularities, local rings [See also 13Hxx, 14B05]

14H25 Arithmetic ground fields [See also 11Dxx, 11G05, 14Gxx]

14H30 Coverings, fundamental group [See also 14E20, 14F35]

14H37 Automorphisms

14H40 Jacobians, Prym varieties
[See also 32G20]

14H42 Theta functions; Schottky problem
[See also 14K25, 32G20]

14H45 Special curves and curves of low genus

14H50 Plane and space curves

14H51 Special divisors (gonality, Brill-Noether theory)

14H52 Elliptic curves [See also 11G05, 11G07, 14Kxx]

14H55 Riemann surfaces; Weierstrass points; gap sequences [See also 30Fxx]

14H57 Dessins d'enfants theory (For arithmetic aspects, see 11G32)

14H60 Vector bundles on curves and their moduli [See also 14D20, 14F05]

14H70 Relationships with integrable systems

14H81 Relationships with physics

14H99 None of the above, but in this section

14Jxx Surfaces and higher-dimensional varieties (For analytic theory, see 32Jxx)

14J10 Families, moduli, classification: algebraic theory

14J15 Moduli, classification: analytic theory; relations with modular forms
[See also 32G13]

14J17 Singularities [See also 14B05, 14E15]

14J20 Arithmetic ground fields
[See also 11Dxx, 11G25, 11G35, 14Gxx]

14J25 Special surfaces (For Hilbert modular surfaces, see 14G35)

14J26 Rational and ruled surfaces

14J27 Elliptic surfaces

14J28 $K3$ surfaces and Enriques surfaces

14J29 Surfaces of general type

14J30 3-folds [See also 32Q25]

14J32 Calabi-Yau manifolds

14J33 Mirror symmetry
[See also 11G42, 53D37]

14J35 4-folds

14J40 n-folds ($n > 4$)

14J45 Fano varieties

14J50 Automorphisms of surfaces and higher-dimensional varieties

14J60 Vector bundles on surfaces and higher-dimensional varieties, and their moduli
[See also 14D20, 14F05, 32Lxx]

14J70 Hypersurfaces

14J80 Topology of surfaces (Donaldson polynomials, Seiberg-Witten invariants)

14J81 Relationships with physics

14J99 None of the above, but in this section

14Kxx Abelian varieties and schemes

14K02 Isogeny

14K05 Algebraic theory

14K10 Algebraic moduli, classification
[See also 11G15]

14K12 Subvarieties

14K15 Arithmetic ground fields
[See also 11Dxx, 11Fxx, 11Gxx, 14Gxx]

14K20 Analytic theory; abelian integrals and differentials

14K22 Complex multiplication [See also 11G15]

14K25 Theta functions [See also 14H42]

14K30 Picard schemes, higher Jacobians
[See also 14H40, 32G20]

14K99 None of the above, but in this section

14Lxx Algebraic groups (For linear algebraic groups, see 20Gxx; for Lie algebras, see 17B45)

14L05 Formal groups, p-divisible groups
[See also 55N22]

14L10 Group varieties

14L15 Group schemes

14L17 Affine algebraic groups, hyperalgebra constructions [See also 17B45, 18D35]

14L24 Geometric invariant theory
[See also 13A50]

14L30 Group actions on varieties or schemes (quotients) [See also 13A50, 14L24]

14L35 Classical groups (geometric aspects)
[See also 20Gxx, 51N30]

14L40 Other algebraic groups
(geometric aspects)

14L99 None of the above, but in this section

14Mxx Special varieties

14M05 Varieties defined by ring conditions (factorial, Cohen-Macaulay, seminormal)
[See also 13F45, 13H10]

14M06 Linkage [See also 13C40]

14M07 Low codimension problems

14M10 Complete intersections [See also 13C40]

14M12 Determinantal varieties [See also 13C40]

14M15 Grassmannians, Schubert varieties, flag manifolds [See also 32M10, 51M35]

14M17 Homogeneous spaces and generalizations [See also 32M10, 53C30, 57T15]

14M20 Rational and unirational varieties [See also 14E08]

14M22 Rationally connected varieties

14M25 Toric varieties, Newton polyhedra [See also 52B20]

14M27 Compactifications; symmetric and spherical varieties

14M30 Supervarieties [See also 32C11, 58A50]

14M99 None of the above, but in this section

14Nxx Projective and enumerative geometry [See also 51-XX]

14N05 Projective techniques [See also 51N35]

14N10 Enumerative problems (combinatorial problems)

14N15 Classical problems, Schubert calculus

14N20 Configurations and arrangements of linear subspaces

14N25 Varieties of low degree

14N30 Adjunction problems

14N35 Gromov-Witten invariants, quantum cohomology, Gopakumar-Vafa invariants, Donaldson-Thomas invariants [See also 53D45]

14N99 None of the above, but in this section

14Pxx Real algebraic and real analytic geometry

14P05 Real algebraic sets [See also 12D15, 13J30]

14P10 Semialgebraic sets and related spaces

14P15 Real analytic and semianalytic sets [See also 32B20, 32C05]

14P20 Nash functions and manifolds [See also 32C07, 58A07]

14P25 Topology of real algebraic varieties

14P99 None of the above, but in this section

14Qxx Computational aspects in algebraic geometry [See also 12Y05, 13Pxx, 68W30]

14Q05 Curves

14Q10 Surfaces, hypersurfaces

14Q15 Higher-dimensional varieties

14Q20 Effectivity, complexity

14Q99 None of the above, but in this section

14Rxx Affine geometry

14R05 Classification of affine varieties

14R10 Affine spaces (automorphisms, embeddings, exotic structures, cancellation problem)

14R15 Jacobian problem

14R20 Group actions on affine varieties [See also 13A50, 14L30]

14R25 Affine fibrations [See also 14D06]

14R99 None of the above, but in this section

14Txx Tropical geometry [See also 12K10, 14M25, 14N10, 52B20]

14T05 Tropical geometry [See also 12K10, 14M25, 14N10, 52B20]

14T99 None of the above, but in this section

15-XX Linear and multilinear algebra; matrix theory

15-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

15-01 Instructional exposition (textbooks, tutorial papers, etc.)

15-02 Research exposition (monographs, survey articles)

15-03 Historical (must also be assigned at least one classification number from Section 01)

15-04 Explicit machine computation and programs (not the theory of computation or programming)

15-06 Proceedings, conferences, collections, etc.

15Axx Basic linear algebra

15A03 Vector spaces, linear dependence, rank

15A04 Linear transformations, semilinear transformations

15A06 Linear equations

15A09 Matrix inversion, generalized inverses

15A12 Conditioning of matrices [See also 65F35]

15A15 Determinants, permanents, other special matrix functions [See also 19B10, 19B14]

15A16 Matrix exponential and similar functions of matrices

15A18 Eigenvalues, singular values, and eigen-vectors

15A21 Canonical forms, reductions, classification

15A22 Matrix pencils [See also 47A56]

15A23 Factorization of matrices

15A24 Matrix equations and identities

15A27 Commutativity

15A29 Inverse problems

15A30 Algebraic systems of matrices [See also 16S50, 20Gxx, 20Hxx]

15A33 Matrices over special rings (quaternions, finite fields, etc.)

15A39 Linear inequalities

15A42 Inequalities involving eigenvalues and eigenvectors

15A45 Miscellaneous inequalities involving matrices

15A54 Matrices over function rings in one or more variables

15A60 Norms of matrices, numerical range, applications of functional analysis to matrix theory [See also 65F35, 65J05]

15A63 Quadratic and bilinear forms, inner products [See mainly 11Exx]

15A66 Clifford algebras, spinors

15A69 Multilinear algebra, tensor products

15A72 Vector and tensor algebra, theory of invariants [See also 13A50, 14L24]

15A75 Exterior algebra, Grassmann algebras

15A78 Other algebras built from modules

15A80 Max-plus and related algebras

15A83 Matrix completion problems

15A86 Linear preserver problems

15A99 Miscellaneous topics

15Bxx Special matrices

15B05 Toeplitz, Cauchy, and related matrices

15B10 Orthogonal matrices

15B15 Fuzzy matrices

15B33 Matrices over special rings (quaternions, finite fields, etc.)

15B34 Boolean and Hadamard matrices

15B35 Sign pattern matrices

15B36 Matrices of integers [See also 11C20]

15B48 Positive matrices and their generalizations; cones of matrices

15B51 Stochastic matrices

15B52 Random matrices

15B57 Hermitian, skew-Hermitian, and related matrices

15B99 None of the above, but in this section

16-XX Associative rings and algebras (For the commutative case, see 13-XX)

16-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

16-01 Instructional exposition (textbooks, tutorial papers, etc.)

16-02 Research exposition (monographs, survey articles)

16-03 Historical (must also be assigned at least one classification number from Section 01)

16-04 Explicit machine computation and programs (not the theory of computation or programming)

16-06 Proceedings, conferences, collections, etc.

16Bxx General and miscellaneous

16B50 Category-theoretic methods and results (except as in 16D90) [See also 18-XX]

16B70 Applications of logic [See also 03Cxx]

16B99 None of the above, but in this section

16Dxx Modules, bimodules and ideals

16D10 General module theory

16D20 Bimodules

16D25 Ideals

16D30 Infinite-dimensional simple rings (except as in 16Kxx)

16D40 Free, projective, and flat modules and ideals [See also 19A13]

16D50 Injective modules, self-injective rings [See also 16L60]

16D60 Simple and semisimple modules, primitive rings and ideals

16D70 Structure and classification (except as in 16Gxx), direct sum decomposition, cancellation

16D80 Other classes of modules and ideals [See also 16G50]

16D90 Module categories [See also 16Gxx, 16S90]; module theory in a category-theoretic context; Morita equivalence and duality

16D99   None of the above, but in this section

16Exx   Homological methods (For commutative rings, see 13Dxx; for general categories, see 18Gxx)

16E05   Syzygies, resolutions, complexes

16E10   Homological dimension

16E20   Grothendieck groups, *K*-theory, etc. [See also 18F30, 19Axx, 19D50]

16E30   Homological functors on modules (Tor, Ext, etc.)

16E35   Derived categories

16E40   (Co)homology of rings and algebras (e.g. Hochschild, cyclic, dihedral, etc.)

16E45   Differential graded algebras and applications

16E50   von Neumann regular rings and generalizations

16E60   Semihereditary and hereditary rings, free ideal rings, Sylvester rings, etc.

16E65   Homological conditions on rings (generalizations of regular, Gorenstein, Cohen-Macaulay rings, etc.)

16E99   None of the above, but in this section

16Gxx   Representation theory of rings and algebras

16G10   Representations of Artinian rings

16G20   Representations of quivers and partially ordered sets

16G30   Representations of orders, lattices, algebras over commutative rings [See also 16Hxx]

16G50   Cohen-Macaulay modules

16G60   Representation type (finite, tame, wild, etc.)

16G70   Auslander-Reiten sequences (almost split sequences) and Auslander-Reiten quivers

16G99   None of the above, but in this section

16Hxx   Algebras and orders (For arithmetic aspects, see 11R52, 11R54, 11S45; for representation theory, see 16G30)

16H05   Separable algebras (e.g., quaternion algebras, Azumaya algebras, etc.)

16H10   Orders in separable algebras

16H15   Commutative orders

16H20   Lattices over orders

16H99   None of the above, but in this section

16Kxx   Division rings and semisimple Artin rings [See also 12E15, 15A30]

16K20   Finite-dimensional (For crossed products, see 16S35)

16K40   Infinite-dimensional and general

16K50   Brauer groups [See also 12G05, 14F22]

16K99   None of the above, but in this section

16Lxx   Local rings and generalizations

16L30   Noncommutative local and semilocal rings, perfect rings

16L60   Quasi-Frobenius rings [See also 16D50]

16L99   None of the above, but in this section

16Nxx   Radicals and radical properties of rings

16N20   Jacobson radical, quasimultiplication

16N40   Nil and nilpotent radicals, sets, ideals, rings

16N60   Prime and semiprime rings [See also 16D60, 16U10]

16N80   General radicals and rings (For radicals in module categories, see 16S90)

16N99   None of the above, but in this section

16Pxx   Chain conditions, growth conditions, and other forms of finiteness

16P10   Finite rings and finite-dimensional algebras (For semisimple, see 16K20; for commutative, see 11Txx, 13Mxx)

16P20   Artinian rings and modules

16P40   Noetherian rings and modules

16P50   Localization and Noetherian rings [See also 16U20]

16P60   Chain conditions on annihilators and summands: Goldie-type conditions [See also 16U20], Krull dimension

16P70   Chain conditions on other classes of submodules, ideals, subrings, etc.; coherence

16P90   Growth rate, Gelfand-Kirillov dimension

16P99   None of the above, but in this section

16Rxx   Rings with polynomial identity

16R10   *T*-ideals, identities, varieties of rings and algebras

16R20 Semiprime p.i. rings, rings embeddable in matrices over commutative rings

16R30 Trace rings and invariant theory

16R40 Identities other than those of matrices over commutative rings

16R50 Other kinds of identities (generalized polynomial, rational, involution)

16R60 Functional identities

16R99 None of the above, but in this section

16Sxx Rings and algebras arising under various constructions

16S10 Rings determined by universal properties (free algebras, coproducts, adjunction of inverses, etc.)

16S15 Finite generation, finite presentability, normal forms (diamond lemma, term-rewriting)

16S20 Centralizing and normalizing extensions

16S30 Universal enveloping algebras of Lie algebras [See mainly 17B35]

16S32 Rings of differential operators [See also 13N10, 32C38]

16S34 Group rings [See also 20C05, 20C07], Laurent polynomial rings

16S35 Twisted and skew group rings, crossed products

16S36 Ordinary and skew polynomial rings and semigroup rings [See also 20M25]

16S37 Quadratic and Koszul algebras

16S38 Rings arising from non-commutative algebraic geometry [See also 14A22]

16S40 Smash products of general Hopf actions [See also 16T05]

16S50 Endomorphism rings; matrix rings [See also 15-XX]

16S60 Rings of functions, subdirect products, sheaves of rings

16S70 Extensions of rings by ideals

16S80 Deformations of rings [See also 13D10, 14D15]

16S85 Rings of fractions and localizations [See also 13B30]

16S90 Torsion theories; radicals on module categories [See also 13D30, 18E40] (For radicals of rings, see 16Nxx)

16S99 None of the above, but in this section

16Txx Hopf algebras, quantum groups and related topics

16T05 Hopf algebras and their applications [See also 16S40, 57T05]

16T10 Bialgebras

16T15 Coalgebras and comodules; corings

16T20 Ring-theoretic aspects of quantum groups [See also 17B37, 20G42, 81R50]

16T25 Yang-Baxter equations

16T30 Connections with combinatorics

16T99 None of the above, but in this section

16Uxx Conditions on elements

16U10 Integral domains

16U20 Ore rings, multiplicative sets, Ore localization

16U30 Divisibility, noncommutative UFDs

16U60 Units, groups of units

16U70 Center, normalizer (invariant elements)

16U80 Generalizations of commutativity

16U99 None of the above, but in this section

16Wxx Rings and algebras with additional structure

16W10 Rings with involution; Lie, Jordan and other nonassociative structures [See also 17B60, 17C50, 46Kxx]

16W20 Automorphisms and endomorphisms

16W22 Actions of groups and semigroups; invariant theory

16W25 Derivations, actions of Lie algebras

16W50 Graded rings and modules

16W55 "Super" (or "skew") structure [See also 17A70, 17Bxx, 17C70] (For exterior algebras, see 15A75; for Clifford algebras, see 11E88, 15A66)

16W60 Valuations, completions, formal power series and related constructions [See also 13Jxx]

16W70 Filtered rings; filtrational and graded techniques

16W80 Topological and ordered rings and modules [See also 06F25, 13Jxx]

16W99 None of the above, but in this section

16Yxx Generalizations (For nonassociative rings, see 17-XX)

16Y30 Near-rings [See also 12K05]

16Y60 Semirings [See also 12K10]

16Y99 None of the above, but in this section

16Zxx Computational aspects of associative rings

16Z05 Computational aspects of associative rings [See also 68W30]

16Z99 None of the above, but in this section

17-XX Nonassociative rings and algebras

17-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

17-01 Instructional exposition (textbooks, tutorial papers, etc.)

17-02 Research exposition (monographs, survey articles)

17-03 Historical (must also be assigned at least one classification number from Section 01)

17-04 Explicit machine computation and programs (not the theory of computation or programming)

17-06 Proceedings, conferences, collections, etc.

17-08 Computational methods

17Axx General nonassociative rings

17A01 General theory

17A05 Power-associative rings

17A15 Noncommutative Jordan algebras

17A20 Flexible algebras

17A30 Algebras satisfying other identities

17A32 Leibniz algebras

17A35 Division algebras

17A36 Automorphisms, derivations, other operators

17A40 Ternary compositions

17A42 Other n-ary compositions ($n \geq 3$)

17A45 Quadratic algebras (but not quadratic Jordan algebras)

17A50 Free algebras

17A60 Structure theory

17A65 Radical theory

17A70 Superalgebras

17A75 Composition algebras

17A80 Valued algebras

17A99 None of the above, but in this section

17Bxx Lie algebras and Lie superalgebras (For Lie groups, see 22Exx)

17B01 Identities, free Lie (super)algebras

17B05 Structure theory

17B08 Coadjoint orbits; nilpotent varieties

17B10 Representations, algebraic theory (weights)

17B15 Representations, analytic theory

17B20 Simple, semisimple, reductive (super)algebras

17B22 Root systems

17B25 Exceptional (super)algebras

17B30 Solvable, nilpotent (super)algebras

17B35 Universal enveloping (super)algebras [See also 16S30]

17B37 Quantum groups (quantized enveloping algebras) and related deformations [See also 16T20, 20G42, 81R50, 82B23]

17B40 Automorphisms, derivations, other operators

17B45 Lie algebras of linear algebraic groups [See also 14Lxx and 20Gxx]

17B50 Modular Lie (super)algebras

17B55 Homological methods in Lie (super)algebras

17B56 Cohomology of Lie (super)algebras

17B60 Lie (super)algebras associated with other structures (associative, Jordan, etc.) [See also 16W10, 17C40, 17C50]

17B62 Lie bialgebras; Lie coalgebras

17B63 Poisson algebras

17B65 Infinite-dimensional Lie (super)algebras [See also 22E65]

17B66 Lie algebras of vector fields and related (super) algebras

17B67 Kac-Moody (super)algebras; extended affine Lie algebras; toroidal Lie algebras

17B68 Virasoro and related algebras

17B69 Vertex operators; vertex operator algebras and related structures

17B70 Graded Lie (super)algebras

17B75 Color Lie (super)algebras

17B80 Applications to integrable systems

17B81 Applications to physics

17B99 None of the above, but in this section

17Cxx Jordan algebras (algebras, triples and pairs)

17C05 Identities and free Jordan structures

17C10 Structure theory

17C17 Radicals

17C20 Simple, semisimple algebras

17C27 Idempotents, Peirce decompositions

17C30 Associated groups, automorphisms

17C36 Associated manifolds

17C37 Associated geometries

17C40 Exceptional Jordan structures

17C50 Jordan structures associated with other structures [See also 16W10]

17C55 Finite-dimensional structures

17C60 Division algebras

17C65 Jordan structures on Banach spaces and algebras [See also 46H70, 46L70]

17C70 Super structures

17C90 Applications to physics

17C99 None of the above, but in this section

17Dxx Other nonassociative rings and algebras

17D05 Alternative rings

17D10 Mal'cev (Mal'tsev) rings and algebras

17D15 Right alternative rings

17D20 (γ, δ)-rings, including $(1, -1)$-rings

17D25 Lie-admissible algebras

17D92 Genetic algebras

17D99 None of the above, but in this section

18-XX Category theory; homological algebra (For commutative rings see 13Dxx, for associative rings 16Exx, for groups 20Jxx, for topological groups and related structures 57Txx; see also 55Nxx and 55Uxx for algebraic topology)

18-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

18-01 Instructional exposition (textbooks, tutorial papers, etc.)

18-02 Research exposition (monographs, survey articles)

18-03 Historical (must also be assigned at least one classification number from Section 01)

18-04 Explicit machine computation and programs (not the theory of computation or programming)

18-06 Proceedings, conferences, collections, etc.

18Axx General theory of categories and functors

18A05 Definitions, generalizations

18A10 Graphs, diagram schemes, precategories [See especially 20L05]

18A15 Foundations, relations to logic and deductive systems [See also 03-XX]

18A20 Epimorphisms, monomorphisms, special classes of morphisms, null morphisms

18A22 Special properties of functors (faithful, full, etc.)

18A23 Natural morphisms, dinatural morphisms

18A25 Functor categories, comma categories

18A30 Limits and colimits (products, sums, directed limits, pushouts, fiber products, equalizers, kernels, ends and coends, etc.)

18A32 Factorization of morphisms, substructures, quotient structures, congruences, amalgams

18A35 Categories admitting limits (complete categories), functors preserving limits, completions

18A40 Adjoint functors (universal constructions, reflective subcategories, Kan extensions, etc.)

18A99 None of the above, but in this section

18Bxx Special categories

18B05 Category of sets, characterizations [See also 03-XX]

18B10 Category of relations, additive relations

18B15 Embedding theorems, universal categories [See also 18E20]

18B20 Categories of machines, automata, operative categories [See also 03D05, 68Qxx]

18B25 Topoi [See also 03G30]

18B30 Categories of topological spaces and continuous mappings [See also 54-XX]

18B35 Preorders, orders and lattices (viewed as categories) [See also 06-XX]

18B40 Groupoids, semigroupoids, semigroups, groups (viewed as categories) [See also 20Axx, 20L05, 20Mxx]

18B99 None of the above, but in this section

18Cxx Categories and theories

18C05 Equational categories [See also 03C05, 08C05]

18C10 Theories (e.g. algebraic theories), structure, and semantics [See also 03G30]

18C15 Triples (= standard construction, monad or triad), algebras for a triple, homology and derived functors for triples [See also 18Gxx]

18C20 Algebras and Kleisli categories associated with monads

18C30 Sketches and generalizations

18C35 Accessible and locally presentable categories

18C50 Categorical semantics of formal languages [See also 68Q55, 68Q65]

18C99 None of the above, but in this section

18Dxx Categories with structure

18D05 Double categories, 2-categories, bicategories and generalizations

18D10 Monoidal categories (= multiplicative categories), symmetric monoidal categories, braided categories [See also 19D23]

18D15 Closed categories (closed monoidal and Cartesian closed categories, etc.)

18D20 Enriched categories (over closed or monoidal categories)

18D25 Strong functors, strong adjunctions

18D30 Fibered categories

18D35 Structured objects in a category (group objects, etc.)

18D50 Operads [See also 55P48]

18D99 None of the above, but in this section

18Exx Abelian categories

18E05 Preadditive, additive categories

18E10 Exact categories, abelian categories

18E15 Grothendieck categories

18E20 Embedding theorems [See also 18B15]

18E25 Derived functors and satellites

18E30 Derived categories, triangulated categories

18E35 Localization of categories

18E40 Torsion theories, radicals [See also 13D30, 16S90]

18E99 None of the above, but in this section

18Fxx Categories and geometry

18F05 Local categories and functors

18F10 Grothendieck topologies [See also 14F20]

18F15 Abstract manifolds and fiber bundles [See also 55Rxx, 57Pxx]

18F20 Presheaves and sheaves [See also 14F05, 32C35, 32L10, 54B40, 55N30]

18F25 Algebraic K-theory and L-theory [See also 11Exx, 11R70, 11S70, 12-XX, 13D15, 14Cxx, 16E20, 19-XX, 46L80, 57R65, 57R67]

18F30 Grothendieck groups [See also 13D15, 16E20, 19Axx]

18F99 None of the above, but in this section

18Gxx Homological algebra [See also 13Dxx, 16Exx, 20Jxx, 55Nxx, 55Uxx, 57Txx]

18G05 Projectives and injectives [See also 13C10, 13C11, 16D40, 16D50]

18G10 Resolutions; derived functors [See also 13D02, 16E05, 18E25]

18G15 Ext and Tor, generalizations, Künneth formula [See also 55U25]

18G20 Homological dimension [See also 13D05, 16E10]

18G25 Relative homological algebra, projective classes

18G30 Simplicial sets, simplicial objects (in a category) [See also 55U10]

18G35 Chain complexes [See also 18E30, 55U15]

18G40 Spectral sequences, hypercohomology [See also 55Txx]

18G50 Nonabelian homological algebra

18G55 Homotopical algebra

18G60 Other (co)homology theories [See also 19D55, 46L80, 58J20, 58J22]

18G99 None of the above, but in this section

19-XX K-theory [See also 16E20, 18F25]

19-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

19-01 Instructional exposition (textbooks, tutorial papers, etc.)

19-02 Research exposition (monographs, survey articles)

19-03 Historical (must also be assigned at least one classification number from Section 01)

19-04 Explicit machine computation and programs (not the theory of computation or programming)

19-06 Proceedings, conferences, collections, etc.

19Axx Grothendieck groups and K_0 [See also 13D15, 18F30]

19A13 Stability for projective modules [See also 13C10]

19A15 Efficient generation

19A22 Frobenius induction, Burnside and representation rings

19A31 K_0 of group rings and orders

19A49 K_0 of other rings

19A99 None of the above, but in this section

19Bxx Whitehead groups and K_1

19B10 Stable range conditions

19B14 Stability for linear groups

19B28 K_1 of group rings and orders [See also 57Q10]

19B37 Congruence subgroup problems [See also 20H05]

19B99 None of the above, but in this section

19Cxx Steinberg groups and K_2

19C09 Central extensions and Schur multipliers

19C20 Symbols, presentations and stability of K_2

19C30 K_2 and the Brauer group

19C40 Excision for K_2

19C99 None of the above, but in this section

19Dxx Higher algebraic K-theory

19D06 Q- and plus-constructions

19D10 Algebraic K-theory of spaces

19D23 Symmetric monoidal categories [See also 18D10]

19D25 Karoubi-Villamayor-Gersten K-theory

19D35 Negative K-theory, NK and Nil

19D45 Higher symbols, Milnor K-theory

19D50 Computations of higher K-theory of rings [See also 13D15, 16E20]

19D55 K-theory and homology; cyclic homology and cohomology [See also 18G60]

19D99 None of the above, but in this section

19Exx K-theory in geometry

19E08 K-theory of schemes [See also 14C35]

19E15 Algebraic cycles and motivic cohomology [See also 14C25, 14C35]

19E20 Relations with cohomology theories [See also 14Fxx]

19E99 None of the above, but in this section

19Fxx K-theory in number theory [See also 11R70, 11S70]

19F05 Generalized class field theory [See also 11G45]

19F15 Symbols and arithmetic [See also 11R37]

19F27 Étale cohomology, higher regulators, zeta and L-functions [See also 11G40, 11R42, 11S40, 14F20, 14G10]

19F99 None of the above, but in this section

19Gxx K-theory of forms [See also 11Exx]

19G05 Stability for quadratic modules

19G12 Witt groups of rings [See also 11E81]

19G24 L-theory of group rings [See also 11E81]

19G38 Hermitian K-theory, relations with K-theory of rings

19G99 None of the above, but in this section

19Jxx Obstructions from topology

19J05 Finiteness and other obstructions in K_0

19J10 Whitehead (and related) torsion

19J25 Surgery obstructions [See also 57R67]

19J35 Obstructions to group actions

19J99 None of the above, but in this section

19Kxx K-theory and operator algebras [See mainly 46L80, and also 46M20]

19K14 K_0 as an ordered group, traces

19K33 EXT and K-homology [See also 55N22]

19K35 Kasparov theory (KK-theory)
[See also 58J22]

19K56 Index theory [See also 58J20, 58J22]

19K99 None of the above, but in this section

**19Lxx Topological K-theory
[See also 55N15, 55R50, 55S25]**

19L10 Riemann-Roch theorems,
Chern characters

19L20 J-homomorphism, Adams operations
[See also 55Q50]

19L41 Connective K-theory, cobordism
[See also 55N22]

19L47 Equivariant K-theory [See also 55N91,
55P91, 55Q91, 55R91, 55S91]

19L50 Twisted K-theory; differential K-theory

19L64 Computations, geometric applications

19L99 None of the above, but in this section

19Mxx Miscellaneous applications of K-theory

19M05 Miscellaneous applications of K-theory

19M99 None of the above, but in this section

20-XX Group theory and generalizations

20-00 General reference works (handbooks,
dictionaries, bibliographies, etc.)

20-01 Instructional exposition
(textbooks, tutorial papers, etc.)

20-02 Research exposition (monographs,
survey articles)

20-03 Historical (must also be assigned at least
one classification number from Section
01)

20-04 Explicit machine computation and pro-
grams (not the theory of computation or
programming)

20-06 Proceedings, conferences, collections,
etc.

20Axx Foundations

20A05 Axiomatics and elementary properties

20A10 Metamathematical considerations
(For word problems, see 20F10)

20A15 Applications of logic to group theory

20A99 None of the above, but in this section

20Bxx Permutation groups

20B05 General theory for finite groups

20B07 General theory for infinite groups

20B10 Characterization theorems

20B15 Primitive groups

20B20 Multiply transitive finite groups

20B22 Multiply transitive infinite groups

20B25 Finite automorphism groups of alge-
braic, geometric, or combinatorial struc-
tures [See also 05Bxx, 12F10, 20G40,
20H30, 51-XX]

20B27 Infinite automorphism groups
[See also 12F10]

20B30 Symmetric groups

20B35 Subgroups of symmetric groups

20B40 Computational methods

20B99 None of the above, but in this section

**20Cxx Representation theory of groups
[See also 19A22 (for representation
rings and Burnside rings)]**

20C05 Group rings of finite groups and their
modules [See also 16S34]

20C07 Group rings of infinite groups and their
modules [See also 16S34]

20C08 Hecke algebras and their representations

20C10 Integral representations of finite groups

20C11 p-adic representations of finite groups

20C12 Integral representations of infinite
groups

20C15 Ordinary representations and characters

20C20 Modular representations and characters

20C25 Projective representations and multipli-
ers

20C30 Representations of finite symmetric
groups

20C32 Representations of infinite symmetric
groups

20C33 Representations of finite groups of Lie
type

20C34 Representations of sporadic groups

20C35 Applications of group representations to
physics

20C40 Computational methods

20C99 None of the above, but in this section

20Dxx   Abstract finite groups

20D05   Finite simple groups and their classification

20D06   Simple groups: alternating groups and groups of Lie type [See also 20Gxx]

20D08   Simple groups: sporadic groups

20D10   Solvable groups, theory of formations, Schunck classes, Fitting classes, π-length, ranks [See also 20F17]

20D15   Nilpotent groups, p-groups

20D20   Sylow subgroups, Sylow properties, π-groups, π-structure

20D25   Special subgroups (Frattini, Fitting, etc.)

20D30   Series and lattices of subgroups

20D35   Subnormal subgroups

20D40   Products of subgroups

20D45   Automorphisms

20D60   Arithmetic and combinatorial problems

20D99   None of the above, but in this section

20Exx   Structure and classification of infinite or finite groups

20E05   Free nonabelian groups

20E06   Free products, free products with amalgamation, Higman-Neumann-Neumann extensions, and generalizations

20E07   Subgroup theorems; subgroup growth

20E08   Groups acting on trees [See also 20F65]

20E10   Quasivarieties and varieties of groups

20E15   Chains and lattices of subgroups, subnormal subgroups [See also 20F22]

20E18   Limits, profinite groups

20E22   Extensions, wreath products, and other compositions [See also 20J05]

20E25   Local properties

20E26   Residual properties and generalizations; residually finite groups

20E28   Maximal subgroups

20E32   Simple groups [See also 20D05]

20E34   General structure theorems

20E36   Automorphisms of infinite groups [For automorphisms of finite groups, see 20D45]

20E42   Groups with a *BN*-pair; buildings [See also 51E24]

20E45   Conjugacy classes

20E99   None of the above, but in this section

20Fxx   Special aspects of infinite or finite groups

20F05   Generators, relations, and presentations

20F06   Cancellation theory; application of van Kampen diagrams [See also 57M05]

20F10   Word problems, other decision problems, connections with logic and automata [See also 03B25, 03D05, 03D40, 06B25, 08A50, 68Q70]

20F11   Groups of finite Morley rank [See also 03C45, 03C60]

20F12   Commutator calculus

20F14   Derived series, central series, and generalizations

20F16   Solvable groups, supersolvable groups [See also 20D10]

20F17   Formations of groups, Fitting classes [See also 20D10]

20F18   Nilpotent groups [See also 20D15]

20F19   Generalizations of solvable and nilpotent groups

20F22   Other classes of groups defined by subgroup chains

20F24   FC-groups and their generalizations

20F28   Automorphism groups of groups [See also 20E36]

20F29   Representations of groups as automorphism groups of algebraic systems

20F34   Fundamental groups and their automorphisms [See also 57M05, 57Sxx]

20F36   Braid groups; Artin groups

20F38   Other groups related to topology or analysis

20F40   Associated Lie structures

20F45   Engel conditions

20F50   Periodic groups; locally finite groups

20F55   Reflection and Coxeter groups [See also 22E40, 51F15]

20F60   Ordered groups [See mainly 06F15]

20F65   Geometric group theory [See also 05C25, 20E08, 57Mxx]

20F67   Hyperbolic groups and nonpositively curved groups

20F69   Asymptotic properties of groups

20F70   Algebraic geometry over groups; equations over groups

20F99 None of the above, but in this section

20Gxx Linear algebraic groups and related topics (For arithmetic theory, see 11E57, 11H56; for geometric theory, see 14Lxx, 22Exx; for other methods in representation theory, see 15A30, 22E45, 22E46, 22E47, 22E50, 22E55)

20G05 Representation theory

20G07 Structure theory

20G10 Cohomology theory

20G15 Linear algebraic groups over arbitrary fields

20G20 Linear algebraic groups over the reals, the complexes, the quaternions

20G25 Linear algebraic groups over local fields and their integers

20G30 Linear algebraic groups over global fields and their integers

20G35 Linear algebraic groups over adèles and other rings and schemes

20G40 Linear algebraic groups over finite fields

20G41 Exceptional groups

20G42 Quantum groups (quantized function algebras) and their representations [See also 16T20, 17B37, 81R50]

20G43 Schur and q-Schur algebras

20G44 Kac-Moody groups

20G45 Applications to physics

20G99 None of the above, but in this section

20Hxx Other groups of matrices [See also 15A30]

20H05 Unimodular groups, congruence subgroups [See also 11F06, 19B37, 22E40, 51F20]

20H10 Fuchsian groups and their generalizations [See also 11F06, 22E40, 30F35, 32Nxx]

20H15 Other geometric groups, including crystallographic groups [See also 51-XX, especially 51F15, and 82D25]

20H20 Other matrix groups over fields

20H25 Other matrix groups over rings

20H30 Other matrix groups over finite fields

20H99 None of the above, but in this section

20Jxx Connections with homological algebra and category theory

20J05 Homological methods in group theory

20J06 Cohomology of groups

20J15 Category of groups

20J99 None of the above, but in this section

20Kxx Abelian groups

20K01 Finite abelian groups [For sumsets, see 11B13 and 11P70]

20K10 Torsion groups, primary groups and generalized primary groups

20K15 Torsion-free groups, finite rank

20K20 Torsion-free groups, infinite rank

20K21 Mixed groups

20K25 Direct sums, direct products, etc.

20K27 Subgroups

20K30 Automorphisms, homomorphisms, endomorphisms, etc.

20K35 Extensions

20K40 Homological and categorical methods

20K45 Topological methods [See also 22A05, 22B05]

20K99 None of the above, but in this section

20Lxx Groupoids (i.e. small categories in which all morphisms are isomorphisms) (For sets with a single binary operation, see 20N02; for topological groupoids, see 22A22, 58H05)

20L05 Groupoids (i.e. small categories in which all morphisms are isomorphisms) (For sets with a single binary operation, see 20N02; for topological groupoids, see 22A22, 58H05)

20L99 None of the above, but in this section

20Mxx Semigroups

20M05 Free semigroups, generators and relations, word problems

20M07 Varieties and pseudovarieties of semigroups

20M10 General structure theory

20M11 Radical theory

20M12 Ideal theory

20M13 Arithmetic theory of monoids

20M14 Commutative semigroups

20M15 Mappings of semigroups

20M17 Regular semigroups

20M18 Inverse semigroups

20M19 Orthodox semigroups

20M20 Semigroups of transformations, etc. [See also 47D03, 47H20, 54H15]

20M25 Semigroup rings, multiplicative semigroups of rings [See also 16S36, 16Y60]

20M30 Representation of semigroups; actions of semigroups on sets

20M32 Algebraic monoids

20M35 Semigroups in automata theory, linguistics, etc. [See also 03D05, 68Q70, 68T50]

20M50 Connections of semigroups with homological algebra and category theory

20M99 None of the above, but in this section

20Nxx Other generalizations of groups

20N02 Sets with a single binary operation (groupoids)

20N05 Loops, quasigroups [See also 05Bxx]

20N10 Ternary systems (heaps, semiheaps, heapoids, etc.)

20N15 n-ary systems ($n \geq 3$)

20N20 Hypergroups

20N25 Fuzzy groups [See also 03E72]

20N99 None of the above, but in this section

20Pxx Probabilistic methods in group theory [See also 60Bxx]

20P05 Probabilistic methods in group theory [See also 60Bxx]

20P99 None of the above, but in this section

22-XX Topological groups, Lie groups (For transformation groups, see 54H15, 57Sxx, 58-XX. For abstract harmonic analysis, see 43-XX)

22-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

22-01 Instructional exposition (textbooks, tutorial papers, etc.)

22-02 Research exposition (monographs, survey articles)

22-03 Historical (must also be assigned at least one classification number from Section 01)

22-04 Explicit machine computation and programs (not the theory of computation or programming)

22-06 Proceedings, conferences, collections, etc.

22Axx Topological and differentiable algebraic systems (For topological rings and fields, see 12Jxx, 13Jxx, 16W80)

22A05 Structure of general topological groups

22A10 Analysis on general topological groups

22A15 Structure of topological semigroups

22A20 Analysis on topological semigroups

22A22 Topological groupoids (including differentiable and Lie groupoids) [See also 58H05]

22A25 Representations of general topological groups and semigroups

22A26 Topological semilattices, lattices and applications [See also 06B30, 06B35, 06F30]

22A30 Other topological algebraic systems and their representations

22A99 None of the above, but in this section

22Bxx Locally compact abelian groups (LCA groups)

22B05 General properties and structure of LCA groups

22B10 Structure of group algebras of LCA groups

22B99 None of the above, but in this section

22Cxx Compact groups

22C05 Compact groups

22C99 None of the above, but in this section

22Dxx Locally compact groups and their algebras

22D05 General properties and structure of locally compact groups

22D10 Unitary representations of locally compact groups

22D12 Other representations of locally compact groups

22D15 Group algebras of locally compact groups

22D20 Representations of group algebras

22D25 C^*-algebras and W^*-algebras in relation to group representations [See also 46Lxx]

22D30 Induced representations

22D35 Duality theorems

22D40 Ergodic theory on groups
[See also 28Dxx]

22D45 Automorphism groups of locally compact groups

22D99 None of the above, but in this section

22Exx Lie groups (For the topology of Lie groups and homogeneous spaces, see 57Sxx, 57Txx; for analysis thereon, see 43A80, 43A85, 43A90)

22E05 Local Lie groups
[See also 34-XX, 35-XX, 58H05]

22E10 General properties and structure of complex Lie groups [See also 32M05]

22E15 General properties and structure of real Lie groups

22E20 General properties and structure of other Lie groups

22E25 Nilpotent and solvable Lie groups

22E27 Representations of nilpotent and solvable Lie groups (special orbital integrals, non-type I representations, etc.)

22E30 Analysis on real and complex Lie groups
[See also 33C80, 43-XX]

22E35 Analysis on p-adic Lie groups

22E40 Discrete subgroups of Lie groups
[See also 20Hxx, 32Nxx]

22E41 Continuous cohomology
[See also 57R32, 57Txx, 58H10]

22E43 Structure and representation of the Lorentz group

22E45 Representations of Lie and linear algebraic groups over real fields: analytic methods (For the purely algebraic theory, see 20G05)

22E46 Semisimple Lie groups and their representations

22E47 Representations of Lie and real algebraic groups: algebraic methods (Verma modules, etc.) [See also 17B10]

22E50 Representations of Lie and linear algebraic groups over local fields
[See also 20G05]

22E55 Representations of Lie and linear algebraic groups over global fields and adèle rings [See also 20G05]

22E57 Geometric Langlands program: representation-theoretic aspects
[See also 14D24]

22E60 Lie algebras of Lie groups (For the algebraic theory of Lie algebras, see 17Bxx)

22E65 Infinite-dimensional Lie groups and their Lie algebras: general properties
[See also 17B65, 58B25, 58H05]

22E66 Analysis on and representations of infinite-dimensional Lie groups

22E67 Loop groups and related constructions, group-theoretic treatment
[See also 58D05]

22E70 Applications of Lie groups to physics; explicit representations [See also 81R05, 81R10]

22E99 None of the above, but in this section

22Fxx Noncompact transformation groups

22F05 General theory of group and pseudogroup actions (For topological properties of spaces with an action, see 57S20)

22F10 Measurable group actions [See also 22D40, 28Dxx, 37Axx]

22F30 Homogeneous spaces (For general actions on manifolds or preserving geometrical structures, see 57M60, 57Sxx; for discrete subgroups of Lie groups, see especially 22E40)

22F50 Groups as automorphisms of other structures

22F99 None of the above, but in this section

26-XX Real functions [See also 54C30]

26-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

26-01 Instructional exposition
(textbooks, tutorial papers, etc.)

26-02 Research exposition (monographs, survey articles)

26-03 Historical (must also be assigned at least one classification number from Section 01)

26-04 Explicit machine computation and programs (not the theory of computation or programming)

26-06 Proceedings, conferences, collections, etc.

26Axx Functions of one variable

26A03 Foundations: limits and generalizations, elementary topology of the line

26A06 One-variable calculus

26A09 Elementary functions

26A12 Rate of growth of functions, orders of infinity, slowly varying functions [See also 26A48]

26A15 Continuity and related questions (modulus of continuity, semicontinuity, discontinuities, etc.) (For properties determined by Fourier coefficients, see 42A16; for those determined by approximation properties, see 41A25, 41A27)

26A16 Lipschitz (Hölder) classes

26A18 Iteration [See also 37Bxx, 37Cxx, 37Exx, 39B12, 47H10, 54H25]

26A21 Classification of real functions; Baire classification of sets and functions [See also 03E15, 28A05, 54C50]

26A24 Differentiation (functions of one variable): general theory, generalized derivatives, mean-value theorems [See also 28A15]

26A27 Nondifferentiability (nondifferentiable functions, points of nondifferentiability), discontinuous derivatives

26A30 Singular functions, Cantor functions, functions with other special properties

26A33 Fractional derivatives and integrals

26A36 Antidifferentiation

26A39 Denjoy and Perron integrals, other special integrals

26A42 Integrals of Riemann, Stieltjes and Lebesgue type [See also 28-XX]

26A45 Functions of bounded variation, generalizations

26A46 Absolutely continuous functions

26A48 Monotonic functions, generalizations

26A51 Convexity, generalizations

26A99 None of the above, but in this section

26Bxx Functions of several variables

26B05 Continuity and differentiation questions

26B10 Implicit function theorems, Jacobians, transformations with several variables

26B12 Calculus of vector functions

26B15 Integration: length, area, volume [See also 28A75, 51M25]

26B20 Integral formulas (Stokes, Gauss, Green, etc.)

26B25 Convexity, generalizations

26B30 Absolutely continuous functions, functions of bounded variation

26B35 Special properties of functions of several variables, Hölder conditions, etc.

26B40 Representation and superposition of functions

26B99 None of the above, but in this section

26Cxx Polynomials, rational functions

26C05 Polynomials: analytic properties, etc. [See also 12Dxx, 12Exx]

26C10 Polynomials: location of zeros [See also 12D10, 30C15, 65H05]

26C15 Rational functions [See also 14Pxx]

26C99 None of the above, but in this section

26Dxx Inequalities (For maximal function inequalities, see 42B25; for functional inequalities, see 39B72; for probabilistic inequalities, see 60E15)

26D05 Inequalities for trigonometric functions and polynomials

26D07 Inequalities involving other types of functions

26D10 Inequalities involving derivatives and differential and integral operators

26D15 Inequalities for sums, series and integrals

26D20 Other analytical inequalities

26D99 None of the above, but in this section

26Exx Miscellaneous topics [See also 58Cxx]

26E05 Real-analytic functions [See also 32B05, 32C05]

26E10 C^∞-functions, quasi-analytic functions [See also 58C25]

26E15 Calculus of functions on infinite-dimensional spaces [See also 46G05, 58Cxx]

26E20 Calculus of functions taking values in infinite-dimensional spaces [See also 46E40, 46G10, 58Cxx]

26E25 Set-valued functions [See also 28B20, 54C60] (For nonsmooth analysis, see 49J52, 58Cxx, 90Cxx)

26E30 Non-Archimedean analysis [See also 12J25]

26E35 Nonstandard analysis
[See also 03H05, 28E05, 54J05]

26E40 Constructive real analysis
[See also 03F60]

26E50 Fuzzy real analysis
[See also 03E72, 28E10]

26E60 Means [See also 47A64]

26E70 Real analysis on time scales or measure chains (For dynamic equations on time scales or measure chains see 34N05)

26E99 None of the above, but in this section

28-XX Measure and integration (For analysis on manifolds, see 58-XX)

28-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

28-01 Instructional exposition (textbooks, tutorial papers, etc.)

28-02 Research exposition (monographs, survey articles)

28-03 Historical (must also be assigned at least one classification number from Section 01)

28-04 Explicit machine computation and programs (not the theory of computation or programming)

28-06 Proceedings, conferences, collections, etc.

28Axx Classical measure theory

28A05 Classes of sets (Borel fields, σ-rings, etc.), measurable sets, Suslin sets, analytic sets [See also 03E15, 26A21, 54H05]

28A10 Real- or complex-valued set functions

28A12 Contents, measures, outer measures, capacities

28A15 Abstract differentiation theory, differentiation of set functions [See also 26A24]

28A20 Measurable and nonmeasurable functions, sequences of measurable functions, modes of convergence

28A25 Integration with respect to measures and other set functions

28A33 Spaces of measures, convergence of measures [See also 46E27, 60Bxx]

28A35 Measures and integrals in product spaces

28A50 Integration and disintegration of measures

28A51 Lifting theory [See also 46G15]

28A60 Measures on Boolean rings, measure algebras [See also 54H10]

28A75 Length, area, volume, other geometric measure theory [See also 26B15, 49Q15]

28A78 Hausdorff and packing measures

28A80 Fractals [See also 37Fxx]

28A99 None of the above, but in this section

28Bxx Set functions, measures and integrals with values in abstract spaces

28B05 Vector-valued set functions, measures and integrals [See also 46G10]

28B10 Group- or semigroup-valued set functions, measures and integrals

28B15 Set functions, measures and integrals with values in ordered spaces

28B20 Set-valued set functions and measures; integration of set-valued functions; measurable selections [See also 26E25, 54C60, 54C65, 91B14]

28B99 None of the above, but in this section

28Cxx Set functions and measures on spaces with additional structure [See also 46G12, 58C35, 58D20]

28C05 Integration theory via linear functionals (Radon measures, Daniell integrals, etc.), representing set functions and measures

28C10 Set functions and measures on topological groups or semigroups, Haar measures, invariant measures [See also 22Axx, 43A05]

28C15 Set functions and measures on topological spaces (regularity of measures, etc.)

28C20 Set functions and measures and integrals in infinite-dimensional spaces (Wiener measure, Gaussian measure, etc.) [See also 46G12, 58C35, 58D20, 60B11]

28C99 None of the above, but in this section

28Dxx Measure-theoretic ergodic theory [See also 11K50, 11K55, 22D40, 37Axx, 47A35, 54H20, 60Fxx, 60G10]

28D05 Measure-preserving transformations

28D10 One-parameter continuous families of measure-preserving transformations

28D15 General groups of measure-preserving transformations

28D20 Entropy and other invariants

28D99 None of the above, but in this section

28Exx Miscellaneous topics in measure theory

28E05 Nonstandard measure theory
[See also 03H05, 26E35]

28E10 Fuzzy measure theory
[See also 03E72, 26E50, 94D05]

28E15 Other connections with logic and set theory

28E99 None of the above, but in this section

30-XX Functions of a complex variable (For analysis on manifolds, see 58-XX)

30-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

30-01 Instructional exposition (textbooks, tutorial papers, etc.)

30-02 Research exposition (monographs, survey articles)

30-03 Historical (must also be assigned at least one classification number from Section 01)

30-04 Explicit machine computation and programs (not the theory of computation or programming)

30-06 Proceedings, conferences, collections, etc.

30Axx General properties

30A05 Monogenic properties of complex functions (including polygenic and areolar monogenic functions)

30A10 Inequalities in the complex domain

30A99 None of the above, but in this section

30Bxx Series expansions

30B10 Power series (including lacunary series)

30B20 Random power series

30B30 Boundary behavior of power series, over-convergence

30B40 Analytic continuation

30B50 Dirichlet series and other series expansions, exponential series
[See also 11M41, 42-XX]

30B60 Completeness problems, closure of a system of functions

30B70 Continued fractions
[See also 11A55, 40A15]

30B99 None of the above, but in this section

30Cxx Geometric function theory

30C10 Polynomials

30C15 Zeros of polynomials, rational functions, and other analytic functions (e.g. zeros of functions with bounded Dirichlet integral) (For algebraic theory, see 12D10; for real methods, see 26C10)

30C20 Conformal mappings of special domains

30C25 Covering theorems in conformal mapping theory

30C30 Numerical methods in conformal mapping theory [See also 65E05]

30C35 General theory of conformal mappings

30C40 Kernel functions and applications

30C45 Special classes of univalent and multivalent functions (starlike, convex, bounded rotation, etc.)

30C50 Coefficient problems for univalent and multivalent functions

30C55 General theory of univalent and multivalent functions

30C62 Quasiconformal mappings in the plane

30C65 Quasiconformal mappings in $\mathbf{R}^n$, other generalizations

30C70 Extremal problems for conformal and quasiconformal mappings, variational methods

30C75 Extremal problems for conformal and quasiconformal mappings, other methods

30C80 Maximum principle; Schwarz's lemma, Lindelöf principle, analogues and generalizations; subordination

30C85 Capacity and harmonic measure in the complex plane [See also 31A15]

30C99 None of the above, but in this section

30Dxx Entire and meromorphic functions, and related topics

30D05 Functional equations in the complex domain, iteration and composition of analytic functions [See also 34Mxx, 37Fxx, 39-XX]

30D10 Representations of entire functions by series and integrals

30D15 Special classes of entire functions and growth estimates

30D20 Entire functions, general theory

30D30 Meromorphic functions, general theory

30D35 Distribution of values, Nevanlinna theory

30D40 Cluster sets, prime ends, boundary behavior

30D45 Bloch functions, normal functions, normal families

30D60 Quasi-analytic and other classes of functions

30D99 None of the above, but in this section

30Exx Miscellaneous topics of analysis in the complex domain

30E05 Moment problems, interpolation problems

30E10 Approximation in the complex domain

30E15 Asymptotic representations in the complex domain

30E20 Integration, integrals of Cauchy type, integral representations of analytic functions [See also 45Exx]

30E25 Boundary value problems [See also 45Exx]

30E99 None of the above, but in this section

30Fxx Riemann surfaces

30F10 Compact Riemann surfaces and uniformization [See also 14H15, 32G15]

30F15 Harmonic functions on Riemann surfaces

30F20 Classification theory of Riemann surfaces

30F25 Ideal boundary theory

30F30 Differentials on Riemann surfaces

30F35 Fuchsian groups and automorphic functions [See also 11Fxx, 20H10, 22E40, 32Gxx, 32Nxx]

30F40 Kleinian groups [See also 20H10]

30F45 Conformal metrics (hyperbolic, Poincaré, distance functions)

30F50 Klein surfaces

30F60 Teichmüller theory [See also 32G15]

30F99 None of the above, but in this section

30Gxx Generalized function theory

30G06 Non-Archimedean function theory [See also 12J25]; nonstandard function theory [See also 03H05]

30G12 Finely holomorphic functions and topological function theory

30G20 Generalizations of Bers or Vekua type (pseudoanalytic, p-analytic, etc.)

30G25 Discrete analytic functions

30G30 Other generalizations of analytic functions
(including abstract-valued functions)

30G35 Functions of hypercomplex variables and generalized variables

30G99 None of the above, but in this section

30Hxx Spaces and algebras of analytic functions

30H05 Bounded analytic functions

30H10 Hardy spaces

30H15 Nevanlinna class and Smirnov class

30H20 Bergman spaces, Fock spaces

30H25 Besov spaces and Q_p-spaces

30H30 Bloch spaces

30H35 BMO-spaces

30H50 Algebras of analytic functions

30H80 Corona theorems

30H99 None of the above, but in this section

30Jxx Function theory on the disc

30J05 Inner functions

30J10 Blaschke products

30J15 Singular inner functions

30J99 None of the above, but in this section

30Kxx Universal holomorphic functions

30K05 Universal Taylor series

30K10 Universal Dirichlet series

30K15 Bounded universal functions

30K20 Compositional universality

30K99 None of the above, but in this section

30Lxx Analysis on metric spaces

30L05 Geometric embeddings of metric spaces

30L10 Quasiconformal mappings in metric spaces

30L99 None of the above, but in this section

31-XX Potential theory (For probabilistic potential theory, see 60J45)

31-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

31-01 Instructional exposition (textbooks, tutorial papers, etc.)

31-02 Research exposition (monographs, survey articles)

31-03 Historical (must also be assigned at least one classification number from Section 01)

31-04 Explicit machine computation and programs (not the theory of computation or programming)

31-06 Proceedings, conferences, collections, etc.

31Axx Two-dimensional theory

31A05 Harmonic, subharmonic, superharmonic functions

31A10 Integral representations, integral operators, integral equations methods

31A15 Potentials and capacity, harmonic measure, extremal length [See also 30C85]

31A20 Boundary behavior (theorems of Fatou type, etc.)

31A25 Boundary value and inverse problems

31A30 Biharmonic, polyharmonic functions and equations, Poisson's equation

31A35 Connections with differential equations

31A99 None of the above, but in this section

31Bxx Higher-dimensional theory

31B05 Harmonic, subharmonic, superharmonic functions

31B10 Integral representations, integral operators, integral equations methods

31B15 Potentials and capacities, extremal length

31B20 Boundary value and inverse problems

31B25 Boundary behavior

31B30 Biharmonic and polyharmonic equations and functions

31B35 Connections with differential equations

31B99 None of the above, but in this section

31Cxx Other generalizations

31C05 Harmonic, subharmonic, superharmonic functions

31C10 Pluriharmonic and plurisubharmonic functions [See also 32U05]

31C12 Potential theory on Riemannian manifolds [See also 53C20; for Hodge theory, see 58A14]

31C15 Potentials and capacities

31C20 Discrete potential theory and numerical methods

31C25 Dirichlet spaces

31C35 Martin boundary theory [See also 60J50]

31C40 Fine potential theory

31C45 Other generalizations (nonlinear potential theory, etc.)

31C99 None of the above, but in this section

31Dxx Axiomatic potential theory

31D05 Axiomatic potential theory

31D99 None of the above, but in this section

31Exx Potential theory on metric spaces

31E05 Potential theory on metric spaces

31E99 None of the above, but in this section

32-XX Several complex variables and analytic spaces (For infinite-dimensional holomorphy, see 46G20, 58B12)

32-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

32-01 Instructional exposition (textbooks, tutorial papers, etc.)

32-02 Research exposition (monographs, survey articles)

32-03 Historical (must also be assigned at least one classification number from Section 01)

32-04 Explicit machine computation and programs (not the theory of computation or programming)

32-06 Proceedings, conferences, collections, etc.

32Axx Holomorphic functions of several complex variables

32A05 Power series, series of functions

32A07 Special domains (Reinhardt, Hartogs, circular, tube)

32A10 Holomorphic functions

32A12 Multifunctions

32A15 Entire functions

32A17 Special families of functions

32A18 Bloch functions, normal functions

32A19 Normal families of functions, mappings

32A20 Meromorphic functions

32A22 Nevanlinna theory (local); growth estimates; other inequalities (For geometric theory, see 32H25, 32H30)

32A25 Integral representations; canonical kernels (Szegő, Bergman, etc.)

32A26 Integral representations, constructed kernels (e.g. Cauchy, Fantappiè-type kernels)

32A27 Local theory of residues [See also 32C30]

32A30 Other generalizations of function theory of one complex variable (should also be assigned at least one classification number from Section 30) (For functions of several hypercomplex variables, see 30G35)

32A35 H^p-spaces, Nevanlinna spaces [See also 32M15, 42B30, 43A85, 46J15]

32A36 Bergman spaces

32A37 Other spaces of holomorphic functions (e.g. bounded mean oscillation (BMOA), vanishing mean oscillation (VMOA)) [See also 46Exx]

32A38 Algebras of holomorphic functions [See also 30H05, 46J10, 46J15]

32A40 Boundary behavior of holomorphic functions

32A45 Hyperfunctions [See also 46F15]

32A50 Harmonic analysis of several complex variables [See mainly 43-XX]

32A55 Singular integrals

32A60 Zero sets of holomorphic functions

32A65 Banach algebra techniques [See mainly 46Jxx]

32A70 Functional analysis techniques [See mainly 46Exx]

32A99 None of the above, but in this section

32Bxx Local analytic geometry [See also 13-XX and 14-XX]

32B05 Analytic algebras and generalizations, preparation theorems

32B10 Germs of analytic sets, local parametrization

32B15 Analytic subsets of affine space

32B20 Semi-analytic sets and subanalytic sets [See also 14P15]

32B25 Triangulation and related questions

32B99 None of the above, but in this section

32Cxx Analytic spaces

32C05 Real-analytic manifolds, real-analytic spaces [See also 14Pxx, 58A07]

32C07 Real-analytic sets, complex Nash functions [See also 14P15, 14P20]

32C09 Embedding of real analytic manifolds

32C11 Complex supergeometry [See also 14A22, 14M30, 58A50]

32C15 Complex spaces

32C18 Topology of analytic spaces

32C20 Normal analytic spaces

32C22 Embedding of analytic spaces

32C25 Analytic subsets and submanifolds

32C30 Integration on analytic sets and spaces, currents (For local theory, see 32A25 or 32A27)

32C35 Analytic sheaves and cohomology groups [See also 14Fxx, 18F20, 55N30]

32C36 Local cohomology of analytic spaces

32C37 Duality theorems

32C38 Sheaves of differential operators and their modules, D-modules [See also 14F10, 16S32, 35A27, 58J15]

32C55 The Levi problem in complex spaces; generalizations

32C81 Applications to physics

32C99 None of the above, but in this section

32Dxx Analytic continuation

32D05 Domains of holomorphy

32D10 Envelopes of holomorphy

32D15 Continuation of analytic objects

32D20 Removable singularities

32D26 Riemann domains

32D99 None of the above, but in this section

32Exx Holomorphic convexity

32E05 Holomorphically convex complex spaces, reduction theory

32E10 Stein spaces, Stein manifolds

32E20 Polynomial convexity

32E30 Holomorphic and polynomial approximation, Runge pairs, interpolation

32E35 Global boundary behavior of holomorphic functions

32E40 The Levi problem

32E99 None of the above, but in this section

32Fxx Geometric convexity

32F10 q-convexity, q-concavity

32F17 Other notions of convexity

32F18 Finite-type conditions

32F27 Topological consequences of geometric convexity

32F32 Analytical consequences of geometric convexity
(vanishing theorems, etc.)

32F45 Invariant metrics and pseudodistances

32F99 None of the above, but in this section

32Gxx Deformations of analytic structures

32G05 Deformations of complex structures
[See also 13D10, 16S80, 58H10, 58H15]

32G07 Deformations of special (e.g. CR) structures

32G08 Deformations of fiber bundles

32G10 Deformations of submanifolds and subspaces

32G13 Analytic moduli problems (For algebraic moduli problems, see 14D20, 14D22, 14H10, 14J10) [See also 14H15, 14J15]

32G15 Moduli of Riemann surfaces, Teichmüller theory [See also 14H15, 30Fxx]

32G20 Period matrices, variation of Hodge structure; degenerations
[See also 14D05, 14D07, 14K30]

32G34 Moduli and deformations for ordinary differential equations (e.g. Knizhnik-Zamolodchikov equation)
[See also 34Mxx]

32G81 Applications to physics

32G99 None of the above, but in this section

32Hxx Holomorphic mappings and correspondences

32H02 Holomorphic mappings, (holomorphic) embeddings and related questions

32H04 Meromorphic mappings

32H12 Boundary uniqueness of mappings

32H25 Picard-type theorems and generalizations (For function-theoretic properties, see 32A22)

32H30 Value distribution theory in higher dimensions (For function-theoretic properties, see 32A22)

32H35 Proper mappings, finiteness theorems

32H40 Boundary regularity of mappings

32H50 Iteration problems

32H99 None of the above, but in this section

32Jxx Compact analytic spaces (For Riemann surfaces, see 14Hxx, 30Fxx; for algebraic theory, see 14Jxx)

32J05 Compactification of analytic spaces

32J10 Algebraic dependence theorems

32J15 Compact surfaces

32J17 Compact 3-folds

32J18 Compact n-folds

32J25 Transcendental methods of algebraic geometry [See also 14C30]

32J27 Compact Kähler manifolds: generalizations, classification

32J81 Applications to physics

32J99 None of the above, but in this section

32Kxx Generalizations of analytic spaces (should also be assigned at least one other classification number from Section 32 describing the type of problem)

32K05 Banach analytic spaces [See also 58Bxx]

32K07 Formal and graded complex spaces
[See also 58C50]

32K15 Differentiable functions on analytic spaces, differentiable spaces
[See also 58C25]

32K99 None of the above, but in this section

**32Lxx Holomorphic fiber spaces
[See also 55Rxx]**

32L05 Holomorphic bundles and generalizations

32L10 Sheaves and cohomology of sections of holomorphic vector bundles, general results [See also 14F05, 18F20, 55N30]

32L15 Bundle convexity [See also 32F10]

32L20 Vanishing theorems

32L25 Twistor theory, double fibrations [See also 53C28]

32L81 Applications to physics

32L99 None of the above, but in this section

32Mxx Complex spaces with a group of automorphisms

32M05 Complex Lie groups, automorphism groups acting on complex spaces [See also 22E10]

32M10 Homogeneous complex manifolds [See also 14M17, 57T15]

32M12 Almost homogeneous manifolds and spaces [See also 14M17]

32M15 Hermitian symmetric spaces, bounded symmetric domains, Jordan algebras [See also 22E10, 22E40, 53C35, 57T15]

32M17 Automorphism groups of $\mathbf{C}^n$ and affine manifolds

32M25 Complex vector fields

32M99 None of the above, but in this section

32Nxx Automorphic functions [See also 11Fxx, 20H10, 22E40, 30F35]

32N05 General theory of automorphic functions of several complex variables

32N10 Automorphic forms

32N15 Automorphic functions in symmetric domains

32N99 None of the above, but in this section

32Pxx Non-Archimedean analysis (should also be assigned at least one other classification number from Section 32 describing the type of problem)

32P05 Non-Archimedean analysis (should also be assigned at least one other classification number from Section 32 describing the type of problem)

32P99 None of the above, but in this section

32Qxx Complex manifolds

32Q05 Negative curvature manifolds

32Q10 Positive curvature manifolds

32Q15 Kähler manifolds

32Q20 Kähler-Einstein manifolds [See also 53Cxx]

32Q25 Calabi-Yau theory [See also 14J30]

32Q26 Notions of stability

32Q28 Stein manifolds

32Q30 Uniformization

32Q35 Complex manifolds as subdomains of Euclidean space

32Q40 Embedding theorems

32Q45 Hyperbolic and Kobayashi hyperbolic manifolds

32Q55 Topological aspects of complex manifolds

32Q57 Classification theorems

32Q60 Almost complex manifolds

32Q65 Pseudoholomorphic curves

32Q99 None of the above, but in this section

32Sxx Singularities [See also 58Kxx]

32S05 Local singularities [See also 14J17]

32S10 Invariants of analytic local rings

32S15 Equisingularity (topological and analytic) [See also 14E15]

32S20 Global theory of singularities; cohomological properties [See also 14E15]

32S22 Relations with arrangements of hyperplanes [See also 52C35]

32S25 Surface and hypersurface singularities [See also 14J17]

32S30 Deformations of singularities; vanishing cycles [See also 14B07]

32S35 Mixed Hodge theory of singular varieties [See also 14C30, 14D07]

32S40 Monodromy; relations with differential equations and D-modules

32S45 Modifications; resolution of singularities [See also 14E15]

32S50 Topological aspects: Lefschetz theorems, topological classification, invariants

32S55 Milnor fibration; relations with knot theory [See also 57M25, 57Q45]

32S60 Stratifications; constructible sheaves; intersection cohomology [See also 58Kxx]

32S65 Singularities of holomorphic vector fields and foliations

32S70 Other operations on singularities

32S99 None of the above, but in this section

32Txx Pseudoconvex domains

32T05 Domains of holomorphy

32T15 Strongly pseudoconvex domains

32T20 Worm domains

32T25 Finite type domains

32T27 Geometric and analytic invariants on weakly pseudoconvex boundaries

32T35 Exhaustion functions

32T40 Peak functions

32T99 None of the above, but in this section

32Uxx Pluripotential theory

32U05 Plurisubharmonic functions and generalizations [See also 31C10]

32U10 Plurisubharmonic exhaustion functions

32U15 General pluripotential theory

32U20 Capacity theory and generalizations

32U25 Lelong numbers

32U30 Removable sets

32U35 Pluricomplex Green functions

32U40 Currents

32U99 None of the above, but in this section

32Vxx CR manifolds

32V05 CR structures, CR operators, and generalizations

32V10 CR functions

32V15 CR manifolds as boundaries of domains

32V20 Analysis on CR manifolds

32V25 Extension of functions and other analytic objects from CR manifolds

32V30 Embeddings of CR manifolds

32V35 Finite type conditions on CR manifolds

32V40 Real submanifolds in complex manifolds

32V99 None of the above, but in this section

32Wxx Differential operators in several variables

32W05 $\bar{\partial}$ and $\bar{\partial}$-Neumann operators

32W10 $\bar{\partial}_b$ and $\bar{\partial}_b$-Neumann operators

32W20 Complex Monge-Ampère operators

32W25 Pseudodifferential operators in several complex variables

32W30 Heat kernels in several complex variables

32W50 Other partial differential equations of complex analysis

32W99 None of the above, but in this section

33-XX Special functions (33-XX deals with the properties of functions as functions) (For orthogonal functions, see 42Cxx; for aspects of combinatorics see 05Axx; for number-theoretic aspects see 11-XX; for representation theory see 22Exx)

33-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

33-01 Instructional exposition (textbooks, tutorial papers, etc.)

33-02 Research exposition (monographs, survey articles)

33-03 Historical (must also be assigned at least one classification number from Section 01)

33-04 Explicit machine computation and programs (not the theory of computation or programming)

33-06 Proceedings, conferences, collections, etc.

33Bxx Elementary classical functions

33B10 Exponential and trigonometric functions

33B15 Gamma, beta and polygamma functions

33B20 Incomplete beta and gamma functions (error functions, probability integral, Fresnel integrals)

33B30 Higher logarithm functions

33B99 None of the above, but in this section

33Cxx Hypergeometric functions

33C05 Classical hypergeometric functions, $_2F_1$

33C10 Bessel and Airy functions, cylinder functions, $_0F_1$

33C15 Confluent hypergeometric functions, Whittaker functions, $_1F_1$

33C20 Generalized hypergeometric series, $_pF_q$

33C45 Orthogonal polynomials and functions of hypergeometric type (Jacobi, Laguerre, Hermite, Askey scheme, etc.) [See also 42C05 for general orthogonal polynomials and functions]

33C47 Other special orthogonal polynomials and functions

33C50 Orthogonal polynomials and functions in several variables expressible in terms of special functions in one variable

33C52 Orthogonal polynomials and functions associated with root systems

33C55 Spherical harmonics

33C60 Hypergeometric integrals and functions defined by them (E, G, H and I functions)

33C65 Appell, Horn and Lauricella functions

33C67 Hypergeometric functions associated with root systems

33C70 Other hypergeometric functions and integrals in several variables

33C75 Elliptic integrals as hypergeometric functions

33C80 Connections with groups and algebras, and related topics

33C90 Applications

33C99 None of the above, but in this section

33Dxx Basic hypergeometric functions

33D05 q-gamma functions, q-beta functions and integrals

33D15 Basic hypergeometric functions in one variable, $_r\phi_s$

33D45 Basic orthogonal polynomials and functions (Askey-Wilson polynomials, etc.)

33D50 Orthogonal polynomials and functions in several variables expressible in terms of basic hypergeometric functions in one variable

33D52 Basic orthogonal polynomials and functions associated with root systems (Macdonald polynomials, etc.)

33D60 Basic hypergeometric integrals and functions defined by them

33D65 Bibasic functions and multiple bases

33D67 Basic hypergeometric functions associated with root systems

33D70 Other basic hypergeometric functions and integrals in several variables

33D80 Connections with quantum groups, Chevalley groups, p-adic groups, Hecke algebras, and related topics

33D90 Applications

33D99 None of the above, but in this section

33Exx Other special functions

33E05 Elliptic functions and integrals

33E10 Lamé, Mathieu, and spheroidal wave functions

33E12 Mittag-Leffler functions and generalizations

33E15 Other wave functions

33E17 Painlevé-type functions

33E20 Other functions defined by series and integrals

33E30 Other functions coming from differential, difference and integral equations

33E50 Special functions in characteristic p (gamma functions, etc.)

33E99 None of the above, but in this section

33Fxx Computational aspects

33F05 Numerical approximation and evaluation [See also 65D20]

33F10 Symbolic computation (Gosper and Zeilberger algorithms, etc.) [See also 68W30]

33F99 None of the above, but in this section

34-XX Ordinary differential equations

34-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

34-01 Instructional exposition (textbooks, tutorial papers, etc.)

34-02 Research exposition (monographs, survey articles)

34-03 Historical (must also be assigned at least one classification number from Section 01)

34-04 Explicit machine computation and programs (not the theory of computation or programming)

34-06 Proceedings, conferences, collections, etc.

34Axx General theory

34A05 Explicit solutions and reductions

34A07 Fuzzy differential equations

34A08 Fractional differential equations

34A09 Implicit equations, differential-algebraic equations [See also 65L80]

34A12 Initial value problems, existence, uniqueness, continuous dependence and continuation of solutions

34A25 Analytical theory: series, transformations, transforms, operational calculus, etc. [See also 44-XX]

34A26 Geometric methods in differential equations

34A30 Linear equations and systems, general

34A33 Lattice differential equations

34A34 Nonlinear equations and systems, general

34A35 Differential equations of infinite order

34A36 Discontinuous equations

34A37 Differential equations with impulses

34A38 Hybrid systems

34A40 Differential inequalities [See also 26D20]

34A45 Theoretical approximation of solutions (For numerical analysis, see 65Lxx)

34A55 Inverse problems

34A60 Differential inclusions [See also 49J21, 49K21]

34A99 None of the above, but in this section

34Bxx Boundary value problems (For ordinary differential operators, see 34Lxx)

34B05 Linear boundary value problems

34B07 Linear boundary value problems with nonlinear dependence on the spectral parameter

34B08 Parameter dependent boundary value problems

34B09 Boundary eigenvalue problems

34B10 Nonlocal and multipoint boundary value problems

34B15 Nonlinear boundary value problems

34B16 Singular nonlinear boundary value problems

34B18 Positive solutions of nonlinear boundary value problems

34B20 Weyl theory and its generalizations

34B24 Sturm-Liouville theory [See also 34Lxx]

34B27 Green functions

34B30 Special equations (Mathieu, Hill, Bessel, etc.)

34B37 Boundary value problems with impulses

34B40 Boundary value problems on infinite intervals

34B45 Boundary value problems on graphs and networks

34B60 Applications

34B99 None of the above, but in this section

34Cxx Qualitative theory [See also 37-XX]

34C05 Location of integral curves, singular points, limit cycles

34C07 Theory of limit cycles of polynomial and analytic vector fields (existence, uniqueness, bounds, Hilbert's 16th problem and ramifications)

34C08 Connections with real algebraic geometry (fewnomials, desingularization, zeros of Abelian integrals, etc.)

34C10 Oscillation theory, zeros, disconjugacy and comparison theory

34C11 Growth, boundedness

34C12 Monotone systems

34C14 Symmetries, invariants

34C15 Nonlinear oscillations, coupled oscillators

34C20 Transformation and reduction of equations and systems, normal forms

34C23 Bifurcation [See also 37Gxx]

34C25 Periodic solutions

34C26 Relaxation oscillations

34C27 Almost and pseudo-almost periodic solutions

34C28 Complex behavior, chaotic systems [See also 37Dxx]

34C29 Averaging method

34C37 Homoclinic and heteroclinic solutions

34C40 Equations and systems on manifolds

34C41 Equivalence, asymptotic equivalence

34C45 Invariant manifolds

34C46 Multifrequency systems

34C55 Hysteresis

34C60 Qualitative investigation and simulation of models

34C99 None of the above, but in this section

34Dxx Stability theory [See also 37C75, 93Dxx]

34D05 Asymptotic properties

34D06 Synchronization

34D08 Characteristic and Lyapunov exponents

34D09 Dichotomy, trichotomy

34D10 Perturbations

34D15 Singular perturbations

34D20 Stability

34D23 Global stability

34D30 Structural stability and analogous concepts [See also 37C20]

34D35 Stability of manifolds of solutions

34D45 Attractors [See also 37C70, 37D45]

34D99 None of the above, but in this section

34Exx Asymptotic theory

34E05 Asymptotic expansions

34E10 Perturbations, asymptotics

34E13 Multiple scale methods

34E15 Singular perturbations, general theory

34E17 Canard solutions

34E18 Methods of nonstandard analysis

34E20 Singular perturbations, turning point theory, WKB methods

34E99 None of the above, but in this section

34Fxx Equations and systems with randomness [See also 34K50, 60H10, 93E03]

34F05 Equations and systems with randomness [See also 34K50, 60H10, 93E03]

34F10 Bifurcation

34F15 Resonance phenomena

34F99 None of the above, but in this section

34Gxx Differential equations in abstract spaces [See also 34Lxx, 37Kxx, 47Dxx, 47Hxx, 47Jxx, 58D25]

34G10 Linear equations [See also 47D06, 47D09]

34G20 Nonlinear equations [See also 47Hxx, 47Jxx]

34G25 Evolution inclusions

34G99 None of the above, but in this section

34Hxx Control problems [See also 49J15, 49K15, 93C15]

34H05 Control problems [See also 49J15, 49K15, 93C15]

34H10 Chaos control

34H15 Stabilization

34H20 Bifurcation control

34H99 None of the above, but in this section

34Kxx Functional-differential and differential-difference equations [See also 37-XX]

34K05 General theory

34K06 Linear functional-differential equations

34K07 Theoretical approximation of solutions

34K08 Spectral theory of functional-differential operators

34K09 Functional-differential inclusions

34K10 Boundary value problems

34K11 Oscillation theory

34K12 Growth, boundedness, comparison of solutions

34K13 Periodic solutions

34K14 Almost and pseudo-periodic solutions

34K17 Transformation and reduction of equations and systems, normal forms

34K18 Bifurcation theory

34K19 Invariant manifolds

34K20 Stability theory

34K21 Stationary solutions

34K23 Complex (chaotic) behavior of solutions

34K25 Asymptotic theory

34K26 Singular perturbations

34K27 Perturbations

34K28 Numerical approximation of solutions

34K29 Inverse problems

34K30 Equations in abstract spaces [See also 34Gxx, 35R09, 35R10, 47Jxx]

34K31 Lattice functional-differential equations

34K32 Implicit equations

34K33 Averaging

34K34 Hybrid systems

34K35 Control problems [See also 49J21, 49K21, 93C23]

34K36 Fuzzy functional-differential equations

34K37 Functional-differential equations with fractional derivatives

34K38 Functional-differential inequalities

34K40 Neutral equations

34K45 Equations with impulses

34K50 Stochastic functional-differential equations [See also , 60Hxx]

34K60 Qualitative investigation and simulation of models

34K99 None of the above, but in this section

34Lxx Ordinary differential operators [See also 47E05]

34L05 General spectral theory

34L10 Eigenfunctions, eigenfunction expansions, completeness of eigenfunctions

34L15 Eigenvalues, estimation of eigenvalues, upper and lower bounds

34L16 Numerical approximation of eigenvalues and of other parts of the spectrum

34L20 Asymptotic distribution of eigenvalues, asymptotic theory of eigenfunctions

34L25 Scattering theory, inverse scattering

34L30 Nonlinear ordinary differential operators

34L40 Particular operators (Dirac, one-dimensional Schrödinger, etc.)

34L99 None of the above, but in this section

34Mxx Differential equations in the complex domain [See also 30Dxx, 32G34]

34M03 Linear equations and systems

34M05 Entire and meromorphic solutions

34M10 Oscillation, growth of solutions

34M15 Algebraic aspects (differential-algebraic, hypertranscendence, group-theoretical)

34M25 Formal solutions, transform techniques

34M30 Asymptotics, summation methods

34M35 Singularities, monodromy, local behavior of solutions, normal forms

34M40 Stokes phenomena and connection problems (linear and nonlinear)

34M45 Differential equations on complex manifolds

34M50 Inverse problems (Riemann-Hilbert, inverse differential Galois, etc.)

34M55 Painlevé and other special equations; classification, hierarchies;

34M56 Isomonodromic deformations

34M60 Singular perturbation problems in the complex domain (complex WKB, turning points, steepest descent) [See also 34E20]

34M99 None of the above, but in this section

34Nxx Dynamic equations on time scales or measure chains (For real analysis on time scales see 26E70)

34N05 Dynamic equations on time scales or measure chains (For real analysis on time scales or measure chains, see 26E70)

34N99 None of the above, but in this section

35-XX Partial differential equations

35-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

35-01 Instructional exposition (textbooks, tutorial papers, etc.)

35-02 Research exposition (monographs, survey articles)

35-03 Historical (must also be assigned at least one classification number from Section 01)

35-04 Explicit machine computation and programs (not the theory of computation or programming)

35-06 Proceedings, conferences, collections, etc.

35Axx General topics

35A01 Existence problems: global existence, local existence, non-existence

35A02 Uniqueness problems: global uniqueness, local uniqueness, non-uniqueness

35A08 Fundamental solutions

35A09 Classical solutions

35A10 Cauchy-Kovalevskaya theorems

35A15 Variational methods

35A16 Topological and monotonicity methods

35A17 Parametrices

35A18 Wave front sets

35A20 Analytic methods, singularities

35A21 Propagation of singularities

35A22 Transform methods (e.g. integral transforms)

35A23 Inequalities involving derivatives and differential and integral operators, inequalities for integrals

35A24 Methods of ordinary differential equations

35A25 Other special methods

35A27 Microlocal methods; methods of sheaf theory and homological algebra in PDE [See also 32C38, 58J15]

35A30 Geometric theory, characteristics, transformations [See also 58J70, 58J72]

35A35 Theoretical approximation to solutions (For numerical analysis, see 65Mxx, 65Nxx)

35A99 None of the above, but in this section

35Bxx Qualitative properties of solutions

35B05 Oscillation, zeros of solutions, mean value theorems, etc.

35B06 Symmetries, invariants, etc.

35B07 Axially symmetric solutions

35B08 Entire solutions

35B09 Positive solutions

35B10 Periodic solutions

35B15 Almost and pseudo-almost periodic solutions

35B20 Perturbations

35B25 Singular perturbations

35B27 Homogenization; equations in media with periodic structure
[See also 74Qxx, 76M50]

35B30 Dependence of solutions on initial and boundary data, parameters
[See also 37Cxx]

35B32 Bifurcation [See also 37Gxx, 37K50]

35B33 Critical exponents

35B34 Resonances

35B35 Stability

35B36 Pattern formation

35B38 Critical points

35B40 Asymptotic behavior of solutions

35B41 Attractors

35B42 Inertial manifolds

35B44 Blow-up

35B45 A priori estimates

35B50 Maximum principles

35B51 Comparison principles

35B53 Liouville theorems, Phragmén-Lindelöf theorems

35B60 Continuation and prolongation of solutions [See also 58A15, 58A17, 58Hxx]

35B65 Smoothness and regularity of solutions

35B99 None of the above, but in this section

35Cxx Representations of solutions

35C05 Solutions in closed form

35C06 Self-similar solutions

35C07 Traveling wave solutions

35C08 Soliton solutions

35C09 Trigonometric solutions

35C10 Series solutions

35C11 Polynomial solutions

35C15 Integral representations of solutions

35C20 Asymptotic expansions

35C99 None of the above, but in this section

35Dxx Generalized solutions

35D30 Weak solutions

35D35 Strong solutions

35D40 Viscosity solutions

35D99 None of the above, but in this section

35Exx Equations and systems with constant coefficients [See also 35N05]

35E05 Fundamental solutions

35E10 Convexity properties

35E15 Initial value problems

35E20 General theory

35E99 None of the above, but in this section

35Fxx General first-order equations and systems

35F05 Linear first-order equations

35F10 Initial value problems for linear first-order equations

35F15 Boundary value problems for linear first-order equations

35F16 Initial-boundary value problems for linear first-order equations

35F20 Nonlinear first-order equations

35F21 Hamilton-Jacobi equations

35F25 Initial value problems for nonlinear first-order equations

35F30 Boundary value problems for nonlinear first-order equations

35F31 Initial-boundary value problems for nonlinear first-order equations

35F35 Linear first-order systems

35F40 Initial value problems for linear first-order systems

35F45 Boundary value problems for linear first-order systems

35F46 Initial-boundary value problems for linear first-order systems

35F50 Nonlinear first-order systems

35F55 Initial value problems for nonlinear first-order systems

35F60 Boundary value problems for nonlinear first-order systems

35F61 Initial-boundary value problems for nonlinear first-order systems

35F99 None of the above, but in this section

35Gxx General higher-order equations and systems

35G05 Linear higher-order equations

35G10 Initial value problems for linear higher-order equations

35G15 Boundary value problems for linear higher-order equations

35G16 Initial-boundary value problems for linear higher-order equations

35G20 Nonlinear higher-order equations

35G25 Initial value problems for nonlinear higher-order equations

35G30 Boundary value problems for nonlinear higher-order equations

35G31 Initial-boundary value problems for nonlinear higher-order equations

35G35 Linear higher-order systems

35G40 Initial value problems for linear higher-order systems

35G45 Boundary value problems for linear higher-order systems

35G46 Initial-boundary value problems for linear higher-order systems

35G50 Nonlinear higher-order systems

35G55 Initial value problems for nonlinear higher-order systems

35G60 Boundary value problems for nonlinear higher-order systems

35G61 Initial-boundary value problems for nonlinear higher-order systems

35G99 None of the above, but in this section

35Hxx Close-to-elliptic equations and systems

35H10 Hypoelliptic equations

35H20 Subelliptic equations

35H30 Quasi-elliptic equations

35H99 None of the above, but in this section

35Jxx Elliptic equations and systems [See also 58J10, 58J20]

35J05 Laplacian operator, reduced wave equation (Helmholtz equation), Poisson equation [See also 31Axx, 31Bxx]

35J08 Green's functions

35J10 Schrödinger operator [See also 35Pxx]

35J15 Second-order elliptic equations

35J20 Variational methods for second-order elliptic equations

35J25 Boundary value problems for second-order elliptic equations

35J30 Higher-order elliptic equations [See also 31A30, 31B30]

35J35 Variational methods for higher-order elliptic equations

35J40 Boundary value problems for higher-order elliptic equations

35J46 First-order elliptic systems

35J47 Second-order elliptic systems

35J48 Higher-order elliptic systems

35J50 Variational methods for elliptic systems

35J56 Boundary value problems for first-order elliptic systems

35J57 Boundary value problems for second-order elliptic systems

35J58 Boundary value problems for higher-order elliptic systems

35J60 Nonlinear elliptic equations

35J61 Semilinear elliptic equations

35J62 Quasilinear elliptic equations

35J65 Nonlinear boundary value problems for linear elliptic equations

35J66 Nonlinear boundary value problems for nonlinear elliptic equations

35J67 Boundary values of solutions to elliptic equations

35J70 Degenerate elliptic equations

35J75 Singular elliptic equations

35J86 Linear elliptic unilateral problems and linear elliptic variational inequalities [See also 35R35, 49J40]

35J87 Nonlinear elliptic unilateral problems and nonlinear elliptic variational inequalities [See also 35R35, 49J40]

35J88 Systems of elliptic variational inequalities [See also 35R35, 49J40]

35J91 Semilinear elliptic equations with Laplacian, bi-Laplacian or poly-Laplacian

35J92 Quasilinear elliptic equations with p-Laplacian

35J93 Quasilinear elliptic equations with mean curvature operator

35J96 Elliptic Monge-Ampère equations

35J99 None of the above, but in this section

35Kxx Parabolic equations and systems [See also 35Bxx, 35Dxx, 35R30, 35R35, 58J35]

35K05 Heat equation

35K08 Heat kernel

35K10 Second-order parabolic equations

35K15 Initial value problems for second-order parabolic equations

35K20 Initial-boundary value problems for second-order parabolic equations

35K25 Higher-order parabolic equations

35K30 Initial value problems for higher-order parabolic equations

35K35 Initial-boundary value problems for higher-order parabolic equations

35K40 Second-order parabolic systems

35K41 Higher-order parabolic systems

35K45 Initial value problems for second-order parabolic systems

35K46 Initial value problems for higher-order parabolic systems

35K51 Initial-boundary value problems for second-order parabolic systems

35K52 Initial-boundary value problems for higher-order parabolic systems

35K55 Nonlinear parabolic equations

35K57 Reaction-diffusion equations

35K58 Semilinear parabolic equations

35K59 Quasilinear parabolic equations

35K60 Nonlinear initial value problems for linear parabolic equations

35K61 Nonlinear initial-boundary value problems for nonlinear parabolic equations

35K65 Degenerate parabolic equations

35K67 Singular parabolic equations

35K70 Ultraparabolic equations, pseudoparabolic equations, etc.

35K85 Linear parabolic unilateral problems and linear parabolic variational inequalities [See also 35R35, 49J40]

35K86 Nonlinear parabolic unilateral problems and nonlinear parabolic variational inequalities [See also 35R35, 49J40]

35K87 Systems of parabolic variational inequalities [See also 35R35, 49J40]

35K90 Abstract parabolic equations

35K91 Semilinear parabolic equations with Laplacian, bi-Laplacian or poly-Laplacian

35K92 Quasilinear parabolic equations with p-Laplacian

35K93 Quasilinear parabolic equations with mean curvature operator

35K96 Parabolic Monge-Ampère equations

35K99 None of the above, but in this section

35Lxx Hyperbolic equations and systems [See also 58J45]

35L02 First-order hyperbolic equations

35L03 Initial value problems for first-order hyperbolic equations

35L04 Initial-boundary value problems for first-order hyperbolic equations

35L05 Wave equation

35L10 Second-order hyperbolic equations

35L15 Initial value problems for second-order hyperbolic equations

35L20 Initial-boundary value problems for second-order hyperbolic equations

35L25 Higher-order hyperbolic equations

35L30 Initial value problems for higher-order hyperbolic equations

35L35 Initial-boundary value problems for higher-order hyperbolic equations

35L40 First-order hyperbolic systems

35L45 Initial value problems for first-order hyperbolic systems

35L50 Initial-boundary value problems for first-order hyperbolic systems

35L51 Second-order hyperbolic systems

35L52 Initial value problems for second-order hyperbolic systems

35L53 Initial-boundary value problems for second-order hyperbolic systems

35L55 Higher-order hyperbolic systems

35L56 Initial value problems for higher-order hyperbolic systems

35L57 Initial-boundary value problems for higher-order hyperbolic systems

35L60 Nonlinear first-order hyperbolic equations

35L65 Conservation laws

35L67 Shocks and singularities [See also 58Kxx, 76L05]

35L70 Nonlinear second-order hyperbolic equations

35L71 Semilinear second-order hyperbolic equations

35L72 Quasilinear second-order hyperbolic equations

35L75 Nonlinear higher-order hyperbolic equations

35L76 Semilinear higher-order hyperbolic equations

35L77 Quasilinear higher-order hyperbolic equations

35L80 Degenerate hyperbolic equations

35L81 Singular hyperbolic equations

35L82 Pseudohyperbolic equations

35L85 Linear hyperbolic unilateral problems and linear hyperbolic variational inequalities [See also 35R35, 49J40]

35L86 Nonlinear hyperbolic unilateral problems and nonlinear hyperbolic variational inequalities [See also 35R35, 49J40]

35L87 Unilateral problems and variational inequalities for hyperbolic systems [See also 35R35, 49J40]

35L90 Abstract hyperbolic equations

35L99 None of the above, but in this section

35Mxx Equations and systems of special type (mixed, composite, etc.)

35M10 Equations of mixed type

35M11 Initial value problems for equations of mixed type

35M12 Boundary value problems for equations of mixed type

35M13 Initial-boundary value problems for equations of mixed type

35M30 Systems of mixed type

35M31 Initial value problems for systems of mixed type

35M32 Boundary value problems for systems of mixed type

35M33 Initial-boundary value problems for systems of mixed type

35M85 Linear unilateral problems and variational inequalities of mixed type [See also 35R35, 49J40]

35M86 Nonlinear unilateral problems and nonlinear variational inequalities of mixed type [See also 35R35, 49J40]

35M87 Systems of variational inequalities of mixed type [See also 35R35, 49J40]

35M99 None of the above, but in this section

35Nxx Overdetermined systems [See also 58Hxx, 58J10, 58J15]

35N05 Overdetermined systems with constant coefficients

35N10 Overdetermined systems with variable coefficients

35N15 $\bar\partial$-Neumann problem and generalizations; formal complexes [See also 32W05, 32W10, 58J10]

35N20 Overdetermined initial value problems

35N25 Overdetermined boundary value problems

35N30 Overdetermined initial-boundary value problems

35N99 None of the above, but in this section

35Pxx Spectral theory and eigenvalue problems [See also 47Axx, 47Bxx, 47F05]

35P05 General topics in linear spectral theory

35P10 Completeness of eigenfunctions, eigenfunction expansions

35P15 Estimation of eigenvalues, upper and lower bounds

35P20 Asymptotic distribution of eigenvalues and eigenfunctions

35P25 Scattering theory [See also 47A40]

35P30 Nonlinear eigenvalue problems, nonlinear spectral theory

35P99 None of the above, but in this section

35Qxx Equations of mathematical physics and other areas of application [See also 35J05, 35J10, 35K05, 35L05]

35Q05 Euler-Poisson-Darboux equations

35Q15 Riemann-Hilbert problems [See also 30E25, 31A25, 31B20]

35Q20 Boltzmann equations

35Q30 Navier-Stokes equations
[See also 76D05, 76D07, 76N10]

35Q31 Euler equations
[See also 76D05, 76D07, 76N10]

35Q35 PDEs in connection with fluid mechanics

35Q40 PDEs in connection with quantum mechanics

35Q41 Time-dependent Schrödinger equations, Dirac equations

35Q51 Soliton-like equations [See also 37K40]

35Q53 KdV-like equations (Korteweg-de Vries) [See also 37K10]

35Q55 NLS-like equations (nonlinear Schrödinger) [See also 37K10]

35Q56 Ginzburg-Landau equations

35Q60 PDEs in connection with optics and electromagnetic theory

35Q61 Maxwell equations

35Q62 PDEs in connection with statistics

35Q68 PDEs in connection with computer science

35Q70 PDEs in connection with mechanics of particles and systems

35Q74 PDEs in connection with mechanics of deformable solids

35Q75 PDEs in connection with relativity and gravitational theory

35Q76 Einstein equations

35Q79 PDEs in connection with classical thermodynamics and heat transfer

35Q82 PDEs in connection with statistical mechanics

35Q83 Vlasov-like equations

35Q84 Fokker-Planck equations

35Q85 PDEs in connection with astronomy and astrophysics

35Q86 PDEs in connection with geophysics

35Q90 PDEs in connection with mathematical programming

35Q91 PDEs in connection with game theory, economics, social and behavioral sciences

35Q92 PDEs in connection with biology and other natural sciences

35Q93 PDEs in connection with control and optimization

35Q94 PDEs in connection with information and communication

35Q99 None of the above, but in this section

35Rxx Miscellaneous topics (For equations on manifolds, see 58Jxx; for manifolds of solutions, see 58Bxx; for stochastic PDE, see also 60H15)

35R01 Partial differential equations on manifolds [See also 32Wxx, 53Cxx, 58Jxx]

35R02 Partial differential equations on graphs and networks (ramified or polygonal spaces)

35R03 Partial differential equations on Heisenberg groups, Lie groups, Carnot groups, etc.

35R05 Partial differential equations with discontinuous coefficients or data

35R06 Partial differential equations with measure

35R09 Integro-partial differential equations [See also 45Kxx]

35R10 Partial functional-differential equations

35R11 Fractional partial differential equations

35R12 Impulsive partial differential equations

35R13 Fuzzy partial differential equations

35R15 Partial differential equations on infinite-dimensional (e.g. function) spaces (= PDE in infinitely many variables) [See also 46Gxx, 58D25]

35R20 Partial operator-differential equations (i.e., PDE on finite-dimensional spaces for abstract space valued functions) [See also 34Gxx, 47A50, 47D03, 47D06, 47D09, 47H20, 47Jxx]

35R25 Improperly posed problems

35R30 Inverse problems

35R35 Free boundary problems

35R37 Moving boundary problems

35R45 Partial differential inequalities

35R50 Partial differential equations of infinite order

35R60 Partial differential equations with randomness, stochastic partial differential equations [See also 60H15]

35R70 Partial differential equations with multi-valued right-hand sides

35R99 None of the above, but in this section

35Sxx Pseudodifferential operators and other generalizations of partial differential operators [See also 47G30, 58J40]

35S05   Pseudodifferential operators

35S10   Initial value problems for pseudodifferential operators

35S11   Initial-boundary value problems for pseudodifferential operators

35S15   Boundary value problems for pseudodifferential operators

35S30   Fourier integral operators

35S35   Topological aspects: intersection cohomology, stratified sets, etc.
[See also 32C38, 32S40, 32S60, 58J15]

35S50   Paradifferential operators

35S99   None of the above, but in this section

37-XX Dynamical systems and ergodic theory [See also 26A18, 28Dxx, 34Cxx, 34Dxx, 35Bxx, 46Lxx, 58Jxx, 70-XX]

37-00   General reference works (handbooks, dictionaries, bibliographies, etc.)

37-01   Instructional exposition (textbooks, tutorial papers, etc.)

37-02   Research exposition (monographs, survey articles)

37-03   Historical (must also be assigned at least one classification number from Section 01)

37-04   Explicit machine computation and programs (not the theory of computation or programming)

37-06   Proceedings, conferences, collections, etc.

37Axx Ergodic theory [See also 28Dxx]

37A05   Measure-preserving transformations

37A10   One-parameter continuous families of measure-preserving transformations

37A15   General groups of measure-preserving transformations [See mainly 22Fxx]

37A17   Homogeneous flows [See also 22Fxx]

37A20   Orbit equivalence, cocycles, ergodic equivalence relations

37A25   Ergodicity, mixing, rates of mixing

37A30   Ergodic theorems, spectral theory, Markov operators (For operator ergodic theory, see mainly 47A35)

37A35   Entropy and other invariants, isomorphism, classification

37A40   Nonsingular (and infinite-measure preserving) transformations

37A45   Relations with number theory and harmonic analysis [See also 11Kxx]

37A50   Relations with probability theory and stochastic processes [See also 60Fxx and 60G10]

37A55   Relations with the theory of C^*-algebras [See mainly 46L55]

37A60   Dynamical systems in statistical mechanics [See also 82Cxx]

37A99   None of the above, but in this section

37Bxx Topological dynamics [See also 54H20]

37B05   Transformations and group actions with special properties (minimality, distality, proximality, etc.)

37B10   Symbolic dynamics [See also 37Cxx, 37Dxx]

37B15   Cellular automata [See also 68Q80]

37B20   Notions of recurrence

37B25   Lyapunov functions and stability; attractors, repellers

37B30   Index theory, Morse-Conley indices

37B35   Gradient-like and recurrent behavior; isolated (locally maximal) invariant sets

37B40   Topological entropy

37B45   Continua theory in dynamics

37B50   Multi-dimensional shifts of finite type, tiling dynamics

37B55   Nonautonomous dynamical systems

37B99   None of the above, but in this section

37Cxx Smooth dynamical systems: general theory [See also 34Cxx, 34Dxx]

37C05   Smooth mappings and diffeomorphisms

37C10   Vector fields, flows, ordinary differential equations

37C15   Topological and differentiable equivalence, conjugacy, invariants, moduli, classification

37C20   Generic properties, structural stability

37C25   Fixed points, periodic points, fixed-point index theory

37C27   Periodic orbits of vector fields and flows

37C29   Homoclinic and heteroclinic orbits

37C30 Zeta functions, (Ruelle-Frobenius) transfer operators, and other functional analytic techniques in dynamical systems

37C35 Orbit growth

37C40 Smooth ergodic theory, invariant measures [See also 37Dxx]

37C45 Dimension theory of dynamical systems

37C50 Approximate trajectories (pseudotrajectories, shadowing, etc.)

37C55 Periodic and quasiperiodic flows and diffeomorphisms

37C60 Nonautonomous smooth dynamical systems [See also 37B55]

37C65 Monotone flows

37C70 Attractors and repellers, topological structure

37C75 Stability theory

37C80 Symmetries, equivariant dynamical systems

37C85 Dynamics of group actions other than **Z** and **R**, and foliations [See mainly 22Fxx, and also 57R30, 57Sxx]

37C99 None of the above, but in this section

37Dxx Dynamical systems with hyperbolic behavior

37D05 Hyperbolic orbits and sets

37D10 Invariant manifold theory

37D15 Morse-Smale systems

37D20 Uniformly hyperbolic systems (expanding, Anosov, Axiom A, etc.)

37D25 Nonuniformly hyperbolic systems (Lyapunov exponents, Pesin theory, etc.)

37D30 Partially hyperbolic systems and dominated splittings

37D35 Thermodynamic formalism, variational principles, equilibrium states

37D40 Dynamical systems of geometric origin and hyperbolicity (geodesic and horocycle flows, etc.)

37D45 Strange attractors, chaotic dynamics

37D50 Hyperbolic systems with singularities (billiards, etc.)

37D99 None of the above, but in this section

37Exx Low-dimensional dynamical systems

37E05 Maps of the interval (piecewise continuous, continuous, smooth)

37E10 Maps of the circle

37E15 Combinatorial dynamics (types of periodic orbits)

37E20 Universality, renormalization [See also 37F25]

37E25 Maps of trees and graphs

37E30 Homeomorphisms and diffeomorphisms of planes and surfaces

37E35 Flows on surfaces

37E40 Twist maps

37E45 Rotation numbers and vectors

37E99 None of the above, but in this section

37Fxx Complex dynamical systems [See also 30D05, 32H50]

37F05 Relations and correspondences

37F10 Polynomials; rational maps; entire and meromorphic functions [See also 32A10, 32A20, 32H02, 32H04]

37F15 Expanding maps; hyperbolicity; structural stability

37F20 Combinatorics and topology

37F25 Renormalization

37F30 Quasiconformal methods and Teichmüller theory; Fuchsian and Kleinian groups as dynamical systems

37F35 Conformal densities and Hausdorff dimension

37F40 Geometric limits

37F45 Holomorphic families of dynamical systems; the Mandelbrot set; bifurcations

37F50 Small divisors, rotation domains and linearization; Fatou and Julia sets

37F75 Holomorphic foliations and vector fields [See also 32M25, 32S65, 34Mxx]

37F99 None of the above, but in this section

37Gxx Local and nonlocal bifurcation theory [See also 34C23, 34K18]

37G05 Normal forms

37G10 Bifurcations of singular points

37G15 Bifurcations of limit cycles and periodic orbits

37G20 Hyperbolic singular points with homoclinic trajectories

37G25 Bifurcations connected with nontransversal intersection

37G30 Infinite nonwandering sets arising in bifurcations

37G35 Attractors and their bifurcations

37G40 Symmetries, equivariant bifurcation theory

37G99 None of the above, but in this section

37Hxx Random dynamical systems [See also 15B52, 34D08, 34F05, 47B80, 70L05, 82C05, 93Exx]

37H05 Foundations, general theory of cocycles, algebraic ergodic theory [See also 37Axx]

37H10 Generation, random and stochastic difference and differential equations [See also 34F05, 34K50, 60H10, 60H15]

37H15 Multiplicative ergodic theory, Lyapunov exponents [See also 34D08, 37Axx, 37Cxx, 37Dxx]

37H20 Bifurcation theory [See also 37Gxx]

37H99 None of the above, but in this section

37Jxx Finite-dimensional Hamiltonian, Lagrangian, contact, and nonholonomic systems [See also 53Dxx, 70Fxx, 70Hxx]

37J05 General theory, relations with symplectic geometry and topology

37J10 Symplectic mappings, fixed points

37J15 Symmetries, invariants, invariant manifolds, momentum maps, reduction [See also 53D20]

37J20 Bifurcation problems

37J25 Stability problems

37J30 Obstructions to integrability (nonintegrability criteria)

37J35 Completely integrable systems, topological structure of phase space, integration methods

37J40 Perturbations, normal forms, small divisors, KAM theory, Arnol'd diffusion

37J45 Periodic, homoclinic and heteroclinic orbits; variational methods, degree-theoretic methods

37J50 Action-minimizing orbits and measures

37J55 Contact systems [See also 53D10]

37J60 Nonholonomic dynamical systems [See also 70F25]

37J99 None of the above, but in this section

37Kxx Infinite-dimensional Hamiltonian systems [See also 35Axx, 35Qxx]

37K05 Hamiltonian structures, symmetries, variational principles, conservation laws

37K10 Completely integrable systems, integrability tests, bi-Hamiltonian structures, hierarchies (KdV, KP, Toda, etc.)

37K15 Integration of completely integrable systems by inverse spectral and scattering methods

37K20 Relations with algebraic geometry, complex analysis, special functions [See also 14H70]

37K25 Relations with differential geometry

37K30 Relations with infinite-dimensional Lie algebras and other algebraic structures

37K35 Lie-Bäcklund and other transformations

37K40 Soliton theory, asymptotic behavior of solutions

37K45 Stability problems

37K50 Bifurcation problems

37K55 Perturbations, KAM for infinite-dimensional systems

37K60 Lattice dynamics [See also 37L60]

37K65 Hamiltonian systems on groups of diffeomorphisms and on manifolds of mappings and metrics

37K99 None of the above, but in this section

37Lxx Infinite-dimensional dissipative dynamical systems [See also 35Bxx, 35Qxx]

37L05 General theory, nonlinear semigroups, evolution equations

37L10 Normal forms, center manifold theory, bifurcation theory

37L15 Stability problems

37L20 Symmetries

37L25 Inertial manifolds and other invariant attracting sets

37L30 Attractors and their dimensions, Lyapunov exponents

37L40 Invariant measures

37L45 Hyperbolicity; Lyapunov functions

37L50 Noncompact semigroups; dispersive equations; perturbations of Hamiltonian systems

37L55 Infinite-dimensional random dynamical systems; stochastic equations [See also 35R60, 60H10, 60H15]

37L60 Lattice dynamics [See also 37K60]

37L65 Special approximation methods (nonlinear Galerkin, etc.)

37L99 None of the above, but in this section

37Mxx Approximation methods and numerical treatment of dynamical systems [See also 65Pxx]

37M05 Simulation

37M10 Time series analysis

37M15 Symplectic integrators

37M20 Computational methods for bifurcation problems

37M25 Computational methods for ergodic theory (approximation of invariant measures, computation of Lyapunov exponents, entropy)

37M99 None of the above, but in this section

37Nxx Applications

37N05 Dynamical systems in classical and celestial mechanics
[See mainly 70Fxx, 70Hxx, 70Kxx]

37N10 Dynamical systems in fluid mechanics, oceanography and meteorology [See mainly 76-XX, especially 76D05, 76F20, 86A05, 86A10]

37N15 Dynamical systems in solid mechanics [See mainly 74Hxx]

37N20 Dynamical systems in other branches of physics (quantum mechanics, general relativity, laser physics)

37N25 Dynamical systems in biology
[See mainly 92-XX, but also 91-XX]

37N30 Dynamical systems in numerical analysis

37N35 Dynamical systems in control

37N40 Dynamical systems in optimization and economics

37N99 None of the above, but in this section

37Pxx Arithmetic and non-Archimedean dynamical systems [See also 11S82, 37A45]

37P05 Polynomial and rational maps

37P10 Analytic and meromorphic maps

37P15 Global ground fields

37P20 Non-Archimedean local ground fields

37P25 Finite ground fields

37P30 Height functions; Green functions; invariant measures [See also 11G50, 14G40]

37P35 Arithmetic properties of periodic points

37P40 Non-Archimedean Fatou and Julia sets

37P45 Families and moduli spaces

37P50 Dynamical systems on Berkovich spaces

37P55 Arithmetic dynamics on general algebraic varieties

37P99 None of the above, but in this section

39-XX Difference and functional equations

39-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

39-01 Instructional exposition (textbooks, tutorial papers, etc.)

39-02 Research exposition (monographs, survey articles)

39-03 Historical (must also be assigned at least one classification number from Section 01)

39-04 Explicit machine computation and programs (not the theory of computation or programming)

39-06 Proceedings, conferences, collections, etc.

**39Axx Difference equations
(For dynamical systems, see 37-XX; for dynamic equations on time scales, see 34N05)**

39A05 General theory

39A06 Linear equations

39A10 Difference equations, additive

39A12 Discrete version of topics in analysis

39A13 Difference equations, scaling (q-differences) [See also 33Dxx]

39A14 Partial difference equations

39A20 Multiplicative and other generalized difference equations, e.g. of Lyness type

39A21 Oscillation theory

39A22 Growth, boundedness, comparison of solutions

39A23 Periodic solutions

39A24 Almost periodic solutions

39A28 Bifurcation theory

39A30 Stability theory

39A33 Complex (chaotic) behavior of solutions

39A45 Equations in the complex domain

39A50 Stochastic difference equations

39A60 Applications

39A70 Difference operators [See also 47B39]

39A99 None of the above, but in this section

39Bxx Functional equations and inequalities [See also 30D05]

39B05 General

39B12 Iteration theory, iterative and composite equations [See also 26A18, 30D05, 37-XX]

39B22 Equations for real functions [See also 26A51, 26B25]

39B32 Equations for complex functions [See also 30D05]

39B42 Matrix and operator equations [See also 47Jxx]

39B52 Equations for functions with more general domains and/or ranges

39B55 Orthogonal additivity and other conditional equations

39B62 Functional inequalities, including subadditivity, convexity, etc. [See also 26A51, 26B25, 26Dxx]

39B72 Systems of functional equations and inequalities

39B82 Stability, separation, extension, and related topics [See also 46A22]

39B99 None of the above, but in this section

40-XX Sequences, series, summability

40-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

40-01 Instructional exposition (textbooks, tutorial papers, etc.)

40-02 Research exposition (monographs, survey articles)

40-03 Historical (must also be assigned at least one classification number from Section 01)

40-04 Explicit machine computation and programs (not the theory of computation or programming)

40-06 Proceedings, conferences, collections, etc.

40Axx Convergence and divergence of infinite limiting processes

40A05 Convergence and divergence of series and sequences

40A10 Convergence and divergence of integrals

40A15 Convergence and divergence of continued fractions [See also 30B70]

40A20 Convergence and divergence of infinite products

40A25 Approximation to limiting values (summation of series, etc.) (For the Euler-Maclaurin summation formula, see 65B15)

40A30 Convergence and divergence of series and sequences of functions

40A35 Ideal and statistical convergence [See also 40G15]

40A99 None of the above, but in this section

40Bxx Multiple sequences and series

40B05 Multiple sequences and series (should also be assigned at least one other classification number in this section)

40B99 None of the above, but in this section

40Cxx General summability methods

40C05 Matrix methods

40C10 Integral methods

40C15 Function-theoretic methods (including power series methods and semicontinuous methods)

40C99 None of the above, but in this section

40Dxx Direct theorems on summability

40D05 General theorems

40D09 Structure of summability fields

40D10 Tauberian constants and oscillation limits

40D15 Convergence factors and summability factors

40D20 Summability and bounded fields of methods

40D25 Inclusion and equivalence theorems

40D99 None of the above, but in this section

40Exx Inversion theorems

40E05 Tauberian theorems, general

40E10 Growth estimates

40E15 Lacunary inversion theorems

40E20 Tauberian constants

40E99 None of the above, but in this section

40Fxx Absolute and strong summability (should also be assigned at least one other classification number in Section 40)

40F05 Absolute and strong summability (should also be assigned at least one other classification number in Section 40)

40F99 None of the above, but in this section

40Gxx Special methods of summability

40G05 Cesàro, Euler, Nörlund and Hausdorff methods

40G10 Abel, Borel and power series methods

40G15 Summability methods using statistical convergence [See also 40A35]

40G99 None of the above, but in this section

40Hxx Functional analytic methods in summability

40H05 Functional analytic methods in summability

40H99 None of the above, but in this section

40Jxx Summability in abstract structures [See also 43A55, 46A35, 46B15]

40J05 Summability in abstract structures [See also 43A55, 46A35, 46B15] (should also be assigned at least one other classification number in this section)

40J99 None of the above, but in this section

41-XX Approximations and expansions (For all approximation theory in the complex domain, see 30E05 and 30E10; for all trigonometric approximation and interpolation, see 42A10 and 42A15; for numerical approximation, see 65Dxx)

41-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

41-01 Instructional exposition (textbooks, tutorial papers, etc.)

41-02 Research exposition (monographs, survey articles)

41-03 Historical (must also be assigned at least one classification number from Section 01)

41-04 Explicit machine computation and programs (not the theory of computation or programming)

41-06 Proceedings, conferences, collections, etc.

41Axx Approximations and expansions (For all approximation theory in the complex domain, see 30E05 and 30E10; for all trigonometric approximation and interpolation, see 42A10 and 42A15; for numerical approximation, see 65Dxx)

41A05 Interpolation
[See also 42A15 and 65D05]

41A10 Approximation by polynomials (For approximation by trigonometric polynomials, see 42A10)

41A15 Spline approximation

41A17 Inequalities in approximation (Bernstein, Jackson, Nikol'skiĭ-type inequalities)

41A20 Approximation by rational functions

41A21 Padé approximation

41A25 Rate of convergence, degree of approximation

41A27 Inverse theorems

41A28 Simultaneous approximation

41A29 Approximation with constraints

41A30 Approximation by other special function classes

41A35 Approximation by operators (in particular, by integral operators)

41A36 Approximation by positive operators

41A40 Saturation

41A44 Best constants

41A45 Approximation by arbitrary linear expressions

41A46 Approximation by arbitrary nonlinear expressions; widths and entropy

41A50 Best approximation, Chebyshev systems

41A52 Uniqueness of best approximation

41A55 Approximate quadratures

41A58 Series expansions (e.g. Taylor, Lidstone series, but not Fourier series)

41A60   Asymptotic approximations, asymptotic expansions (steepest descent, etc.) [See also 30E15]

41A63   Multidimensional problems (should also be assigned at least one other classification number in this section)

41A65   Abstract approximation theory (approximation in normed linear spaces and other abstract spaces)

41A80   Remainders in approximation formulas

41A99   None of the above, but in this section

42-XX Harmonic analysis on Euclidean spaces

42-00   General reference works (handbooks, dictionaries, bibliographies, etc.)

42-01   Instructional exposition (textbooks, tutorial papers, etc.)

42-02   Research exposition (monographs, survey articles)

42-03   Historical (must also be assigned at least one classification number from Section 01)

42-04   Explicit machine computation and programs (not the theory of computation or programming)

42-06   Proceedings, conferences, collections, etc.

42Axx   Harmonic analysis in one variable

42A05   Trigonometric polynomials, inequalities, extremal problems

42A10   Trigonometric approximation

42A15   Trigonometric interpolation

42A16   Fourier coefficients, Fourier series of functions with special properties, special Fourier series (For automorphic theory, see mainly 11F30)

42A20   Convergence and absolute convergence of Fourier and trigonometric series

42A24   Summability and absolute summability of Fourier and trigonometric series

42A32   Trigonometric series of special types (positive coefficients, monotonic coefficients, etc.)

42A38   Fourier and Fourier-Stieltjes transforms and other transforms of Fourier type

42A45   Multipliers

42A50   Conjugate functions, conjugate series, singular integrals

42A55   Lacunary series of trigonometric and other functions; Riesz products

42A61   Probabilistic methods

42A63   Uniqueness of trigonometric expansions, uniqueness of Fourier expansions, Riemann theory, localization

42A65   Completeness of sets of functions

42A70   Trigonometric moment problems

42A75   Classical almost periodic functions, mean periodic functions [See also 43A60]

42A82   Positive definite functions

42A85   Convolution, factorization

42A99   None of the above, but in this section

42Bxx   Harmonic analysis in several variables (For automorphic theory, see mainly 11F30)

42B05   Fourier series and coefficients

42B08   Summability

42B10   Fourier and Fourier-Stieltjes transforms and other transforms of Fourier type

42B15   Multipliers

42B20   Singular and oscillatory integrals (Calderón-Zygmund, etc.)

42B25   Maximal functions, Littlewood-Paley theory

42B30 H^p-spaces

42B35   Function spaces arising in harmonic analysis

42B37   Harmonic analysis and PDE [See also 35-XX]

42B99   None of the above, but in this section

42Cxx   Nontrigonometric harmonic analysis

42C05   Orthogonal functions and polynomials, general theory [See also 33C45, 33C50, 33D45]

42C10   Fourier series in special orthogonal functions (Legendre polynomials, Walsh functions, etc.)

42C15   General harmonic expansions, frames

42C20   Other transformations of harmonic type

42C25   Uniqueness and localization for orthogonal series

42C30   Completeness of sets of functions

42C40   Wavelets and other special systems

42C99   None of the above, but in this section

43-XX Abstract harmonic analysis (For other analysis on topological and Lie groups, see 22Exx)

43-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

43-01 Instructional exposition (textbooks, tutorial papers, etc.)

43-02 Research exposition (monographs, survey articles)

43-03 Historical (must also be assigned at least one classification number from Section 01)

43-04 Explicit machine computation and programs (not the theory of computation or programming)

43-06 Proceedings, conferences, collections, etc.

43Axx Abstract harmonic analysis (For other analysis on topological and Lie groups, see 22Exx)

43A05 Measures on groups and semigroups, etc.

43A07 Means on groups, semigroups, etc.; amenable groups

43A10 Measure algebras on groups, semigroups, etc.

43A15 L^p-spaces and other function spaces on groups, semigroups, etc.

43A17 Analysis on ordered groups, H^p-theory

43A20 L^1-algebras on groups, semigroups, etc.

43A22 Homomorphisms and multipliers of function spaces on groups, semigroups, etc.

43A25 Fourier and Fourier-Stieltjes transforms on locally compact and other abelian groups

43A30 Fourier and Fourier-Stieltjes transforms on nonabelian groups and on semigroups, etc.

43A32 Other transforms and operators of Fourier type

43A35 Positive definite functions on groups, semigroups, etc.

43A40 Character groups and dual objects

43A45 Spectral synthesis on groups, semigroups, etc.

43A46 Special sets (thin sets, Kronecker sets, Helson sets, Ditkin sets, Sidon sets, etc.)

43A50 Convergence of Fourier series and of inverse transforms

43A55 Summability methods on groups, semigroups, etc. [See also 40J05]

43A60 Almost periodic functions on groups and semigroups and their generalizations (recurrent functions, distal functions, etc.); almost automorphic functions

43A62 Hypergroups

43A65 Representations of groups, semigroups, etc. [See also 22A10, 22A20, 22Dxx, 22E45]

43A70 Analysis on specific locally compact and other abelian groups [See also 11R56, 22B05]

43A75 Analysis on specific compact groups

43A77 Analysis on general compact groups

43A80 Analysis on other specific Lie groups [See also 22Exx]

43A85 Analysis on homogeneous spaces

43A90 Spherical functions [See also 22E45, 22E46, 33C55]

43A95 Categorical methods [See also 46Mxx]

43A99 None of the above, but in this section

44-XX Integral transforms, operational calculus (For fractional derivatives and integrals, see 26A33. For Fourier transforms, see 42A38, 42B10. For integral transforms in distribution spaces, see 46F12. For numerical methods, see 65R10)

44-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

44-01 Instructional exposition (textbooks, tutorial papers, etc.)

44-02 Research exposition (monographs, survey articles)

44-03 Historical (must also be assigned at least one classification number from Section 01)

44-04 Explicit machine computation and programs (not the theory of computation or programming)

44-06 Proceedings, conferences, collections, etc.

44Axx **Integral transforms, operational calculus (For fractional derivatives and integrals, see 26A33. For Fourier transforms, see 42A38, 42B10. For integral transforms in distribution spaces, see 46F12. For numerical methods, see 65R10)**

44A05 General transforms [See also 42A38]

44A10 Laplace transform

44A12 Radon transform [See also 92C55]

44A15 Special transforms (Legendre, Hilbert, etc.)

44A20 Transforms of special functions

44A30 Multiple transforms

44A35 Convolution

44A40 Calculus of Mikusiński and other operational calculi

44A45 Classical operational calculus

44A55 Discrete operational calculus

44A60 Moment problems

44A99 None of the above, but in this section

45-XX Integral equations

45-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

45-01 Instructional exposition (textbooks, tutorial papers, etc.)

45-02 Research exposition (monographs, survey articles)

45-03 Historical (must also be assigned at least one classification number from Section 01)

45-04 Explicit machine computation and programs (not the theory of computation or programming)

45-06 Proceedings, conferences, collections, etc.

45Axx **Linear integral equations**

45A05 Linear integral equations

45A99 None of the above, but in this section

45Bxx **Fredholm integral equations**

45B05 Fredholm integral equations

45B99 None of the above, but in this section

45Cxx **Eigenvalue problems
[See also 34Lxx, 35Pxx, 45P05, 47A75]**

45C05 Eigenvalue problems
[See also 34Lxx, 35Pxx, 45P05, 47A75]

45C99 None of the above, but in this section

45Dxx **Volterra integral equations
[See also 34A12]**

45D05 Volterra integral equations
[See also 34A12]

45D99 None of the above, but in this section

45Exx **Singular integral equations
[See also 30E20, 30E25, 44A15, 44A35]**

45E05 Integral equations with kernels of Cauchy type [See also 35J15]

45E10 Integral equations of the convolution type
(Abel, Picard, Toeplitz and Wiener-Hopf type) [See also 47B35]

45E99 None of the above, but in this section

45Fxx **Systems of linear integral equations**

45F05 Systems of nonsingular linear integral equations

45F10 Dual, triple, etc., integral and series equations

45F15 Systems of singular linear integral equations

45F99 None of the above, but in this section

45Gxx **Nonlinear integral equations
[See also 47H30, 47Jxx]**

45G05 Singular nonlinear integral equations

45G10 Other nonlinear integral equations

45G15 Systems of nonlinear integral equations

45G99 None of the above, but in this section

45Hxx **Miscellaneous special kernels [See also 44A15]**

45H05 Miscellaneous special kernels [See also 44A15]

45H99 None of the above, but in this section

45Jxx **Integro-ordinary differential equations
[See also 34K05, 34K30, 47G20]**

45J05 Integro-ordinary differential equations
[See also 34K05, 34K30, 47G20]

45J99 None of the above, but in this section

45Kxx Integro-partial differential equations [See also 34K30, 35R09, 35R10, 47G20]

45K05 Integro-partial differential equations [See also 34K30, 35R09, 35R10, 47G20]

45K99 None of the above, but in this section

45Lxx Theoretical approximation of solutions (For numerical analysis, see 65Rxx)

45L05 Theoretical approximation of solutions (For numerical analysis, see 65Rxx)

45L99 None of the above, but in this section

45Mxx Qualitative behavior

45M05 Asymptotics

45M10 Stability theory

45M15 Periodic solutions

45M20 Positive solutions

45M99 None of the above, but in this section

45Nxx Abstract integral equations, integral equations in abstract spaces

45N05 Abstract integral equations, integral equations in abstract spaces

45N99 None of the above, but in this section

45Pxx Integral operators [See also 47B38, 47G10]

45P05 Integral operators [See also 47B38, 47G10]

45P99 None of the above, but in this section

45Qxx Inverse problems

45Q05 Inverse problems

45Q99 None of the above, but in this section

45Rxx Random integral equations [See also 60H20]

45R05 Random integral equations [See also 60H20]

45R99 None of the above, but in this section

46-XX Functional analysis (For manifolds modeled on topological linear spaces, see 57Nxx, 58Bxx)

46-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

46-01 Instructional exposition (textbooks, tutorial papers, etc.)

46-02 Research exposition (monographs, survey articles)

46-03 Historical (must also be assigned at least one classification number from Section 01)

46-04 Explicit machine computation and programs (not the theory of computation or programming)

46-06 Proceedings, conferences, collections, etc.

46Axx Topological linear spaces and related structures (For function spaces, see 46Exx)

46A03 General theory of locally convex spaces

46A04 Locally convex Fréchet spaces and (DF)-spaces

46A08 Barrelled spaces, bornological spaces

46A11 Spaces determined by compactness or summability properties (nuclear spaces, Schwartz spaces, Montel spaces, etc.)

46A13 Spaces defined by inductive or projective limits (LB, LF, etc.) [See also 46M40]

46A16 Not locally convex spaces (metrizable topological linear spaces, locally bounded spaces, quasi-Banach spaces, etc.)

46A17 Bornologies and related structures; Mackey convergence, etc.

46A19 Other "topological" linear spaces (convergence spaces, ranked spaces, spaces with a metric taking values in an ordered structure more general than $\mathbf{R}$, etc.)

46A20 Duality theory

46A22 Theorems of Hahn-Banach type; extension and lifting of functionals and operators [See also 46M10]

46A25 Reflexivity and semi-reflexivity [See also 46B10]

46A30 Open mapping and closed graph theorems; completeness (including B-, B_r-completeness)

46A32 Spaces of linear operators; topological tensor products; approximation properties [See also 46B28, 46M05, 47L05, 47L20]

46A35 Summability and bases [See also 46B15]

46A40 Ordered topological linear spaces, vector lattices [See also 06F20, 46B40, 46B42]

46A45 Sequence spaces (including Köthe sequence spaces) [See also 46B45]

46A50 Compactness in topological linear spaces; angelic spaces, etc.

46A55 Convex sets in topological linear spaces; Choquet theory [See also 52A07]

46A61 Graded Fréchet spaces and tame operators

46A63 Topological invariants ((DN), (Ω), etc.)

46A70 Saks spaces and their duals (strict topologies, mixed topologies, two-norm spaces, co-Saks spaces, etc.)

46A80 Modular spaces

46A99 None of the above, but in this section

46Bxx Normed linear spaces and Banach spaces; Banach lattices (For function spaces, see 46Exx)

46B03 Isomorphic theory (including renorming) of Banach spaces

46B04 Isometric theory of Banach spaces

46B06 Asymptotic theory of Banach spaces [See also 52A23]

46B07 Local theory of Banach spaces

46B08 Ultraproduct techniques in Banach space theory [See also 46M07]

46B09 Probabilistic methods in Banach space theory [See also 60Bxx]

46B10 Duality and reflexivity [See also 46A25]

46B15 Summability and bases [See also 46A35]

46B20 Geometry and structure of normed linear spaces

46B22 Radon-Nikodým, Kreĭn-Milman and related properties [See also 46G10]

46B25 Classical Banach spaces in the general theory

46B26 Nonseparable Banach spaces

46B28 Spaces of operators; tensor products; approximation properties [See also 46A32, 46M05, 47L05, 47L20]

46B40 Ordered normed spaces [See also 46A40, 46B42]

46B42 Banach lattices [See also 46A40, 46B40]

46B45 Banach sequence spaces [See also 46A45]

46B50 Compactness in Banach (or normed) spaces

46B70 Interpolation between normed linear spaces [See also 46M35]

46B80 Nonlinear classification of Banach spaces; nonlinear quotients

46B85 Embeddings of discrete metric spaces into Banach spaces; applications in topology and computer science [See also 05C12, 68Rxx]

46B99 None of the above, but in this section

46Cxx Inner product spaces and their generalizations, Hilbert spaces (For function spaces, see 46Exx)

46C05 Hilbert and pre-Hilbert spaces: geometry and topology (including spaces with semidefinite inner product)

46C07 Hilbert subspaces (= operator ranges); complementation (Aronszajn, de Branges, etc.) [See also 46B70, 46M35]

46C15 Characterizations of Hilbert spaces

46C20 Spaces with indefinite inner product (Kreĭn spaces, Pontryagin spaces, etc.) [See also 47B50]

46C50 Generalizations of inner products (semi-inner products, partial inner products, etc.)

46C99 None of the above, but in this section

46Exx Linear function spaces and their duals [See also 30H05, 32A38, 46F05] (For function algebras, see 46J10)

46E05 Lattices of continuous, differentiable or analytic functions

46E10 Topological linear spaces of continuous, differentiable or analytic functions

46E15 Banach spaces of continuous, differentiable or analytic functions

46E20 Hilbert spaces of continuous, differentiable or analytic functions

46E22 Hilbert spaces with reproducing kernels (= [proper] functional Hilbert spaces, including de Branges-Rovnyak and other structured spaces) [See also 47B32]

46E25 Rings and algebras of continuous, differentiable or analytic functions (For Banach function algebras, see 46J10, 46J15)

46E27 Spaces of measures [See also 28A33, 46Gxx]

46E30 Spaces of measurable functions (L^p-spaces, Orlicz spaces, Köthe function spaces, Lorentz spaces, rearrangement invariant spaces, ideal spaces, etc.)

46E35 Sobolev spaces and other spaces of "smooth" functions, embedding theorems, trace theorems

46E39 Sobolev (and similar kinds of) spaces of functions of discrete variables

46E40 Spaces of vector- and operator-valued functions

46E50 Spaces of differentiable or holomorphic functions on infinite-dimensional spaces [See also 46G20, 46G25, 47H60]

46E99 None of the above, but in this section

46Fxx **Distributions, generalized functions, distribution spaces [See also 46T30]**

46F05 Topological linear spaces of test functions, distributions and ultradistributions [See also 46E10, 46E35]

46F10 Operations with distributions

46F12 Integral transforms in distribution spaces [See also 42-XX, 44-XX]

46F15 Hyperfunctions, analytic functionals [See also 32A25, 32A45, 32C35, 58J15]

46F20 Distributions and ultradistributions as boundary values of analytic functions [See also 30D40, 30E25, 32A40]

46F25 Distributions on infinite-dimensional spaces [See also 58C35]

46F30 Generalized functions for nonlinear analysis (Rosinger, Colombeau, nonstandard, etc.)

46F99 None of the above, but in this section

46Gxx **Measures, integration, derivative, holomorphy (all involving infinite-dimensional spaces) [See also 28-XX, 46Txx]**

46G05 Derivatives [See also 46T20, 58C20, 58C25]

46G10 Vector-valued measures and integration [See also 28Bxx, 46B22]

46G12 Measures and integration on abstract linear spaces [See also 28C20, 46T12]

46G15 Functional analytic lifting theory [See also 28A51]

46G20 Infinite-dimensional holomorphy [See also 32-XX, 46E50, 46T25, 58B12, 58C10]

46G25 (Spaces of) multilinear mappings, polynomials [See also 46E50, 46G20, 47H60]

46G99 None of the above, but in this section

46Hxx **Topological algebras, normed rings and algebras, Banach algebras (For group algebras, convolution algebras and measure algebras, see 43A10, 43A20)**

46H05 General theory of topological algebras

46H10 Ideals and subalgebras

46H15 Representations of topological algebras

46H20 Structure, classification of topological algebras

46H25 Normed modules and Banach modules, topological modules (if not placed in 13-XX or 16-XX)

46H30 Functional calculus in topological algebras [See also 47A60]

46H35 Topological algebras of operators [See mainly 47Lxx]

46H40 Automatic continuity

46H70 Nonassociative topological algebras [See also 46K70, 46L70]

46H99 None of the above, but in this section

46Jxx **Commutative Banach algebras and commutative topological algebras [See also 46E25]**

46J05 General theory of commutative topological algebras

46J10 Banach algebras of continuous functions, function algebras [See also 46E25]

46J15 Banach algebras of differentiable or analytic functions, H^p-spaces [See also 30H10, 32A35, 32A37, 32A38, 42B30]

46J20 Ideals, maximal ideals, boundaries

46J25 Representations of commutative topological algebras

46J30 Subalgebras

46J40 Structure, classification of commutative topological algebras

46J45 Radical Banach algebras

46J99 None of the above, but in this section

46Kxx Topological (rings and) algebras with an involution [See also 16W10]

46K05 General theory of topological algebras with involution

46K10 Representations of topological algebras with involution

46K15 Hilbert algebras

46K50 Nonselfadjoint (sub)algebras in algebras with involution

46K70 Nonassociative topological algebras with an involution [See also 46H70, 46L70]

46K99 None of the above, but in this section

46Lxx Selfadjoint operator algebras (C^*-algebras, von Neumann (W^*-) algebras, etc.) [See also 22D25, 47Lxx]

46L05 General theory of C^*-algebras

46L06 Tensor products of C^*-algebras

46L07 Operator spaces and completely bounded maps [See also 47L25]

46L08 C^*-modules

46L09 Free products of C^*-algebras

46L10 General theory of von Neumann algebras

46L30 States

46L35 Classifications of C^*-algebras

46L36 Classification of factors

46L37 Subfactors and their classification

46L40 Automorphisms

46L45 Decomposition theory for C^*-algebras

46L51 Noncommutative measure and integration

46L52 Noncommutative function spaces

46L53 Noncommutative probability and statistics

46L54 Free probability and free operator algebras

46L55 Noncommutative dynamical systems [See also 28Dxx, 37Kxx, 37Lxx, 54H20]

46L57 Derivations, dissipations and positive semigroups in C^*-algebras

46L60 Applications of selfadjoint operator algebras to physics [See also 46N50, 46N55, 47L90, 81T05, 82B10, 82C10]

46L65 Quantizations, deformations

46L70 Nonassociative selfadjoint operator algebras [See also 46H70, 46K70]

46L80 K-theory and operator algebras (including cyclic theory) [See also 18F25, 19Kxx, 46M20, 55Rxx, 58J22]

46L85 Noncommutative topology [See also 58B32, 58B34, 58J22]

46L87 Noncommutative differential geometry [See also 58B32, 58B34, 58J22]

46L89 Other "noncommutative" mathematics based on C^*-algebra theory [See also 58B32, 58B34, 58J22]

46L99 None of the above, but in this section

46Mxx Methods of category theory in functional analysis [See also 18-XX]

46M05 Tensor products [See also 46A32, 46B28, 47A80]

46M07 Ultraproducts [See also 46B08, 46S20]

46M10 Projective and injective objects [See also 46A22]

46M15 Categories, functors (For K-theory, EXT, etc., see 19K33, 46L80, 46M18, 46M20)

46M18 Homological methods (exact sequences, right inverses, lifting, etc.)

46M20 Methods of algebraic topology (cohomology, sheaf and bundle theory, etc.) [See also 14F05, 18Fxx, 19Kxx, 32Cxx, 32Lxx, 46L80, 46M15, 46M18, 55Rxx]

46M35 Abstract interpolation of topological vector spaces [See also 46B70]

46M40 Inductive and projective limits [See also 46A13]

46M99 None of the above, but in this section

46Nxx Miscellaneous applications of functional analysis [See also 47Nxx]

46N10 Applications in optimization, convex analysis, mathematical programming, economics

46N20 Applications to differential and integral equations

46N30 Applications in probability theory and statistics

46N40 Applications in numerical analysis [See also 65Jxx]

46N50 Applications in quantum physics

46N55 Applications in statistical physics

46N60 Applications in biology and other sciences

46N99 None of the above, but in this section

46Sxx	**Other (nonclassical) types of functional analysis [See also 47Sxx]**
46S10	Functional analysis over fields other than **R** or **C** or the quaternions; non-Archimedean functional analysis [See also 12J25, 32P05]
46S20	Nonstandard functional analysis [See also 03H05]
46S30	Constructive functional analysis [See also 03F60]
46S40	Fuzzy functional analysis [See also 03E72]
46S50	Functional analysis in probabilistic metric linear spaces
46S60	Functional analysis on superspaces (supermanifolds) or graded spaces [See also 58A50 and 58C50]
46S99	None of the above, but in this section

46Txx	**Nonlinear functional analysis [See also 47Hxx, 47Jxx, 58Cxx, 58Dxx]**
46T05	Infinite-dimensional manifolds [See also 53Axx, 57N20, 58Bxx, 58Dxx]
46T10	Manifolds of mappings
46T12	Measure (Gaussian, cylindrical, etc.) and integrals (Feynman, path, Fresnel, etc.) on manifolds [See also 28Cxx, 46G12, 60-XX]
46T20	Continuous and differentiable maps [See also 46G05]
46T25	Holomorphic maps [See also 46G20]
46T30	Distributions and generalized functions on nonlinear spaces [See also 46Fxx]
46T99	None of the above, but in this section

47-XX Operator theory

47-00	General reference works (handbooks, dictionaries, bibliographies, etc.)
47-01	Instructional exposition (textbooks, tutorial papers, etc.)
47-02	Research exposition (monographs, survey articles)
47-03	Historical (must also be assigned at least one classification number from Section 01)
47-04	Explicit machine computation and programs (not the theory of computation or programming)

47-06	Proceedings, conferences, collections, etc.

47Axx	**General theory of linear operators**
47A05	General (adjoints, conjugates, products, inverses, domains, ranges, etc.)
47A06	Linear relations (multivalued linear operators)
47A07	Forms (bilinear, sesquilinear, multilinear)
47A10	Spectrum, resolvent
47A11	Local spectral properties
47A12	Numerical range, numerical radius
47A13	Several-variable operator theory (spectral, Fredholm, etc.)
47A15	Invariant subspaces [See also 47A46]
47A16	Cyclic vectors, hypercyclic and chaotic operators
47A20	Dilations, extensions, compressions
47A25	Spectral sets
47A30	Norms (inequalities, more than one norm, etc.)
47A35	Ergodic theory [See also 28Dxx, 37Axx]
47A40	Scattering theory [See also 34L25, 35P25, 37K15, 58J50, 81Uxx]
47A45	Canonical models for contractions and nonselfadjoint operators
47A46	Chains (nests) of projections or of invariant subspaces, integrals along chains, etc.
47A48	Operator colligations (= nodes), vessels, linear systems, characteristic functions, realizations, etc.
47A50	Equations and inequalities involving linear operators, with vector unknowns
47A52	Ill-posed problems, regularization [See also 35R25, 47J06, 65F22, 65J20, 65L08, 65M30, 65R30]
47A53	(Semi-) Fredholm operators; index theories [See also 58B15, 58J20]
47A55	Perturbation theory [See also 47H14, 58J37, 70H09, 81Q15]
47A56	Functions whose values are linear operators (operator and matrix valued functions, etc., including analytic and meromorphic ones)
47A57	Operator methods in interpolation, moment and extension problems [See also 30E05, 42A70, 42A82, 44A60]
47A58	Operator approximation theory

47A60 Functional calculus

47A62 Equations involving linear operators, with operator unknowns

47A63 Operator inequalities

47A64 Operator means, shorted operators, etc.

47A65 Structure theory

47A66 Quasitriangular and nonquasitriangular, quasidiagonal and nonquasidiagonal operators

47A67 Representation theory

47A68 Factorization theory (including Wiener-Hopf and spectral factorizations)

47A70 (Generalized) eigenfunction expansions; rigged Hilbert spaces

47A75 Eigenvalue problems
[See also 47J10, 49R05]

47A80 Tensor products of operators
[See also 46M05]

47A99 None of the above, but in this section

47Bxx Special classes of linear operators

47B06 Riesz operators; eigenvalue distributions; approximation numbers, s-numbers, Kolmogorov numbers, entropy numbers, etc. of operators

47B07 Operators defined by compactness properties

47B10 Operators belonging to operator ideals (nuclear, p-summing, in the Schatten-von Neumann classes, etc.)
[See also 47L20]

47B15 Hermitian and normal operators (spectral measures, functional calculus, etc.)

47B20 Subnormal operators, hyponormal operators, etc.

47B25 Symmetric and selfadjoint operators (unbounded)

47B32 Operators in reproducing-kernel Hilbert spaces (including de Branges, de Branges-Rovnyak, and other structured spaces) [See also 46E22]

47B33 Composition operators

47B34 Kernel operators

47B35 Toeplitz operators, Hankel operators, Wiener-Hopf operators [See also 45P05, 47G10 for other integral operators; see also 32A25, 32M15]

47B36 Jacobi (tridiagonal) operators (matrices) and generalizations

47B37 Operators on special spaces (weighted shifts, operators on sequence spaces, etc.)

47B38 Operators on function spaces (general)

47B39 Difference operators [See also 39A70]

47B40 Spectral operators, decomposable operators, well-bounded operators, etc.

47B44 Accretive operators, dissipative operators, etc.

47B47 Commutators, derivations, elementary operators, etc.

47B48 Operators on Banach algebras

47B49 Transformers, preservers
(operators on spaces of operators)

47B50 Operators on spaces with an indefinite metric [See also 46C50]

47B60 Operators on ordered spaces

47B65 Positive operators and order-bounded operators

47B80 Random operators
[See also 47H40, 60H25]

47B99 None of the above, but in this section

47Cxx Individual linear operators as elements of algebraic systems

47C05 Operators in algebras

47C10 Operators in *-algebras

47C15 Operators in C^*- or von Neumann algebras

47C99 None of the above, but in this section

47Dxx Groups and semigroups of linear operators, their generalizations and applications

47D03 Groups and semigroups of linear operators (For nonlinear operators, see 47H20; see also 20M20)

47D06 One-parameter semigroups and linear evolution equations
[See also 34G10, 34K30]

47D07 Markov semigroups and applications to diffusion processes
(For Markov processes, see 60Jxx)

47D08 Schrödinger and Feynman-Kac semigroups

47D09 Operator sine and cosine functions and higher-order Cauchy problems
[See also 34G10]

47D60 C-semigroups, regularized semigroups

47D62 Integrated semigroups

47D99 None of the above, but in this section

47Exx Ordinary differential operators
[See also 34Bxx, 34Lxx]

47E05 Ordinary differential operators [See also 34Bxx, 34Lxx] (should also be assigned at least one other classification number in section 47)

47E99 None of the above, but in this section

47Fxx Partial differential operators
[See also 35Pxx, 58Jxx]

47F05 Partial differential operators [See also 35Pxx, 58Jxx] (should also be assigned at least one other classification number in section 47)

47F99 None of the above, but in this section

47Gxx Integral, integro-differential, and pseudodifferential operators
[See also 58Jxx]

47G10 Integral operators [See also 45P05]

47G20 Integro-differential operators [See also 34K30, 35R09, 35R10, 45Jxx, 45Kxx]

47G30 Pseudodifferential operators [See also 35Sxx, 58Jxx]

47G40 Potential operators [See also 31-XX]

47G99 None of the above, but in this section

47Hxx Nonlinear operators and their properties (For global and geometric aspects, see 49J53, 58-XX, especially 58Cxx)

47H04 Set-valued operators [See also 28B20, 54C60, 58C06]

47H05 Monotone operators and generalizations

47H06 Accretive operators, dissipative operators, etc.

47H07 Monotone and positive operators on ordered Banach spaces or other ordered topological vector spaces

47H08 Measures of noncompactness and condensing mappings, *K*-set contractions, etc.

47H09 Contraction-type mappings, nonexpansive mappings, *A*-proper mappings, etc.

47H10 Fixed-point theorems [See also 37C25, 54H25, 55M20, 58C30]

47H11 Degree theory [See also 55M25, 58C30]

47H14 Perturbations of nonlinear operators [See also 47A55, 58J37, 70H09, 70K60, 81Q15]

47H20 Semigroups of nonlinear operators [See also 37L05, 47J35, 54H15, 58D07]

47H25 Nonlinear ergodic theorems [See also 28Dxx, 37Axx, 47A35]

47H30 Particular nonlinear operators (superposition, Hammerstein, Nemytskiĭ, Uryson, etc.) [See also 45Gxx, 45P05]

47H40 Random operators [See also 47B80, 60H25]

47H60 Multilinear and polynomial operators [See also 46G25]

47H99 None of the above, but in this section

47Jxx Equations and inequalities involving nonlinear operators [See also 46Txx] (For global and geometric aspects, see 58-XX)

47J05 Equations involving nonlinear operators (general) [See also 47H10, 47J25]

47J06 Nonlinear ill-posed problems [See also 35R25, 47A52, 65F22, 65J20, 65L08, 65M30, 65R30]

47J07 Abstract inverse mapping and implicit function theorems [See also 46T20 and 58C15]

47J10 Nonlinear spectral theory, nonlinear eigenvalue problems [See also 49R05]

47J15 Abstract bifurcation theory [See also 34C23, 37Gxx, 58E07, 58E09]

47J20 Variational and other types of inequalities involving nonlinear operators (general) [See also 49J40]

47J22 Variational and other types of inclusions [See also 34A60, 49J21, 49K21]

47J25 Iterative procedures [See also 65J15]

47J30 Variational methods [See also 58Exx]

47J35 Nonlinear evolution equations [See also 34G20, 35K90, 35L90, 35Qxx, 35R20, 37Kxx, 37Lxx, 47H20, 58D25]

47J40 Equations with hysteresis operators [See also 34C55, 74N30]

47J99 None of the above, but in this section

47Lxx Linear spaces and algebras of operators [See also 46Lxx]

47L05 Linear spaces of operators [See also 46A32 and 46B28]

47L07 Convex sets and cones of operators
[See also 46A55]

47L10 Algebras of operators on Banach spaces and other topological linear spaces

47L15 Operator algebras with symbol structure

47L20 Operator ideals [See also 47B10]

47L22 Ideals of polynomials and of multilinear mappings

47L25 Operator spaces (= matricially normed spaces) [See also 46L07]

47L30 Abstract operator algebras on Hilbert spaces

47L35 Nest algebras, CSL algebras

47L40 Limit algebras, subalgebras of C^*-algebras

47L45 Dual algebras; weakly closed singly generated operator algebras

47L50 Dual spaces of operator algebras

47L55 Representations of (nonselfadjoint) operator algebras

47L60 Algebras of unbounded operators; partial algebras of operators

47L65 Crossed product algebras (analytic crossed products)

47L70 Nonassociative nonselfadjoint operator algebras

47L75 Other nonselfadjoint operator algebras

47L80 Algebras of specific types of operators (Toeplitz, integral, pseudodifferential, etc.)

47L90 Applications of operator algebras to physics

47L99 None of the above, but in this section

47Nxx Miscellaneous applications of operator theory [See also 46Nxx]

47N10 Applications in optimization, convex analysis, mathematical programming, economics

47N20 Applications to differential and integral equations

47N30 Applications in probability theory and statistics

47N40 Applications in numerical analysis [See also 65Jxx]

47N50 Applications in the physical sciences

47N60 Applications in chemistry and life sciences

47N70 Applications in systems theory, circuits, and control theory

47N99 None of the above, but in this section

47Sxx Other (nonclassical) types of operator theory [See also 46Sxx]

47S10 Operator theory over fields other than **R**, **C** or the quaternions; non-Archimedean operator theory

47S20 Nonstandard operator theory [See also 03H05]

47S30 Constructive operator theory [See also 03F60]

47S40 Fuzzy operator theory [See also 03E72]

47S50 Operator theory in probabilistic metric linear spaces [See also 54E70]

47S99 None of the above, but in this section

49-XX Calculus of variations and optimal control; optimization [See also 34H05, 34K35, 65Kxx, 90Cxx, 93-XX]

49-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

49-01 Instructional exposition (textbooks, tutorial papers, etc.)

49-02 Research exposition (monographs, survey articles)

49-03 Historical (must also be assigned at least one classification number from Section 01)

49-04 Explicit machine computation and programs (not the theory of computation or programming)

49-06 Proceedings, conferences, collections, etc.

49Jxx Existence theories

49J05 Free problems in one independent variable

49J10 Free problems in two or more independent variables

49J15 Optimal control problems involving ordinary differential equations

49J20 Optimal control problems involving partial differential equations

49J21 Optimal control problems involving relations other than differential equations

49J27 Problems in abstract spaces [See also 90C48, 93C25]

49J30 Optimal solutions belonging to restricted classes
(Lipschitz controls, bang-bang controls, etc.)

49J35 Minimax problems

49J40 Variational methods including variational inequalities [See also 47J20]

49J45 Methods involving semicontinuity and convergence; relaxation

49J50 Fréchet and Gateaux differentiability [See also 46G05, 58C20]

49J52 Nonsmooth analysis
[See also 46G05, 58C50, 90C56]

49J53 Set-valued and variational analysis
[See also 28B20, 47H04, 54C60, 58C06]

49J55 Problems involving randomness
[See also 93E20]

49J99 None of the above, but in this section

49Kxx Optimality conditions

49K05 Free problems in one independent variable

49K10 Free problems in two or more independent variables

49K15 Problems involving ordinary differential equations

49K20 Problems involving partial differential equations

49K21 Problems involving relations other than differential equations

49K27 Problems in abstract spaces
[See also 90C48, 93C25]

49K30 Optimal solutions belonging to restricted classes

49K35 Minimax problems

49K40 Sensitivity, stability, well-posedness
[See also 90C31]

49K45 Problems involving randomness
[See also 93E20]

49K99 None of the above, but in this section

49Lxx Hamilton-Jacobi theories, including dynamic programming

49L20 Dynamic programming method

49L25 Viscosity solutions

49L99 None of the above, but in this section

49Mxx Numerical methods
[See also 90Cxx, 65Kxx]

49M05 Methods based on necessary conditions

49M15 Newton-type methods

49M20 Methods of relaxation type

49M25 Discrete approximations

49M27 Decomposition methods

49M29 Methods involving duality

49M30 Other methods

49M37 Methods of nonlinear programming type [See also 90C30, 65Kxx]

49M99 None of the above, but in this section

49Nxx Miscellaneous topics

49N05 Linear optimal control problems
[See also 93C05]

49N10 Linear-quadratic problems

49N15 Duality theory

49N20 Periodic optimization

49N25 Impulsive optimal control problems

49N30 Problems with incomplete information
[See also 93C41]

49N35 Optimal feedback synthesis
[See also 93B52]

49N45 Inverse problems

49N60 Regularity of solutions

49N70 Differential games

49N75 Pursuit and evasion games

49N90 Applications of optimal control and differential games [See also 90C90, 93C95]

49N99 None of the above, but in this section

49Qxx Manifolds [See also 58Exx]

49Q05 Minimal surfaces
[See also 53A10, 58E12]

49Q10 Optimization of shapes other than minimal surfaces [See also 90C90]

49Q12 Sensitivity analysis

49Q15 Geometric measure and integration theory, integral and normal currents
[See also 28A75, 32C30, 58A25, 58C35]

49Q20 Variational problems in a geometric measure-theoretic setting

49Q99 None of the above, but in this section

49Rxx Variational methods for eigenvalues of operators [See also 47A75]

49R05 Variational methods for eigenvalues of operators [See also 47A75] (should also be assigned at least one other classification number in Section 49)

49R99 None of the above, but in this section

49Sxx Variational principles of physics

49S05 Variational principles of physics (should also be assigned at least one other classification number in section 49)

49S99 None of the above, but in this section

51-XX Geometry (For algebraic geometry, see 14-XX)

51-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

51-01 Instructional exposition (textbooks, tutorial papers, etc.)

51-02 Research exposition (monographs, survey articles)

51-03 Historical (must also be assigned at least one classification number from Section 01)

51-04 Explicit machine computation and programs (not the theory of computation or programming)

51-06 Proceedings, conferences, collections, etc.

51Axx Linear incidence geometry

51A05 General theory and projective geometries

51A10 Homomorphism, automorphism and dualities

51A15 Structures with parallelism

51A20 Configuration theorems

51A25 Algebraization [See also 12Kxx, 20N05]

51A30 Desarguesian and Pappian geometries

51A35 Non-Desarguesian affine and projective planes

51A40 Translation planes and spreads

51A45 Incidence structures imbeddable into projective geometries

51A50 Polar geometry, symplectic spaces, orthogonal spaces

51A99 None of the above, but in this section

51Bxx Nonlinear incidence geometry

51B05 General theory

51B10 Möbius geometries

51B15 Laguerre geometries

51B20 Minkowski geometries

51B25 Lie geometries

51B99 None of the above, but in this section

51Cxx Ring geometry (Hjelmslev, Barbilian, etc.)

51C05 Ring geometry (Hjelmslev, Barbilian, etc.)

51C99 None of the above, but in this section

51Dxx Geometric closure systems

51D05 Abstract (Maeda) geometries

51D10 Abstract geometries with exchange axiom

51D15 Abstract geometries with parallelism

51D20 Combinatorial geometries [See also 05B25, 05B35]

51D25 Lattices of subspaces [See also 05B35]

51D30 Continuous geometries and related topics [See also 06Cxx]

51D99 None of the above, but in this section

51Exx Finite geometry and special incidence structures

51E05 General block designs [See also 05B05]

51E10 Steiner systems

51E12 Generalized quadrangles, generalized polygons

51E14 Finite partial geometries (general), nets, partial spreads

51E15 Affine and projective planes

51E20 Combinatorial structures in finite projective spaces [See also 05Bxx]

51E21 Blocking sets, ovals, k-arcs

51E22 Linear codes and caps in Galois spaces [See also 94B05]

51E23 Spreads and packing problems

51E24 Buildings and the geometry of diagrams

51E25 Other finite nonlinear geometries

51E26 Other finite linear geometries

51E30 Other finite incidence structures [See also 05B30]

51E99 None of the above, but in this section

51Fxx Metric geometry
51F05 Absolute planes
51F10 Absolute spaces
51F15 Reflection groups, reflection geometries [See also 20H10, 20H15; for Coxeter groups, see 20F55]
51F20 Congruence and orthogonality [See also 20H05]
51F25 Orthogonal and unitary groups [See also 20H05]
51F99 None of the above, but in this section

51Gxx Ordered geometries (ordered incidence structures, etc.)
51G05 Ordered geometries (ordered incidence structures, etc.)
51G99 None of the above, but in this section

51Hxx Topological geometry
51H05 General theory
51H10 Topological linear incidence structures
51H15 Topological nonlinear incidence structures
51H20 Topological geometries on manifolds [See also 57-XX]
51H25 Geometries with differentiable structure [See also 53Cxx, 53C70]
51H30 Geometries with algebraic manifold structure [See also 14-XX]
51H99 None of the above, but in this section

51Jxx Incidence groups
51J05 General theory
51J10 Projective incidence groups
51J15 Kinematic spaces
51J20 Representation by near-fields and near-algebras [See also 12K05, 16Y30]
51J99 None of the above, but in this section

51Kxx Distance geometry
51K05 General theory
51K10 Synthetic differential geometry
51K99 None of the above, but in this section

51Lxx Geometric order structures [See also 53C75]
51L05 Geometry of orders of nondifferentiable curves
51L10 Directly differentiable curves
51L15 n-vertex theorems via direct methods
51L20 Geometry of orders of surfaces
51L99 None of the above, but in this section

51Mxx Real and complex geometry
51M04 Elementary problems in Euclidean geometries
51M05 Euclidean geometries (general) and generalizations
51M09 Elementary problems in hyperbolic and elliptic geometries
51M10 Hyperbolic and elliptic geometries (general) and generalizations
51M15 Geometric constructions
51M16 Inequalities and extremum problems (For convex problems, see 52A40)
51M20 Polyhedra and polytopes; regular figures, division of spaces [See also 51F15]
51M25 Length, area and volume [See also 26B15]
51M30 Line geometries and their generalizations [See also 53A25]
51M35 Synthetic treatment of fundamental manifolds in projective geometries (Grassmannians, Veronesians and their generalizations) [See also 14M15]
51M99 None of the above, but in this section

51Nxx Analytic and descriptive geometry
51N05 Descriptive geometry [See also 65D17, 68U07]
51N10 Affine analytic geometry
51N15 Projective analytic geometry
51N20 Euclidean analytic geometry
51N25 Analytic geometry with other transformation groups
51N30 Geometry of classical groups [See also 20Gxx, 14L35]
51N35 Questions of classical algebraic geometry [See also 14Nxx]
51N99 None of the above, but in this section

51Pxx Geometry and physics (should also be assigned at least one other classification number from Sections 70–86)

51P05 Geometry and physics (should also be assigned at least one other classification number from Sections 70–86)

51P99 None of the above, but in this section

52-XX Convex and discrete geometry

52-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

52-01 Instructional exposition (textbooks, tutorial papers, etc.)

52-02 Research exposition (monographs, survey articles)

52-03 Historical (must also be assigned at least one classification number from Section 01)

52-04 Explicit machine computation and programs (not the theory of computation or programming)

52-06 Proceedings, conferences, collections, etc.

52Axx General convexity

52A01 Axiomatic and generalized convexity

52A05 Convex sets without dimension restrictions

52A07 Convex sets in topological vector spaces [See also 46A55]

52A10 Convex sets in 2 dimensions (including convex curves) [See also 53A04]

52A15 Convex sets in 3 dimensions (including convex surfaces) [See also 53A05, 53C45]

52A20 Convex sets in n dimensions (including convex hypersurfaces) [See also 53A07, 53C45]

52A21 Finite-dimensional Banach spaces (including special norms, zonoids, etc.) [See also 46Bxx]

52A22 Random convex sets and integral geometry [See also 53C65, 60D05]

52A23 Asymptotic theory of convex bodies [See also 46B06]

52A27 Approximation by convex sets

52A30 Variants of convex sets (star-shaped, (m, n)-convex, etc.)

52A35 Helly-type theorems and geometric transversal theory

52A37 Other problems of combinatorial convexity

52A38 Length, area, volume [See also 26B15, 28A75, 49Q20]

52A39 Mixed volumes and related topics

52A40 Inequalities and extremum problems

52A41 Convex functions and convex programs [See also 26B25, 90C25]

52A55 Spherical and hyperbolic convexity

52A99 None of the above, but in this section

52Bxx Polytopes and polyhedra

52B05 Combinatorial properties (number of faces, shortest paths, etc.) [See also 05Cxx]

52B10 Three-dimensional polytopes

52B11 n-dimensional polytopes

52B12 Special polytopes (linear programming, centrally symmetric, etc.)

52B15 Symmetry properties of polytopes

52B20 Lattice polytopes (including relations with commutative algebra and algebraic geometry) [See also 06A11, 13F20, 13Hxx]

52B22 Shellability

52B35 Gale and other diagrams

52B40 Matroids (realizations in the context of convex polytopes, convexity in combinatorial structures, etc.) [See also 05B35, 52Cxx]

52B45 Dissections and valuations (Hilbert's third problem, etc.)

52B55 Computational aspects related to convexity (For computational geometry and algorithms, see 68Q25, 68U05; for numerical algorithms, see 65Yxx) [See also 68Uxx]

52B60 Isoperimetric problems for polytopes

52B70 Polyhedral manifolds

52B99 None of the above, but in this section

52Cxx Discrete geometry

52C05 Lattices and convex bodies in 2 dimensions [See also 11H06, 11H31, 11P21]

52C07 Lattices and convex bodies in n dimensions [See also 11H06, 11H31, 11P21]

52C10 Erdős problems and related topics of discrete geometry [See also 11Hxx]

52C15 Packing and covering in 2 dimensions [See also 05B40, 11H31]

52C17 Packing and covering in n dimensions [See also 05B40, 11H31]

52C20 Tilings in 2 dimensions [See also 05B45, 51M20]

52C22 Tilings in n dimensions [See also 05B45, 51M20]

52C23 Quasicrystals, aperiodic tilings

52C25 Rigidity and flexibility of structures [See also 70B15]

52C26 Circle packings and discrete conformal geometry

52C30 Planar arrangements of lines and pseudolines

52C35 Arrangements of points, flats, hyperplanes [See also 32S22]

52C40 Oriented matroids

52C45 Combinatorial complexity of geometric structures [See also 68U05]

52C99 None of the above, but in this section

53-XX Differential geometry (For differential topology, see 57Rxx. For foundational questions of differentiable manifolds, see 58Axx)

53-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

53-01 Instructional exposition (textbooks, tutorial papers, etc.)

53-02 Research exposition (monographs, survey articles)

53-03 Historical (must also be assigned at least one classification number from Section 01)

53-04 Explicit machine computation and programs (not the theory of computation or programming)

53-06 Proceedings, conferences, collections, etc.

53Axx Classical differential geometry

53A04 Curves in Euclidean space

53A05 Surfaces in Euclidean space

53A07 Higher-dimensional and -codimensional surfaces in Euclidean n-space

53A10 Minimal surfaces, surfaces with prescribed mean curvature [See also 49Q05, 49Q10, 53C42]

53A15 Affine differential geometry

53A17 Kinematics

53A20 Projective differential geometry

53A25 Differential line geometry

53A30 Conformal differential geometry

53A35 Non-Euclidean differential geometry

53A40 Other special differential geometries

53A45 Vector and tensor analysis

53A55 Differential invariants (local theory), geometric objects

53A60 Geometry of webs [See also 14C21, 20N05]

53A99 None of the above, but in this section

53Bxx Local differential geometry

53B05 Linear and affine connections

53B10 Projective connections

53B15 Other connections

53B20 Local Riemannian geometry

53B21 Methods of Riemannian geometry

53B25 Local submanifolds [See also 53C40]

53B30 Lorentz metrics, indefinite metrics

53B35 Hermitian and Kählerian structures [See also 32Cxx]

53B40 Finsler spaces and generalizations (areal metrics)

53B50 Applications to physics

53B99 None of the above, but in this section

53Cxx Global differential geometry [See also 51H25, 58-XX; for related bundle theory, see 55Rxx, 57Rxx]

53C05 Connections, general theory

53C07 Special connections and metrics on vector bundles (Hermite-Einstein-Yang-Mills) [See also 32Q20]

53C08 Gerbes, differential characters: differential geometric aspects

53C10 G-structures

53C12 Foliations (differential geometric aspects) [See also 57R30, 57R32]

53C15 General geometric structures on manifolds (almost complex, almost product structures, etc.)

53C17 Sub-Riemannian geometry

53C20 Global Riemannian geometry, including pinching [See also 31C12, 58B20]

53C21 Methods of Riemannian geometry, including PDE methods; curvature restrictions [See also 58J60]

53C22 Geodesics [See also 58E10]

53C23 Global geometric and topological methods (à la Gromov); differential geometric analysis on metric spaces

53C24 Rigidity results

53C25 Special Riemannian manifolds (Einstein, Sasakian, etc.)

53C26 Hyper-Kähler and quaternionic Kähler geometry, "special" geometry

53C27 Spin and Spin^c geometry

53C28 Twistor methods [See also 32L25]

53C29 Issues of holonomy

53C30 Homogeneous manifolds [See also 14M15, 14M17, 32M10, 57T15]

53C35 Symmetric spaces [See also 32M15, 57T15]

53C38 Calibrations and calibrated geometries

53C40 Global submanifolds [See also 53B25]

53C42 Immersions (minimal, prescribed curvature, tight, etc.) [See also 49Q05, 49Q10, 53A10, 57R40, 57R42]

53C43 Differential geometric aspects of harmonic maps [See also 58E20]

53C44 Geometric evolution equations (mean curvature flow, Ricci flow, etc.)

53C45 Global surface theory (convex surfaces à la A. D. Aleksandrov)

53C50 Lorentz manifolds, manifolds with indefinite metrics

53C55 Hermitian and Kählerian manifolds [See also 32Cxx]

53C56 Other complex differential geometry [See also 32Cxx]

53C60 Finsler spaces and generalizations (areal metrics) [See also 58B20]

53C65 Integral geometry [See also 52A22, 60D05]; differential forms, currents, etc. [See mainly 58Axx]

53C70 Direct methods (*G*-spaces of Busemann, etc.)

53C75 Geometric orders, order geometry [See also 51Lxx]

53C80 Applications to physics

53C99 None of the above, but in this section

53Dxx Symplectic geometry, contact geometry [See also 37Jxx, 70Gxx, 70Hxx]

53D05 Symplectic manifolds, general

53D10 Contact manifolds, general

53D12 Lagrangian submanifolds; Maslov index

53D15 Almost contact and almost symplectic manifolds

53D17 Poisson manifolds; Poisson groupoids and algebroids

53D18 Generalized geometries (à la Hitchin)

53D20 Momentum maps; symplectic reduction

53D22 Canonical transformations

53D25 Geodesic flows

53D30 Symplectic structures of moduli spaces

53D35 Global theory of symplectic and contact manifolds [See also 57Rxx]

53D37 Mirror symmetry, symplectic aspects; homological mirror symmetry; Fukaya category [See also 14J33]

53D40 Floer homology and cohomology, symplectic aspects

53D42 Symplectic field theory; contact homology

53D45 Gromov-Witten invariants, quantum cohomology, Frobenius manifolds [See also 14N35]

53D50 Geometric quantization

53D55 Deformation quantization, star products

53D99 None of the above, but in this section

53Zxx Applications to physics

53Z05 Applications to physics

53Z99 None of the above, but in this section

54-XX General topology (For the topology of manifolds of all dimensions, see 57Nxx)

54-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

54-01 Instructional exposition (textbooks, tutorial papers, etc.)

54-02 Research exposition (monographs, survey articles)

54-03 Historical (must also be assigned at least one classification number from Section 01)

54-04 Explicit machine computation and programs (not the theory of computation or programming)

54-06 Proceedings, conferences, collections, etc.

54Axx Generalities

54A05 Topological spaces and generalizations (closure spaces, etc.)

54A10 Several topologies on one set (change of topology, comparison of topologies, lattices of topologies)

54A15 Syntopogeneous structures

54A20 Convergence in general topology (sequences, filters, limits, convergence spaces, etc.)

54A25 Cardinality properties (cardinal functions and inequalities, discrete subsets) [See also 03Exx] (For ultrafilters, see 54D80)

54A35 Consistency and independence results [See also 03E35]

54A40 Fuzzy topology [See also 03E72]

54A99 None of the above, but in this section

54Bxx Basic constructions

54B05 Subspaces

54B10 Product spaces

54B15 Quotient spaces, decompositions

54B17 Adjunction spaces and similar constructions

54B20 Hyperspaces

54B30 Categorical methods [See also 18B30]

54B35 Spectra

54B40 Presheaves and sheaves [See also 18F20]

54B99 None of the above, but in this section

54Cxx Maps and general types of spaces defined by maps

54C05 Continuous maps

54C08 Weak and generalized continuity

54C10 Special maps on topological spaces (open, closed, perfect, etc.)

54C15 Retraction

54C20 Extension of maps

54C25 Embedding

54C30 Real-valued functions [See also 26-XX]

54C35 Function spaces [See also 46Exx, 58D15]

54C40 Algebraic properties of function spaces [See also 46J10]

54C45 C- and C^*-embedding

54C50 Special sets defined by functions [See also 26A21]

54C55 Absolute neighborhood extensor, absolute extensor, absolute neighborhood retract (ANR), absolute retract spaces (general properties) [See also 55M15]

54C56 Shape theory [See also 55P55, 57N25]

54C60 Set-valued maps [See also 26E25, 28B20, 47H04, 58C06]

54C65 Selections [See also 28B20]

54C70 Entropy

54C99 None of the above, but in this section

54Dxx Fairly general properties

54D05 Connected and locally connected spaces (general aspects)

54D10 Lower separation axioms (T_0–T_3, etc.)

54D15 Higher separation axioms (completely regular, normal, perfectly or collectionwise normal, etc.)

54D20 Noncompact covering properties (paracompact, Lindelöf, etc.)

54D25 "P-minimal" and "P-closed" spaces

54D30 Compactness

54D35 Extensions of spaces (compactifications, supercompactifications, completions, etc.)

54D40 Remainders

54D45 Local compactness, σ-compactness

54D50 k-spaces

54D55 Sequential spaces

54D60 Realcompactness and realcompactification

54D65 Separability

54D70 Base properties

54D80 Special constructions of spaces (spaces of ultrafilters, etc.)

54D99 None of the above, but in this section

54Exx Spaces with richer structures

54E05 Proximity structures and generalizations

54E15 Uniform structures and generalizations

54E17 Nearness spaces

54E18 p-spaces, M-spaces, σ-spaces, etc.

54E20 Stratifiable spaces, cosmic spaces, etc.

54E25 Semimetric spaces

54E30 Moore spaces

54E35 Metric spaces, metrizability

54E40 Special maps on metric spaces

54E45 Compact (locally compact) metric spaces

54E50 Complete metric spaces

54E52 Baire category, Baire spaces

54E55 Bitopologies

54E70 Probabilistic metric spaces

54E99 None of the above, but in this section

54Fxx Special properties

54F05 Linearly ordered topological spaces, generalized ordered spaces, and partially ordered spaces
[See also 06B30, 06F30]

54F15 Continua and generalizations

54F35 Higher-dimensional local connectedness [See also 55Mxx, 55Nxx]

54F45 Dimension theory [See also 55M10]

54F50 Spaces of dimension ≤ 1;
curves, dendrites [See also 26A03]

54F55 Unicoherence, multicoherence

54F65 Topological characterizations of particular spaces

54F99 None of the above, but in this section

54Gxx Peculiar spaces

54G05 Extremally disconnected spaces,
F-spaces, etc.

54G10 *P*-spaces

54G12 Scattered spaces

54G15 Pathological spaces

54G20 Counterexamples

54G99 None of the above, but in this section

54Hxx Connections with other structures, applications

54H05 Descriptive set theory (topological aspects of Borel, analytic, projective, etc. sets) [See also 03E15, 26A21, 28A05]

54H10 Topological representations of algebraic systems [See also 22-XX]

54H11 Topological groups [See also 22A05]

54H12 Topological lattices, etc.
[See also 06B30, 06F30]

54H13 Topological fields, rings, etc. [See also 12Jxx] (For algebraic aspects, see 13Jxx, 16W80)

54H15 Transformation groups and semigroups [See also 20M20, 22-XX, 57Sxx]

54H20 Topological dynamics
[See also 28Dxx, 37Bxx]

54H25 Fixed-point and coincidence theorems [See also 47H10, 55M20]

54H99 None of the above, but in this section

54Jxx Nonstandard topology [See also 03H05]

54J05 Nonstandard topology [See also 03H05]

54J99 None of the above, but in this section

55-XX Algebraic topology

55-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

55-01 Instructional exposition
(textbooks, tutorial papers, etc.)

55-02 Research exposition (monographs, survey articles)

55-03 Historical (must also be assigned at least one classification number from Section 01)

55-04 Explicit machine computation and programs (not the theory of computation or programming)

55-06 Proceedings, conferences, collections, etc.

55Mxx Classical topics (For the topology of Euclidean spaces and manifolds, see 57Nxx)

55M05 Duality

55M10 Dimension theory [See also 54F45]

55M15 Absolute neighborhood retracts
[See also 54C55]

55M20 Fixed points and coincidences
[See also 54H25]

55M25 Degree, winding number

55M30 Ljusternik-Schnirelman (Lyusternik-Shnirel'man) category of a space

55M35 Finite groups of transformations (including Smith theory) [See also 57S17]

55M99 None of the above, but in this section

55Nxx Homology and cohomology theories [See also 57Txx]

55N05 Čech types

55N07 Steenrod-Sitnikov homologies

55N10 Singular theory

55N15 *K*-theory [See also 19Lxx] (For algebraic *K*-theory, see 18F25, 19-XX)

55N20 Generalized (extraordinary) homology and cohomology theories

55N22 Bordism and cobordism theories, formal group laws [See also 14L05, 19L41, 57R75, 57R77, 57R85, 57R90]

55N25 Homology with local coefficients, equivariant cohomology

55N30 Sheaf cohomology [See also 18F20, 32C35, 32L10]

55N32 Orbifold cohomology

55N33 Intersection homology and cohomology

55N34 Elliptic cohomology

55N35 Other homology theories

55N40 Axioms for homology theory and uniqueness theorems

55N45 Products and intersections

55N91 Equivariant homology and cohomology [See also 19L47]

55N99 None of the above, but in this section

55Pxx Homotopy theory (For simple homotopy type, see 57Q10)

55P05 Homotopy extension properties, cofibrations

55P10 Homotopy equivalences

55P15 Classification of homotopy type

55P20 Eilenberg-Mac Lane spaces

55P25 Spanier-Whitehead duality

55P30 Eckmann-Hilton duality

55P35 Loop spaces

55P40 Suspensions

55P42 Stable homotopy theory, spectra

55P43 Spectra with additional structure (E_∞, A_∞, ring spectra, etc.)

55P45 *H*-spaces and duals

55P47 Infinite loop spaces

55P48 Loop space machines, operads [See also 18D50]

55P50 String topology

55P55 Shape theory [See also 54C56, 55Q07]

55P57 Proper homotopy theory

55P60 Localization and completion

55P62 Rational homotopy theory

55P65 Homotopy functors

55P91 Equivariant homotopy theory [See also 19L47]

55P92 Relations between equivariant and nonequivariant homotopy theory

55P99 None of the above, but in this section

55Qxx Homotopy groups

55Q05 Homotopy groups, general; sets of homotopy classes

55Q07 Shape groups

55Q10 Stable homotopy groups

55Q15 Whitehead products and generalizations

55Q20 Homotopy groups of wedges, joins, and simple spaces

55Q25 Hopf invariants

55Q35 Operations in homotopy groups

55Q40 Homotopy groups of spheres

55Q45 Stable homotopy of spheres

55Q50 *J*-morphism [See also 19L20]

55Q51 v_n-periodicity

55Q52 Homotopy groups of special spaces

55Q55 Cohomotopy groups

55Q70 Homotopy groups of special types [See also 55N05, 55N07]

55Q91 Equivariant homotopy groups [See also 19L47]

55Q99 None of the above, but in this section

55Rxx Fiber spaces and bundles [See also 18F15, 32Lxx, 46M20, 57R20, 57R22, 57R25]

55R05 Fiber spaces

55R10 Fiber bundles

55R12 Transfer

55R15 Classification

55R20 Spectral sequences and homology of fiber spaces [See also 55Txx]

55R25 Sphere bundles and vector bundles

55R35 Classifying spaces of groups and *H*-spaces

55R37 Maps between classifying spaces

55R40 Homology of classifying spaces, characteristic classes [See also 57Txx, 57R20]

55R45 Homology and homotopy of *B*O and *B*U; Bott periodicity

55R50 Stable classes of vector space bundles, K-theory [See also 19Lxx] (For algebraic K-theory, see 18F25, 19-XX)

55R55 Fiberings with singularities

55R60 Microbundles and block bundles [See also 57N55, 57Q50]

55R65 Generalizations of fiber spaces and bundles

55R70 Fibrewise topology

55R80 Discriminantal varieties, configuration spaces

55R91 Equivariant fiber spaces and bundles [See also 19L47]

55R99 None of the above, but in this section

55Sxx Operations and obstructions

55S05 Primary cohomology operations

55S10 Steenrod algebra

55S12 Dyer-Lashof operations

55S15 Symmetric products, cyclic products

55S20 Secondary and higher cohomology operations

55S25 K-theory operations and generalized cohomology operations [See also 19D55, 19Lxx]

55S30 Massey products

55S35 Obstruction theory

55S36 Extension and compression of mappings

55S37 Classification of mappings

55S40 Sectioning fiber spaces and bundles

55S45 Postnikov systems, k-invariants

55S91 Equivariant operations and obstructions [See also 19L47]

55S99 None of the above, but in this section

55Txx Spectral sequences [See also 18G40, 55R20]

55T05 General

55T10 Serre spectral sequences

55T15 Adams spectral sequences

55T20 Eilenberg-Moore spectral sequences [See also 57T35]

55T25 Generalized cohomology

55T99 None of the above, but in this section

55Uxx Applied homological algebra and category theory [See also 18Gxx]

55U05 Abstract complexes

55U10 Simplicial sets and complexes

55U15 Chain complexes

55U20 Universal coefficient theorems, Bockstein operator

55U25 Homology of a product, Künneth formula

55U30 Duality

55U35 Abstract and axiomatic homotopy theory

55U40 Topological categories, foundations of homotopy theory

55U99 None of the above, but in this section

57-XX Manifolds and cell complexes (For complex manifolds, see 32Qxx)

57-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

57-01 Instructional exposition (textbooks, tutorial papers, etc.)

57-02 Research exposition (monographs, survey articles)

57-03 Historical (must also be assigned at least one classification number from Section 01)

57-04 Explicit machine computation and programs (not the theory of computation or programming)

57-06 Proceedings, conferences, collections, etc.

57Mxx Low-dimensional topology

57M05 Fundamental group, presentations, free differential calculus

57M07 Topological methods in group theory

57M10 Covering spaces

57M12 Special coverings, e.g. branched

57M15 Relations with graph theory [See also 05Cxx]

57M20 Two-dimensional complexes

57M25 Knots and links in S^3 (For higher dimensions, see 57Q45)

57M27 Invariants of knots and 3-manifolds

57M30 Wild knots and surfaces, etc., wild embeddings

57M35 Dehn's lemma, sphere theorem, loop theorem, asphericity

57M40 Characterizations of E^3 and S^3 (Poincaré conjecture) [See also 57N12]

57M50 Geometric structures on low-dimension-al manifolds

57M60 Group actions in low dimensions

57M99 None of the above, but in this section

57Nxx Topological manifolds

57N05 Topology of E^2, 2-manifolds

57N10 Topology of general 3-manifolds [See also 57Mxx]

57N12 Topology of E^3 and S^3 [See also 57M40]

57N13 Topology of E^4, 4-manifolds [See also 14Jxx, 32Jxx]

57N15 Topology of E^n, n-manifolds ($4 < n < \infty$)

57N16 Geometric structures on manifolds [See also 57M50]

57N17 Topology of topological vector spaces

57N20 Topology of infinite-dimensional manifolds [See also 58Bxx]

57N25 Shapes [See also 54C56, 55P55, 55Q07]

57N30 Engulfing

57N35 Embeddings and immersions

57N37 Isotopy and pseudo-isotopy

57N40 Neighborhoods of submanifolds

57N45 Flatness and tameness

57N50 $S^{n-1} \subset E^n$, Schoenflies problem

57N55 Microbundles and block bundles [See also 55R60, 57Q50]

57N60 Cellularity

57N65 Algebraic topology of manifolds

57N70 Cobordism and concordance

57N75 General position and transversality

57N80 Stratifications

57N99 None of the above, but in this section

57Pxx Generalized manifolds [See also 18F15]

57P05 Local properties of generalized manifolds

57P10 Poincaré duality spaces

57P99 None of the above, but in this section

57Qxx PL-topology

57Q05 General topology of complexes

57Q10 Simple homotopy type, Whitehead torsion, Reidemeister-Franz torsion, etc. [See also 19B28]

57Q12 Wall finiteness obstruction for CW-complexes

57Q15 Triangulating manifolds

57Q20 Cobordism

57Q25 Comparison of PL-structures: classification, Hauptvermutung

57Q30 Engulfing

57Q35 Embeddings and immersions

57Q37 Isotopy

57Q40 Regular neighborhoods

57Q45 Knots and links (in high dimensions) (For the low-dimensional case, see 57M25)

57Q50 Microbundles and block bundles [See also 55R60, 57N55]

57Q55 Approximations

57Q60 Cobordism and concordance

57Q65 General position and transversality

57Q91 Equivariant PL-topology

57Q99 None of the above, but in this section

57Rxx Differential topology (For foundational questions of differentiable manifolds, see 58Axx; for infinite-dimensional manifolds, see 58Bxx)

57R05 Triangulating

57R10 Smoothing

57R12 Smooth approximations

57R15 Specialized structures on manifolds (spin manifolds, framed manifolds, etc.)

57R17 Symplectic and contact topology

57R18 Topology and geometry of orbifolds

57R19 Algebraic topology on manifolds

57R20 Characteristic classes and numbers

57R22 Topology of vector bundles and fiber bundles [See also 55Rxx]

57R25 Vector fields, frame fields

57R27 Controllability of vector fields on C^∞ and real-analytic manifolds [See also 49Qxx, 37C10, 93B05]

57R30 Foliations; geometric theory

57R32 Classifying spaces for foliations; Gelfand-Fuks cohomology [See also 58H10]

57R35 Differentiable mappings

57R40 Embeddings

57R42 Immersions

57R45 Singularities of differentiable mappings

57R50 Diffeomorphisms

57R52   Isotopy

57R55   Differentiable structures

57R56   Topological quantum field theories

57R57   Applications of global analysis to structures on manifolds, Donaldson and Seiberg-Witten invariants
[See also 58-XX]

57R58   Floer homology

57R60   Homotopy spheres, Poincaré conjecture

57R65   Surgery and handlebodies

57R67   Surgery obstructions, Wall groups
[See also 19J25]

57R70   Critical points and critical submanifolds

57R75   O- and SO-cobordism

57R77   Complex cobordism (U- and SU-cobordism) [See also 55N22]

57R80   *h*- and *s*-cobordism

57R85   Equivariant cobordism

57R90   Other types of cobordism
[See also 55N22]

57R91   Equivariant algebraic topology of manifolds

57R95   Realizing cycles by submanifolds

57R99   None of the above, but in this section

57Sxx   **Topological transformation groups [See also 20F34, 22-XX, 37-XX, 54H15, 58D05]**

57S05   Topological properties of groups of homeomorphisms or diffeomorphisms

57S10   Compact groups of homeomorphisms

57S15   Compact Lie groups of differentiable transformations

57S17   Finite transformation groups

57S20   Noncompact Lie groups of transformations

57S25   Groups acting on specific manifolds

57S30   Discontinuous groups of transformations

57S99   None of the above, but in this section

57Txx   **Homology and homotopy of topological groups and related structures**

57T05   Hopf algebras [See also 16T05]

57T10   Homology and cohomology of Lie groups

57T15   Homology and cohomology of homogeneous spaces of Lie groups

57T20   Homotopy groups of topological groups and homogeneous spaces

57T25   Homology and cohomology of *H*-spaces

57T30   Bar and cobar constructions
[See also 18G55, 55Uxx]

57T35   Applications of Eilenberg-Moore spectral sequences [See also 55R20, 55T20]

57T99   None of the above, but in this section

58-XX   Global analysis, analysis on manifolds [See also 32Cxx, 32Fxx, 32Wxx, 46-XX, 47Hxx, 53Cxx] (For geometric integration theory, see 49Q15)

58-00   General reference works (handbooks, dictionaries, bibliographies, etc.)

58-01   Instructional exposition
(textbooks, tutorial papers, etc.)

58-02   Research exposition (monographs, survey articles)

58-03   Historical (must also be assigned at least one classification number from Section 01)

58-04   Explicit machine computation and programs (not the theory of computation or programming)

58-06   Proceedings, conferences, collections, etc.

58Axx   **General theory of differentiable manifolds [See also 32Cxx]**

58A03   Topos-theoretic approach to differentiable manifolds

58A05   Differentiable manifolds, foundations

58A07   Real-analytic and Nash manifolds
[See also 14P20, 32C07]

58A10   Differential forms

58A12   de Rham theory [See also 14Fxx]

58A14   Hodge theory
[See also 14C30, 14Fxx, 32J25, 32S35]

58A15   Exterior differential systems
(Cartan theory)

58A17   Pfaffian systems

58A20   Jets

58A25   Currents [See also 32C30, 53C65]

58A30   Vector distributions
(subbundles of the tangent bundles)

58A32   Natural bundles

58A35   Stratified sets [See also 32S60]

58A40   Differential spaces

58A50 Supermanifolds and graded manifolds [See also 14A22, 32C11]

58A99 None of the above, but in this section

58Bxx Infinite-dimensional manifolds

58B05 Homotopy and topological questions

58B10 Differentiability questions

58B12 Questions of holomorphy [See also 32-XX, 46G20]

58B15 Fredholm structures [See also 47A53]

58B20 Riemannian, Finsler and other geometric structures [See also 53C20, 53C60]

58B25 Group structures and generalizations on infinite-dimensional manifolds [See also 22E65, 58D05]

58B32 Geometry of quantum groups

58B34 Noncommutative geometry (à la Connes)

58B99 None of the above, but in this section

58Cxx Calculus on manifolds; nonlinear operators [See also 46Txx, 47Hxx, 47Jxx]

58C05 Real-valued functions

58C06 Set valued and function-space valued mappings [See also 47H04, 54C60]

58C07 Continuity properties of mappings

58C10 Holomorphic maps [See also 32-XX]

58C15 Implicit function theorems; global Newton methods

58C20 Differentiation theory (Gateaux, Fréchet, etc.) [See also 26Exx, 46G05]

58C25 Differentiable maps

58C30 Fixed point theorems on manifolds [See also 47H10]

58C35 Integration on manifolds; measures on manifolds [See also 28Cxx]

58C40 Spectral theory; eigenvalue problems [See also 47J10, 58E07]

58C50 Analysis on supermanifolds or graded manifolds

58C99 None of the above, but in this section

58Dxx Spaces and manifolds of mappings (including nonlinear versions of 46Exx) [See also 46Txx, 53Cxx]

58D05 Groups of diffeomorphisms and homeomorphisms as manifolds [See also 22E65, 57S05]

58D07 Groups and semigroups of nonlinear operators [See also 17B65, 47H20]

58D10 Spaces of imbeddings and immersions

58D15 Manifolds of mappings [See also 46T10, 54C35]

58D17 Manifolds of metrics (esp. Riemannian)

58D19 Group actions and symmetry properties

58D20 Measures (Gaussian, cylindrical, etc.) on manifolds of maps [See also 28Cxx, 46T12]

58D25 Equations in function spaces; evolution equations [See also 34Gxx, 35K90, 35L90, 35R15, 37Lxx, 47Jxx]

58D27 Moduli problems for differential geometric structures

58D29 Moduli problems for topological structures

58D30 Applications (in quantum mechanics (Feynman path integrals), relativity, fluid dynamics, etc.)

58D99 None of the above, but in this section

58Exx Variational problems in infinite-dimensional spaces

58E05 Abstract critical point theory (Morse theory, Ljusternik-Schnirelman (Lyusternik-Shnirel'man) theory, etc.)

58E07 Abstract bifurcation theory

58E09 Group-invariant bifurcation theory

58E10 Applications to the theory of geodesics (problems in one independent variable)

58E11 Critical metrics

58E12 Applications to minimal surfaces (problems in two independent variables) [See also 49Q05]

58E15 Application to extremal problems in several variables; Yang-Mills functionals [See also 81T13], etc.

58E17 Pareto optimality, etc., applications to economics [See also 90C29]

58E20 Harmonic maps [See also 53C43], etc.

58E25 Applications to control theory [See also 49-XX, 93-XX]

58E30 Variational principles

58E35 Variational inequalities (global problems)

58E40 Group actions

58E50 Applications

58E99 None of the above, but in this section

58Hxx   Pseudogroups, differentiable groupoids and general structures on manifolds

58H05   Pseudogroups and differentiable groupoids [See also 22A22, 22E65]

58H10   Cohomology of classifying spaces for pseudogroup structures (Spencer, Gelfand-Fuks, etc.) [See also 57R32]

58H15   Deformations of structures [See also 32Gxx, 58J10]

58H99   None of the above, but in this section

58Jxx   Partial differential equations on manifolds; differential operators [See also 32Wxx, 35-XX, 53Cxx]

58J05   Elliptic equations on manifolds, general theory [See also 35-XX]

58J10   Differential complexes [See also 35Nxx]; elliptic complexes

58J15   Relations with hyperfunctions

58J20   Index theory and related fixed point theorems [See also 19K56, 46L80]

58J22   Exotic index theories [See also 19K56, 46L05, 46L10, 46L80, 46M20]

58J26   Elliptic genera

58J28   Eta-invariants, Chern-Simons invariants

58J30   Spectral flows

58J32   Boundary value problems on manifolds

58J35   Heat and other parabolic equation methods

58J37   Perturbations; asymptotics

58J40   Pseudodifferential and Fourier integral operators on manifolds [See also 35Sxx]

58J42   Noncommutative global analysis, noncommutative residues

58J45   Hyperbolic equations [See also 35Lxx]

58J47   Propagation of singularities; initial value problems

58J50   Spectral problems; spectral geometry; scattering theory [See also 35Pxx]

58J51   Relations between spectral theory and ergodic theory, e.g. quantum unique ergodicity

58J52   Determinants and determinant bundles, analytic torsion

58J53   Isospectrality

58J55   Bifurcation [See also 35B32]

58J60   Relations with special manifold structures (Riemannian, Finsler, etc.)

58J65   Diffusion processes and stochastic analysis on manifolds [See also 35R60, 60H10, 60J60]

58J70   Invariance and symmetry properties [See also 35A30]

58J72   Correspondences and other transformation methods (e.g. Lie-Bäcklund) [See also 35A22]

58J90   Applications

58J99   None of the above, but in this section

58Kxx   Theory of singularities and catastrophe theory [See also 32Sxx, 37-XX]

58K05   Critical points of functions and mappings

58K10   Monodromy

58K15   Topological properties of mappings

58K20   Algebraic and analytic properties of mappings

58K25   Stability

58K30   Global theory

58K35   Catastrophe theory

58K40   Classification; finite determinacy of map germs

58K45   Singularities of vector fields, topological aspects

58K50   Normal forms

58K55   Asymptotic behavior

58K60   Deformation of singularities

58K65   Topological invariants

58K70   Symmetries, equivariance

58K99   None of the above, but in this section

58Zxx   Applications to physics

58Z05   Applications to physics

58Z99   None of the above, but in this section

60-XX Probability theory and stochastic processes (For additional applications, see 11Kxx, 62-XX, 90-XX, 91-XX, 92-XX, 93-XX, 94-XX)

60-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

60-01 Instructional exposition (textbooks, tutorial papers, etc.)

60-02 Research exposition (monographs, survey articles)

60-03 Historical (must also be assigned at least one classification number from Section 01)

60-04 Explicit machine computation and programs (not the theory of computation or programming)

60-06 Proceedings, conferences, collections, etc.

60-08 Computational methods (not classified at a more specific level) [See also 65C50]

60Axx Foundations of probability theory
60A05 Axioms; other general questions

60A10 Probabilistic measure theory (For ergodic theory, see 28Dxx and 60Fxx)

60A86 Fuzzy probability

60A99 None of the above, but in this section

60Bxx Probability theory on algebraic and topological structures
60B05 Probability measures on topological spaces

60B10 Convergence of probability measures

60B11 Probability theory on linear topological spaces [See also 28C20]

60B12 Limit theorems for vector-valued random variables (infinite-dimensional case)

60B15 Probability measures on groups or semigroups, Fourier transforms, factorization

60B20 Random matrices (probabilistic aspects; for algebraic aspects see 15B52)

60B99 None of the above, but in this section

60Cxx Combinatorial probability
60C05 Combinatorial probability

60C99 None of the above, but in this section

60Dxx Geometric probability and stochastic geometry [See also 52A22, 53C65]
60D05 Geometric probability and stochastic geometry [See also 52A22, 53C65]

60D99 None of the above, but in this section

60Exx Distribution theory [See also 62Exx, 62Hxx]
60E05 Distributions: general theory

60E07 Infinitely divisible distributions; stable distributions

60E10 Characteristic functions; other transforms

60E15 Inequalities; stochastic orderings

60E99 None of the above, but in this section

60Fxx Limit theorems [See also 28Dxx, 60B12]
60F05 Central limit and other weak theorems

60F10 Large deviations

60F15 Strong theorems

60F17 Functional limit theorems; invariance principles

60F20 Zero-one laws

60F25 L^p-limit theorems

60F99 None of the above, but in this section

60Gxx Stochastic processes
60G05 Foundations of stochastic processes

60G07 General theory of processes

60G09 Exchangeability

60G10 Stationary processes

60G12 General second-order processes

60G15 Gaussian processes

60G17 Sample path properties

60G18 Self-similar processes

60G20 Generalized stochastic processes

60G22 Fractional processes, including fractional Brownian motion

60G25 Prediction theory [See also 62M20]

60G30 Continuity and singularity of induced measures

60G35 Signal detection and filtering [See also 62M20, 93E10, 93E11, 94Axx]

60G40 Stopping times; optimal stopping problems; gambling theory [See also 62L15, 91A60]

60G42 Martingales with discrete parameter

60G44 Martingales with continuous parameter

60G46 Martingales and classical analysis

60G48 Generalizations of martingales

60G50 Sums of independent random variables; random walks

60G51 Processes with independent increments; Lévy processes

60G52 Stable processes

60G55 Point processes

60G57 Random measures

60G60 Random fields

60G70 Extreme value theory; extremal processes

60G99 None of the above, but in this section

60Hxx Stochastic analysis [See also 58J65]

60H05 Stochastic integrals

60H07 Stochastic calculus of variations and the Malliavin calculus

60H10 Stochastic ordinary differential equations [See also 34F05]

60H15 Stochastic partial differential equations [See also 35R60]

60H20 Stochastic integral equations

60H25 Random operators and equations [See also 47B80]

60H30 Applications of stochastic analysis (to PDE, etc.)

60H35 Computational methods for stochastic equations [See also 65C30]

60H40 White noise theory

60H99 None of the above, but in this section

60Jxx Markov processes

60J05 Discrete-time Markov processes on general state spaces

60J10 Markov chains (discrete-time Markov processes on discrete state spaces)

60J20 Applications of Markov chains and discrete-time Markov processes on general state spaces (social mobility, learning theory, industrial processes, etc.) [See also 90B30, 91D10, 91D35, 91E40]

60J22 Computational methods in Markov chains [See also 65C40]

60J25 Continuous-time Markov processes on general state spaces

60J27 Continuous-time Markov processes on discrete state spaces

60J28 Applications of continuous-time Markov processes on discrete state spaces

60J35 Transition functions, generators and resolvents [See also 47D03, 47D07]

60J40 Right processes

60J45 Probabilistic potential theory [See also 31Cxx, 31D05]

60J50 Boundary theory

60J55 Local time and additive functionals

60J57 Multiplicative functionals

60J60 Diffusion processes [See also 58J65]

60J65 Brownian motion [See also 58J65]

60J67 Stochastic (Schramm-)Loewner evolution (SLE)

60J68 Superprocesses

60J70 Applications of Brownian motions and diffusion theory (population genetics, absorption problems, etc.) [See also 92Dxx]

60J75 Jump processes

60J80 Branching processes (Galton-Watson, birth-and-death, etc.)

60J85 Applications of branching processes [See also 92Dxx]

60J99 None of the above, but in this section

60Kxx Special processes

60K05 Renewal theory

60K10 Applications (reliability, demand theory, etc.)

60K15 Markov renewal processes, semi-Markov processes

60K20 Applications of Markov renewal processes (reliability, queueing networks, etc.) [See also 90Bxx]

60K25 Queueing theory [See also 68M20, 90B22]

60K30 Applications (congestion, allocation, storage, traffic, etc.) [See also 90Bxx]

60K35 Interacting random processes; statistical mechanics type models; percolation theory [See also 82B43, 82C43]

60K37 Processes in random environments

60K40 Other physical applications of random processes

60K99 None of the above, but in this section

62-XX Statistics

62-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

62-01 Instructional exposition (textbooks, tutorial papers, etc.)

62-02 Research exposition (monographs, survey articles)

62-03 Historical (must also be assigned at least one classification number from Section 01)

62-04 Explicit machine computation and programs (not the theory of computation or programming)

62-06 Proceedings, conferences, collections, etc.

62-07 Data analysis

62-09 Graphical methods

62Axx Foundational and philosophical topics

62A01 Foundations and philosophical topics

62A86 Fuzzy analysis in statistics

62A99 None of the above, but in this section

62Bxx Sufficiency and information

62B05 Sufficient statistics and fields

62B10 Information-theoretic topics [See also 94A17]

62B15 Theory of statistical experiments

62B86 Fuzziness, sufficiency, and information

62B99 None of the above, but in this section

62Cxx Decision theory [See also 90B50, 91B06; for game theory, see 91A35]

62C05 General considerations

62C07 Complete class results

62C10 Bayesian problems; characterization of Bayes procedures

62C12 Empirical decision procedures; empirical Bayes procedures

62C15 Admissibility

62C20 Minimax procedures

62C25 Compound decision problems

62C86 Decision theory and fuzziness

62C99 None of the above, but in this section

62Dxx Sampling theory, sample surveys

62D05 Sampling theory, sample surveys

62D99 None of the above, but in this section

62Exx Distribution theory [See also 60Exx]

62E10 Characterization and structure theory

62E15 Exact distribution theory

62E17 Approximations to distributions (nonasymptotic)

62E20 Asymptotic distribution theory

62E86 Fuzziness in connection with the topics on distributions in this section

62E99 None of the above, but in this section

62Fxx Parametric inference

62F03 Hypothesis testing

62F05 Asymptotic properties of tests

62F07 Ranking and selection

62F10 Point estimation

62F12 Asymptotic properties of estimators

62F15 Bayesian inference

62F25 Tolerance and confidence regions

62F30 Inference under constraints

62F35 Robustness and adaptive procedures

62F40 Bootstrap, jackknife and other resampling methods

62F86 Parametric inference and fuzziness

62F99 None of the above, but in this section

62Gxx Nonparametric inference

62G05 Estimation

62G07 Density estimation

62G08 Nonparametric regression

62G09 Resampling methods

62G10 Hypothesis testing

62G15 Tolerance and confidence regions

62G20 Asymptotic properties

62G30 Order statistics; empirical distribution functions

62G32 Statistics of extreme values; tail inference

62G35 Robustness

62G86 Nonparametric inference and fuzziness

62G99 None of the above, but in this section

62Hxx Multivariate analysis [See also 60Exx]

62H05 Characterization and structure theory

62H10 Distribution of statistics

62H11 Directional data; spatial statistics

62H12 Estimation

62H15 Hypothesis testing

62H17 Contingency tables

62H20 Measures of association
(correlation, canonical correlation, etc.)

62H25 Factor analysis and principal components; correspondence analysis

62H30 Classification and discrimination;
cluster analysis [See also 68T10, 91C20]

62H35 Image analysis

62H86 Multivariate analysis and fuzziness

62H99 None of the above, but in this section

62Jxx Linear inference, regression

62J02 General nonlinear regression

62J05 Linear regression

62J07 Ridge regression; shrinkage estimators

62J10 Analysis of variance and covariance

62J12 Generalized linear models

62J15 Paired and multiple comparisons

62J20 Diagnostics

62J86 Fuzziness, and linear inference
and regression

62J99 None of the above, but in this section

62Kxx Design of experiments [See also 05Bxx]

62K05 Optimal designs

62K10 Block designs

62K15 Factorial designs

62K20 Response surface designs

62K25 Robust parameter designs

62K86 Fuzziness and design of experiments

62K99 None of the above, but in this section

62Lxx Sequential methods

62L05 Sequential design

62L10 Sequential analysis

62L12 Sequential estimation

62L15 Optimal stopping
[See also 60G40, 91A60]

62L20 Stochastic approximation

62L86 Fuzziness and sequential methods

62L99 None of the above, but in this section

62Mxx Inference from stochastic processes

62M02 Markov processes: hypothesis testing

62M05 Markov processes: estimation

62M07 Non-Markovian processes:
hypothesis testing

62M09 Non-Markovian processes: estimation

62M10 Time series, auto-correlation, regression,
etc. [See also 91B84]

62M15 Spectral analysis

62M20 Prediction [See also 60G25]; filtering
[See also 60G35, 93E10, 93E11]

62M30 Spatial processes

62M40 Random fields; image analysis

62M45 Neural nets and related approaches

62M86 Inference from stochastic processes and
fuzziness

62M99 None of the above, but in this section

62Nxx Survival analysis and censored data

62N01 Censored data models

62N02 Estimation

62N03 Testing

62N05 Reliability and life testing
[See also 90B25]

62N86 Fuzziness, and survival analysis and
censored data

62N99 None of the above, but in this section

**62Pxx Applications
[See also 90-XX, 91-XX, 92-XX]**

62P05 Applications to actuarial sciences and
financial mathematics

62P10 Applications to biology and
medical sciences

62P12 Applications to environmental and
related topics

62P15 Applications to psychology

62P20 Applications to economics
[See also 91Bxx]

62P25 Applications to social sciences

62P30 Applications in engineering and
industry

62P35 Applications to physics

62P99 None of the above, but in this section

62Qxx Statistical tables

62Q05 Statistical tables

62Q99 None of the above, but in this section

65-XX Numerical analysis

65-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

65-01 Instructional exposition (textbooks, tutorial papers, etc.)

65-02 Research exposition (monographs, survey articles)

65-03 Historical (must also be assigned at least one classification number from Section 01)

65-04 Explicit machine computation and programs (not the theory of computation or programming)

65-05 Experimental papers

65-06 Proceedings, conferences, collections, etc.

65Axx Tables
65A05 Tables

65A99 None of the above, but in this section

65Bxx Acceleration of convergence
65B05 Extrapolation to the limit, deferred corrections

65B10 Summation of series

65B15 Euler-Maclaurin formula

65B99 None of the above, but in this section

65Cxx Probabilistic methods, simulation and stochastic differential equations (For theoretical aspects, see 68U20 and 60H35)
65C05 Monte Carlo methods

65C10 Random number generation

65C20 Models, numerical methods [See also 68U20]

65C30 Stochastic differential and integral equations

65C35 Stochastic particle methods [See also 82C80]

65C40 Computational Markov chains

65C50 Other computational problems in probability

65C60 Computational problems in statistics

65C99 None of the above, but in this section

65Dxx Numerical approximation and computational geometry (primarily algorithms) (For theory, see 41-XX and 68Uxx)
65D05 Interpolation

65D07 Splines

65D10 Smoothing, curve fitting

65D15 Algorithms for functional approximation

65D17 Computer aided design (modeling of curves and surfaces) [See also 68U07]

65D18 Computer graphics, image analysis, and computational geometry [See also 51N05, 68U05]

65D19 Computational issues in computer and robotic vision

65D20 Computation of special functions, construction of tables [See also 33F05]

65D25 Numerical differentiation

65D30 Numerical integration

65D32 Quadrature and cubature formulas

65D99 None of the above, but in this section

65Exx Numerical methods in complex analysis (potential theory, etc.) (For numerical methods in conformal mapping, see also 30C30)
65E05 Numerical methods in complex analysis (potential theory, etc.) For numerical methods in conformal mapping, see also 30C30

65E99 None of the above, but in this section

65Fxx Numerical linear algebra
65F05 Direct methods for linear systems and matrix inversion

65F08 Preconditioners for iterative methods

65F10 Iterative methods for linear systems [See also 65N22]

65F15 Eigenvalues, eigenvectors

65F18 Inverse eigenvalue problems

65F20 Overdetermined systems, pseudoinverses

65F22 Ill-posedness, regularization

65F25 Orthogonalization

65F30 Other matrix algorithms

65F35 Matrix norms, conditioning, scaling [See also 15A12, 15A60]

65F40 Determinants

65F50 Sparse matrices

65F60 Matrix exponential and similar matrix functions

65F99 None of the above, but in this section

65Gxx Error analysis and interval analysis

65G20 Algorithms with automatic result verification

65G30 Interval and finite arithmetic

65G40 General methods in interval analysis

65G50 Roundoff error

65G99 None of the above, but in this section

65Hxx Nonlinear algebraic or transcendental equations

65H04 Roots of polynomial equations

65H05 Single equations

65H10 Systems of equations

65H17 Eigenvalues, eigenvectors [See also 47Hxx, 47Jxx, 58C40, 58E07, 90C30]

65H20 Global methods, including homotopy approaches [See also 58C30, 90C30]

65H99 None of the above, but in this section

65Jxx Numerical analysis in abstract spaces

65J05 General theory

65J08 Abstract evolution equations

65J10 Equations with linear operators (do not use 65Fxx)

65J15 Equations with nonlinear operators (do not use 65Hxx)

65J20 Improperly posed problems; regularization

65J22 Inverse problems

65J99 None of the above, but in this section

65Kxx Mathematical programming, optimization and variational techniques

65K05 Mathematical programming methods [See also 90Cxx]

65K10 Optimization and variational techniques [See also 49Mxx, 93B40]

65K15 Numerical methods for variational inequalities and related problems

65K99 None of the above, but in this section

65Lxx Ordinary differential equations

65L03 Functional-differential equations

65L04 Stiff equations

65L05 Initial value problems

65L06 Multistep, Runge-Kutta and extrapolation methods

65L07 Numerical investigation of stability of solutions

65L08 Improperly posed problems

65L09 Inverse problems

65L10 Boundary value problems

65L11 Singularly perturbed problems

65L12 Finite difference methods

65L15 Eigenvalue problems

65L20 Stability and convergence of numerical methods

65L50 Mesh generation and refinement

65L60 Finite elements, Rayleigh-Ritz, Galerkin and collocation methods

65L70 Error bounds

65L80 Methods for differential-algebraic equations

65L99 None of the above, but in this section

65Mxx Partial differential equations, initial value and time-dependent initial-boundary value problems

65M06 Finite difference methods

65M08 Finite volume methods

65M12 Stability and convergence of numerical methods

65M15 Error bounds

65M20 Method of lines

65M22 Solution of discretized equations [See also 65Fxx, 65Hxx]

65M25 Method of characteristics

65M30 Improperly posed problems

65M32 Inverse problems

65M38 Boundary element methods

65M50 Mesh generation and refinement

65M55 Multigrid methods; domain decomposition

65M60 Finite elements, Rayleigh-Ritz and Galerkin methods, finite methods

65M70 Spectral, collocation and related methods

65M75 Probabilistic methods, particle methods, etc.

65M80 Fundamental solutions, Green's function methods, etc.

65M85 Fictitious domain methods

65M99 None of the above, but in this section

65Nxx Partial differential equations, boundary value problems

65N06 Finite difference methods

65N08 Finite volume methods

65N12 Stability and convergence of numerical methods

65N15 Error bounds

65N20 Ill-posed problems

65N21 Inverse problems

65N22 Solution of discretized equations [See also 65Fxx, 65Hxx]

65N25 Eigenvalue problems

65N30 Finite elements, Rayleigh-Ritz and Galerkin methods, finite methods

65N35 Spectral, collocation and related methods

65N38 Boundary element methods

65N40 Method of lines

65N45 Method of contraction of the boundary

65N50 Mesh generation and refinement

65N55 Multigrid methods; domain decomposition

65N75 Probabilistic methods, particle methods, etc.

65N80 Fundamental solutions, Green's function methods, etc.

65N85 Fictitious domain methods

65N99 None of the above, but in this section

65Pxx Numerical problems in dynamical systems [See also 37Mxx]

65P10 Hamiltonian systems including symplectic integrators

65P20 Numerical chaos

65P30 Bifurcation problems

65P40 Nonlinear stabilities

65P99 None of the above, but in this section

65Qxx Difference and functional equations, recurrence relations

65Q10 Difference equations

65Q20 Functional equations

65Q30 Recurrence relations

65Q99 None of the above, but in this section

65Rxx Integral equations, integral transforms

65R10 Integral transforms

65R20 Integral equations

65R30 Improperly posed problems

65R32 Inverse problems

65R99 None of the above, but in this section

65Sxx Graphical methods

65S05 Graphical methods

65S99 None of the above, but in this section

65Txx Numerical methods in Fourier analysis

65T40 Trigonometric approximation and interpolation

65T50 Discrete and fast Fourier transforms

65T60 Wavelets

65T99 None of the above, but in this section

65Yxx Computer aspects of numerical algorithms

65Y04 Algorithms for computer arithmetic, etc. [See also 68M07]

65Y05 Parallel computation

65Y10 Algorithms for specific classes of architectures

65Y15 Packaged methods

65Y20 Complexity and performance of numerical algorithms [See also 68Q25]

65Y99 None of the above, but in this section

65Zxx Applications to physics

65Z05 Applications to physics

65Z99 None of the above, but in this section

68-XX Computer science (For papers involving machine computations and programs in a specific mathematical area, see Section –04 in that area)

68-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

68-01 Instructional exposition (textbooks, tutorial papers, etc.)

68-02 Research exposition (monographs, survey articles)

68-03 Historical (must also be assigned at least one classification number from Section 01)

68-04 Explicit machine computation and programs (not the theory of computation or programming)

68-06 Proceedings, conferences, collections, etc.

68Mxx Computer system organization

68M01 General

68M07 Mathematical problems of computer architecture

68M10 Network design and communication [See also 68R10, 90B18]

68M11 Internet topics [See also 68U35]

68M12 Network protocols

68M14 Distributed systems

68M15 Reliability, testing and fault tolerance [See also 94C12]

68M20 Performance evaluation; queueing; scheduling [See also 60K25, 90Bxx]

68M99 None of the above, but in this section

68Nxx Software

68N01 General

68N15 Programming languages

68N17 Logic programming

68N18 Functional programming and lambda calculus [See also 03B40]

68N19 Other programming techniques (object-oriented, sequential, concurrent, automatic, etc.)

68N20 Compilers and interpreters

68N25 Operating systems

68N30 Mathematical aspects of software engineering (specification, verification, metrics, requirements, etc.)

68N99 None of the above, but in this section

68Pxx Theory of data

68P01 General

68P05 Data structures

68P10 Searching and sorting

68P15 Database theory

68P20 Information storage and retrieval

68P25 Data encryption [See also 94A60, 81P94]

68P30 Coding and information theory (compaction, compression, models of communication, encoding schemes, etc.) [See also 94Axx]

68P99 None of the above, but in this section

68Qxx Theory of computing

68Q01 General

68Q05 Models of computation (Turing machines, etc.) [See also 03D10, 68Q12, 81P68]

68Q10 Modes of computation (nondeterministic, parallel, interactive, probabilistic, etc.) [See also 68Q85]

68Q12 Quantum algorithms and complexity [See also 68Q05, 81P68]

68Q15 Complexity classes (hierarchies, relations among complexity classes, etc.) [See also 03D15, 68Q17, 68Q19]

68Q17 Computational difficulty of problems (lower bounds, completeness, difficulty of approximation, etc.) [See also 68Q15]

68Q19 Descriptive complexity and finite models [See also 03C13]

68Q25 Analysis of algorithms and problem complexity [See also 68W40]

68Q30 Algorithmic information theory (Kolmogorov complexity, etc.) [See also 03D32]

68Q32 Computational learning theory [See also 68T05]

68Q42 Grammars and rewriting systems

68Q45 Formal languages and automata [See also 03D05, 68Q70, 94A45]

68Q55 Semantics [See also 03B70, 06B35, 18C50]

68Q60 Specification and verification (program logics, model checking, etc.) [See also 03B70]

68Q65 Abstract data types; algebraic specification [See also 18C50]

68Q70 Algebraic theory of languages and automata [See also 18B20, 20M35]

68Q80 Cellular automata [See also 37B15]

68Q85 Models and methods for concurrent and distributed computing (process algebras, bisimulation, transition nets, etc.)

68Q87 Probability in computer science (algorithm analysis, random structures, phase transitions, etc.) [See also 68W20, 68W40]

68Q99 None of the above, but in this section

68Rxx Discrete mathematics in relation to computer science

68R01 General

68R05 Combinatorics

68R10 Graph theory (including graph drawing) [See also 05Cxx, 90B10, 90B35, 90C35]

68R15 Combinatorics on words

68R99 None of the above, but in this section

68Txx Artificial intelligence

68T01 General

68T05 Learning and adaptive systems [See also 68Q32, 91E40]

68T10 Pattern recognition, speech recognition (For cluster analysis, see 62H30)

68T15 Theorem proving (deduction, resolution, etc.) [See also 03B35]

68T20 Problem solving (heuristics, search strategies, etc.)

68T27 Logic in artificial intelligence

68T30 Knowledge representation

68T35 Languages and software systems (knowledge-based systems, expert systems, etc.)

68T37 Reasoning under uncertainty

68T40 Robotics [See also 93C85]

68T42 Agent technology

68T45 Machine vision and scene understanding

68T50 Natural language processing [See also 03B65]

68T99 None of the above, but in this section

68Uxx Computing methodologies and applications

68U01 General

68U05 Computer graphics; computational geometry [See also 65D18]

68U07 Computer-aided design [See also 65D17]

68U10 Image processing

68U15 Text processing; mathematical typography

68U20 Simulation [See also 65Cxx]

68U35 Information systems (hypertext navigation, interfaces, decision support, etc.) [See also 68M11]

68U99 None of the above, but in this section

68Wxx Algorithms (For numerical algorithms, see 65-XX; for combinatorics and graph theory, see 05C85, 68Rxx)

68W01 General

68W05 Nonnumerical algorithms

68W10 Parallel algorithms

68W15 Distributed algorithms

68W20 Randomized algorithms

68W25 Approximation algorithms

68W27 Online algorithms

68W30 Symbolic computation and algebraic computation [See also 11Yxx, 12Y05, 13Pxx, 14Qxx, 16Z05, 17-08, 33F10]

68W32 Algorithms on strings

68W35 VLSI algorithms

68W40 Analysis of algorithms [See also 68Q25]

68W99 None of the above, but in this section

70-XX Mechanics of particles and systems (For relativistic mechanics, see 83A05 and 83C10; for statistical mechanics, see 82-XX)

70-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

70-01 Instructional exposition (textbooks, tutorial papers, etc.)

70-02 Research exposition (monographs, survey articles)

70-03 Historical (must also be assigned at least one classification number from Section 01)

70-04 Explicit machine computation and programs (not the theory of computation or programming)

70-05 Experimental work

70-06 Proceedings, conferences, collections, etc.

70-08 Computational methods

70Axx Axiomatics, foundations

70A05 Axiomatics, foundations

70A99 None of the above, but in this section

70Bxx Kinematics [See also 53A17]

70B05 Kinematics of a particle

70B10 Kinematics of a rigid body

70B15 Mechanisms, robots [See also 68T40, 70Q05, 93C85]

70B99   None of the above, but in this section

70Cxx   Statics
70C20   Statics
70C99   None of the above, but in this section

70Exx   Dynamics of a rigid body and of multibody systems
70E05   Motion of the gyroscope
70E15   Free motion of a rigid body
[See also 70M20]
70E17   Motion of a rigid body with a fixed point
70E18   Motion of a rigid body in contact with a solid surface [See also 70F25]
70E20   Perturbation methods for rigid body dynamics
70E40   Integrable cases of motion
70E45   Higher-dimensional generalizations
70E50   Stability problems
70E55   Dynamics of multibody systems
70E60   Robot dynamics and control [See also 68T40, 70Q05, 93C85]
70E99   None of the above, but in this section

70Fxx   Dynamics of a system of particles, including celestial mechanics
70F05   Two-body problems
70F07   Three-body problems
70F10 n-body problems
70F15   Celestial mechanics
70F16   Collisions in celestial mechanics, regularization
70F17   Inverse problems
70F20   Holonomic systems
70F25   Nonholonomic systems
70F35   Collision of rigid or pseudo-rigid bodies
70F40   Problems with friction
70F45   Infinite particle systems
70F99   None of the above, but in this section

70Gxx   General models, approaches, and methods [See also 37-XX]
70G10   Generalized coordinates; event, impulse-energy, configuration, state, or phase space
70G40   Topological and differential-topological methods

70G45   Differential-geometric methods (tensors, connections, symplectic, Poisson, contact, Riemannian, nonholonomic, etc.) [See also 53Cxx, 53Dxx, 58Axx]
70G55   Algebraic geometry methods
70G60   Dynamical systems methods
70G65   Symmetries, Lie-group and Lie-algebra methods
70G70   Functional-analytic methods
70G75   Variational methods
70G99   None of the above, but in this section

70Hxx   Hamiltonian and Lagrangian mechanics [See also 37Jxx]
70H03   Lagrange's equations
70H05   Hamilton's equations
70H06   Completely integrable systems and methods of integration
70H07   Nonintegrable systems
70H08   Nearly integrable Hamiltonian systems, KAM theory
70H09   Perturbation theories
70H11   Adiabatic invariants
70H12   Periodic and almost periodic solutions
70H14   Stability problems
70H15   Canonical and symplectic transformations
70H20   Hamilton-Jacobi equations
70H25   Hamilton's principle
70H30   Other variational principles
70H33   Symmetries and conservation laws, reverse symmetries, invariant manifolds and their bifurcations, reduction
70H40   Relativistic dynamics
70H45   Constrained dynamics, Dirac's theory of constraints [See also 70F20, 70F25, 70Gxx]
70H50   Higher-order theories
70H99   None of the above, but in this section

70Jxx   Linear vibration theory
70J10   Modal analysis
70J25   Stability
70J30   Free motions
70J35   Forced motions
70J40   Parametric resonances
70J50   Systems arising from the discretization of structural vibration problems

70J99 None of the above, but in this section

**70Kxx Nonlinear dynamics
[See also 34Cxx, 37-XX]**
70K05 Phase plane analysis, limit cycles
70K20 Stability
70K25 Free motions
70K28 Parametric resonances
70K30 Nonlinear resonances
70K40 Forced motions
70K42 Equilibria and periodic trajectories
70K43 Quasi-periodic motions and invariant tori
70K44 Homoclinic and heteroclinic trajectories
70K45 Normal forms
70K50 Bifurcations and instability
70K55 Transition to stochasticity
(chaotic behavior) [See also 37D45]
70K60 General perturbation schemes
70K65 Averaging of perturbations
70K70 Systems with slow and fast motions
70K75 Nonlinear modes
70K99 None of the above, but in this section

70Lxx Random vibrations [See also 74H50]
70L05 Random vibrations [See also 74H50]
70L99 None of the above, but in this section

70Mxx Orbital mechanics
70M20 Orbital mechanics
70M99 None of the above, but in this section

70Pxx Variable mass, rockets
70P05 Variable mass, rockets
70P99 None of the above, but in this section

**70Qxx Control of mechanical systems
[See also 60Gxx, 60Jxx]**
70Q05 Control of mechanical systems
[See also 60Gxx, 60Jxx]
70Q99 None of the above, but in this section

**70Sxx Classical field theories [See also 37Kxx,
37Lxx, 78-XX, 81Txx, 83-XX]**
70S05 Lagrangian formalism and Hamiltonian
formalism
70S10 Symmetries and conservation laws

70S15 Yang-Mills and other gauge theories
70S20 More general nonquantum field theories
70S99 None of the above, but in this section

74-XX Mechanics of deformable solids

74-00 General reference works (handbooks,
dictionaries, bibliographies, etc.)
74-01 Instructional exposition
(textbooks, tutorial papers, etc.)
74-02 Research exposition (monographs,
survey articles)
74-03 Historical (must also be assigned at least
one classification number from Section
01)
74-04 Explicit machine computation and pro-
grams (not the theory of computation or
programming)
74-05 Experimental work
74-06 Proceedings, conferences, collections,
etc.

**74Axx Generalities, axiomatics, foundations
ofcontinuum mechanics of solids**
74A05 Kinematics of deformation
74A10 Stress
74A15 Thermodynamics
74A20 Theory of constitutive functions
74A25 Molecular, statistical, and
kinetic theories
74A30 Nonsimple materials
74A35 Polar materials
74A40 Random materials and
composite materials
74A45 Theories of fracture and damage
74A50 Structured surfaces and interfaces,
coexistent phases
74A55 Theories of friction (tribology)
74A60 Micromechanical theories
74A65 Reactive materials
74A99 None of the above, but in this section

74Bxx Elastic materials
74B05 Classical linear elasticity
74B10 Linear elasticity with initial stresses
74B15 Equations linearized about a deformed
state (small deformations superposed on
large)
74B20 Nonlinear elasticity

74B99 None of the above, but in this section

74Cxx Plastic materials, materials of stress-rate and internal-variable type

74C05 Small-strain, rate-independent theories (including rigid-plastic and elasto-plastic materials)

74C10 Small-strain, rate-dependent theories (including theories of viscoplasticity)

74C15 Large-strain, rate-independent theories (including nonlinear plasticity)

74C20 Large-strain, rate-dependent theories

74C99 None of the above, but in this section

74Dxx Materials of strain-rate type and history type, other materials with memory (including elastic materials with viscous damping, various viscoelastic materials)

74D05 Linear constitutive equations

74D10 Nonlinear constitutive equations

74D99 None of the above, but in this section

74Exx Material properties given special treatment

74E05 Inhomogeneity

74E10 Anisotropy

74E15 Crystalline structure

74E20 Granularity

74E25 Texture

74E30 Composite and mixture properties

74E35 Random structure

74E40 Chemical structure

74E99 None of the above, but in this section

74Fxx Coupling of solid mechanics with other effects

74F05 Thermal effects

74F10 Fluid-solid interactions (including aero- and hydro-elasticity, porosity, etc.)

74F15 Electromagnetic effects

74F20 Mixture effects

74F25 Chemical and reactive effects

74F99 None of the above, but in this section

74Gxx Equilibrium (steady-state) problems

74G05 Explicit solutions

74G10 Analytic approximation of solutions (perturbation methods, asymptotic methods, series, etc.)

74G15 Numerical approximation of solutions

74G20 Local existence of solutions (near a given solution)

74G25 Global existence of solutions

74G30 Uniqueness of solutions

74G35 Multiplicity of solutions

74G40 Regularity of solutions

74G45 Bounds for solutions

74G50 Saint-Venant's principle

74G55 Qualitative behavior of solutions

74G60 Bifurcation and buckling

74G65 Energy minimization

74G70 Stress concentrations, singularities

74G75 Inverse problems

74G99 None of the above, but in this section

74Hxx Dynamical problems

74H05 Explicit solutions

74H10 Analytic approximation of solutions (perturbation methods, asymptotic methods, series, etc.)

74H15 Numerical approximation of solutions

74H20 Existence of solutions

74H25 Uniqueness of solutions

74H30 Regularity of solutions

74H35 Singularities, blowup, stress concentrations

74H40 Long-time behavior of solutions

74H45 Vibrations

74H50 Random vibrations

74H55 Stability

74H60 Dynamical bifurcation

74H65 Chaotic behavior

74H99 None of the above, but in this section

74Jxx Waves

74J05 Linear waves

74J10 Bulk waves

74J15 Surface waves

74J20 Wave scattering

74J25 Inverse problems

74J30 Nonlinear waves

74J35 Solitary waves

74J40 Shocks and related discontinuities

74J99 None of the above, but in this section

74Kxx Thin bodies, structures

74K05 Strings

74K10 Rods (beams, columns, shafts, arches, rings, etc.)

74K15 Membranes

74K20 Plates

74K25 Shells

74K30 Junctions

74K35 Thin films

74K99 None of the above, but in this section

74Lxx Special subfields of solid mechanics

74L05 Geophysical solid mechanics [See also 86-XX]

74L10 Soil and rock mechanics

74L15 Biomechanical solid mechanics [See also 92C10]

74L99 None of the above, but in this section

74Mxx Special kinds of problems

74M05 Control, switches and devices ("smart materials") [See also 93Cxx]

74M10 Friction

74M15 Contact

74M20 Impact

74M25 Micromechanics

74M99 None of the above, but in this section

74Nxx Phase transformations in solids [See also 74A50, 80Axx, 82B26, 82C26]

74N05 Crystals

74N10 Displacive transformations

74N15 Analysis of microstructure

74N20 Dynamics of phase boundaries

74N25 Transformations involving diffusion

74N30 Problems involving hysteresis

74N99 None of the above, but in this section

74Pxx Optimization [See also 49Qxx]

74P05 Compliance or weight optimization

74P10 Optimization of other properties

74P15 Topological methods

74P20 Geometrical methods

74P99 None of the above, but in this section

74Qxx Homogenization, determination of effective properties

74Q05 Homogenization in equilibrium problems

74Q10 Homogenization and oscillations in dynamical problems

74Q15 Effective constitutive equations

74Q20 Bounds on effective properties

74Q99 None of the above, but in this section

74Rxx Fracture and damage

74R05 Brittle damage

74R10 Brittle fracture

74R15 High-velocity fracture

74R20 Anelastic fracture and damage

74R99 None of the above, but in this section

74Sxx Numerical methods [See also 65-XX, 74G15, 74H15]

74S05 Finite element methods

74S10 Finite volume methods

74S15 Boundary element methods

74S20 Finite difference methods

74S25 Spectral and related methods

74S30 Other numerical methods

74S60 Stochastic methods

74S70 Complex variable methods

74S99 None of the above, but in this section

76-XX Fluid mechanics (For general continuum mechanics, see 74Axx, or other parts of 74-XX)

76-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

76-01 Instructional exposition (textbooks, tutorial papers, etc.)

76-02 Research exposition (monographs, survey articles)

76-03 Historical (must also be assigned at least one classification number from Section 01)

76-04 Explicit machine computation and programs (not the theory of computation or programming)

76-05 Experimental work

76-06 Proceedings, conferences, collections, etc.

76Axx Foundations, constitutive equations, rheology

76A02 Foundations of fluid mechanics

76A05 Non-Newtonian fluids

76A10 Viscoelastic fluids

76A15 Liquid crystals [See also 82D30]

76A20 Thin fluid films

76A25 Superfluids (classical aspects)

76A99 None of the above, but in this section

76Bxx Incompressible inviscid fluids

76B03 Existence, uniqueness, and regularity theory [See also 35Q35]

76B07 Free-surface potential flows

76B10 Jets and cavities, cavitation, free-streamline theory, water-entry problems, airfoil and hydrofoil theory, sloshing

76B15 Water waves, gravity waves; dispersion and scattering, nonlinear interaction [See also 35Q30]

76B20 Ship waves

76B25 Solitary waves [See also 35C11]

76B45 Capillarity (surface tension) [See also 76D45]

76B47 Vortex flows

76B55 Internal waves

76B60 Atmospheric waves [See also 86A10]

76B65 Rossby waves [See also 86A05, 86A10]

76B70 Stratification effects in inviscid fluids

76B75 Flow control and optimization [See also 49Q10, 93C20, 93C95]

76B99 None of the above, but in this section

76Dxx Incompressible viscous fluids

76D03 Existence, uniqueness, and regularity theory [See also 35Q30]

76D05 Navier-Stokes equations [See also 35Q30]

76D06 Statistical solutions of Navier-Stokes and related equations [See also 60H30, 76M35]

76D07 Stokes and related (Oseen, etc.) flows

76D08 Lubrication theory

76D09 Viscous-inviscid interaction

76D10 Boundary-layer theory, separation and reattachment, higher-order effects

76D17 Viscous vortex flows

76D25 Wakes and jets

76D27 Other free-boundary flows; Hele-Shaw flows

76D33 Waves

76D45 Capillarity (surface tension) [See also 76B45]

76D50 Stratification effects in viscous fluids

76D55 Flow control and optimization [See also 49Q10, 93C20, 93C95]

76D99 None of the above, but in this section

76Exx Hydrodynamic stability

76E05 Parallel shear flows

76E06 Convection

76E07 Rotation

76E09 Stability and instability of nonparallel flows

76E15 Absolute and convective instability and stability

76E17 Interfacial stability and instability

76E19 Compressibility effects

76E20 Stability and instability of geophysical andastrophysical flows

76E25 Stability and instability of magnetohydrodynamic and electrohydrodynamic flows

76E30 Nonlinear effects

76E99 None of the above, but in this section

76Fxx Turbulence [See also 37-XX, 60Gxx, 60Jxx]

76F02 Fundamentals

76F05 Isotropic turbulence; homogeneous turbulence

76F06 Transition to turbulence

76F10 Shear flows

76F20 Dynamical systems approach to turbulence [See also 37-XX]

76F25 Turbulent transport, mixing

76F30 Renormalization and other field-theoretical methods [See also 81T99]

76F35 Convective turbulence
[See also 76E15, 76Rxx]

76F40 Turbulent boundary layers

76F45 Stratification effects

76F50 Compressibility effects

76F55 Statistical turbulence modeling
[See also 76M35]

76F60 *k-ε* modeling

76F65 Direct numerical and large eddy simulation of turbulence

76F70 Control of turbulent flows

76F99 None of the above, but in this section

76Gxx General aerodynamics and subsonic flows

76G25 General aerodynamics and subsonic flows

76G99 None of the above, but in this section

76Hxx Transonic flows

76H05 Transonic flows

76H99 None of the above, but in this section

76Jxx Supersonic flows

76J20 Supersonic flows

76J99 None of the above, but in this section

76Kxx Hypersonic flows

76K05 Hypersonic flows

76K99 None of the above, but in this section

**76Lxx Shock waves and blast waves
[See also 35L67]**

76L05 Shock waves and blast waves
[See also 35L67]

76L99 None of the above, but in this section

**76Mxx Basic methods in fluid mechanics
[See also 65-XX]**

76M10 Finite element methods

76M12 Finite volume methods

76M15 Boundary element methods

76M20 Finite difference methods

76M22 Spectral methods

76M23 Vortex methods

76M25 Other numerical methods

76M27 Visualization algorithms

76M28 Particle methods and lattice-gas methods

76M30 Variational methods

76M35 Stochastic analysis

76M40 Complex-variables methods

76M45 Asymptotic methods, singular perturbations

76M50 Homogenization

76M55 Dimensional analysis and similarity

76M60 Symmetry analysis, Lie group and algebra methods

76M99 None of the above, but in this section

76Nxx Compressible fluids and gas dynamics, general

76N10 Existence, uniqueness, and regularity theory [See also 35L60, 35L65, 35Q30]

76N15 Gas dynamics, general

76N17 Viscous-inviscid interaction

76N20 Boundary-layer theory

76N25 Flow control and optimization

76N99 None of the above, but in this section

76Pxx Rarefied gas flows, Boltzmann equation [See also 82B40, 82C40, 82D05]

76P05 Rarefied gas flows, Boltzmann equation [See also 82B40, 82C40, 82D05]

76P99 None of the above, but in this section

76Qxx Hydro- and aero-acoustics

76Q05 Hydro- and aero-acoustics

76Q99 None of the above, but in this section

76Rxx Diffusion and convection

76R05 Forced convection

76R10 Free convection

76R50 Diffusion [See also 60J60]

76R99 None of the above, but in this section

76Sxx Flows in porous media; filtration; seepage

76S05 Flows in porous media; filtration; seepage

76S99 None of the above, but in this section

76Txx **Two-phase and multiphase flows**

76T10 Liquid-gas two-phase flows,
bubbly flows

76T15 Dusty-gas two-phase flows

76T20 Suspensions

76T25 Granular flows [See also 74C99, 74E20]

76T30 Three or more component flows

76T99 None of the above, but in this section

76Uxx **Rotating fluids**

76U05 Rotating fluids

76U99 None of the above, but in this section

76Vxx **Reaction effects in flows
[See also 80A32]**

76V05 Reaction effects in flows [See also 80A32]

76V99 None of the above, but in this section

76Wxx **Magnetohydrodynamics and electro-
hydrodynamics**

76W05 Magnetohydrodynamics and electrohy-
drodynamics

76W99 None of the above, but in this section

76Xxx **Ionized gas flow in electromagnetic
fields; plasmic flow [See also 82D10]**

76X05 Ionized gas flow in electromagnetic
fields; plasmic flow [See also 82D10]

76X99 None of the above, but in this section

76Yxx **Quantum hydrodynamics and relati-
vistic hydrodynamics
[See also 82D50, 83C55, 85A30]**

76Y05 Quantum hydrodynamics and relativis-
tic hydrodynamics
[See also 82D50, 83C55, 85A30]

76Y99 None of the above, but in this section

76Zxx **Biological fluid mechanics
[See also 74F10, 74L15, 92Cxx]**

76Z05 Physiological flows [See also 92C35]

76Z10 Biopropulsion in water and in air

76Z99 None of the above, but in this section

78-XX Optics, electromagnetic theory (For quantum optics, see 81V80)

78-00 General reference works (handbooks,
dictionaries, bibliographies, etc.)

78-01 Instructional exposition
(textbooks, tutorial papers, etc.)

78-02 Research exposition (monographs,
survey articles)

78-03 Historical (must also be assigned at least
one classification number from Section
01)

78-04 Explicit machine computation and pro-
grams (not the theory of computation or
programming)

78-05 Experimental work

78-06 Proceedings, conferences, collections,
etc.

78Axx **General**

78A02 Foundations

78A05 Geometric optics

78A10 Physical optics

78A15 Electron optics

78A20 Space charge waves

78A25 Electromagnetic theory, general

78A30 Electro- and magnetostatics

78A35 Motion of charged particles

78A37 Ion traps

78A40 Waves and radiation

78A45 Diffraction, scattering
[See also 34E20 for WKB methods]

78A46 Inverse scattering problems

78A48 Composite media; random media

78A50 Antennas, wave-guides

78A55 Technical applications

78A57 Electrochemistry

78A60 Lasers, masers, optical bistability, non-
linear optics [See also 81V80]

78A70 Biological applications
[See also 91D30, 92C30]

78A97 Mathematically heuristic optics and
electromagnetic theory (must also be as-
signed at least one other classification
number in this section)

78A99 Miscellaneous topics

78Mxx **Basic methods**

78M05 Method of moments

78M10 Finite element methods

78M12 Finite volume methods,
       finite integration techniques

78M15 Boundary element methods

78M16 Multipole methods

78M20 Finite difference methods

78M22 Spectral methods

78M25 Other numerical methods

78M30 Variational methods

78M31 Monte Carlo methods

78M32 Neural and heuristic methods

78M34 Model reduction

78M35 Asymptotic analysis

78M40 Homogenization

78M50 Optimization

78M99 None of the above, but in this section

80-XX Classical thermodynamics, heat transfer (For thermodynamics of solids, see 74A15)

80-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

80-01 Instructional exposition (textbooks, tutorial papers, etc.)

80-02 Research exposition (monographs, survey articles)

80-03 Historical (must also be assigned at least one classification number from Section 01)

80-04 Explicit machine computation and programs (not the theory of computation or programming)

80-05 Experimental work

80-06 Proceedings, conferences, collections, etc.

80Axx Thermodynamics and heat transfer

80A05 Foundations

80A10 Classical thermodynamics, including relativistic

80A17 Thermodynamics of continua [See also 74A15]

80A20 Heat and mass transfer, heat flow

80A22 Stefan problems, phase changes, etc. [See also 74Nxx]

80A23 Inverse problems

80A25 Combustion

80A30 Chemical kinetics [See also 76V05, 92C45, 92E20]

80A32 Chemically reacting flows [See also 92C45, 92E20]

80A50 Chemistry (general) [See mainly 92Exx]

80A99 None of the above, but in this section

80Mxx Basic methods

80M10 Finite element methods

80M12 Finite volume methods

80M15 Boundary element methods

80M20 Finite difference methods

80M22 Spectral methods

80M25 Other numerical methods

80M30 Variational methods

80M31 Monte Carlo methods

80M35 Asymptotic analysis

80M40 Homogenization

80M50 Optimization

80M99 None of the above, but in this section

81-XX Quantum theory

81-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

81-01 Instructional exposition (textbooks, tutorial papers, etc.)

81-02 Research exposition (monographs, survey articles)

81-03 Historical (must also be assigned at least one classification number from Section 01)

81-04 Explicit machine computation and programs (not the theory of computation or programming)

81-05 Experimental papers

81-06 Proceedings, conferences, collections, etc.

81-08 Computational methods

81Pxx Axiomatics, foundations, philosophy

81P05 General and philosophical

81P10 Logical foundations of quantum mechanics; quantum logic [See also 03G12, 06C15]

81P13 Contextuality

81P15 Quantum measurement theory

81P16 Quantum state spaces, operational and probabilistic concepts

81P20 Stochastic mechanics (including stochastic electrodynamics)

81P40 Quantum coherence, entanglement, quantum correlations

81P45 Quantum information, communication, networks [see also 94A15, 94A17]

81P50 Quantum state estimation, approximate cloning

81P68 Quantum computation [See also 68Q05, 68Q12]

81P70 Quantum coding (general)

81P94 Quantum cryptography [See also 94A60]

81P99 None of the above, but in this section

81Qxx General mathematical topics and methods in quantum theory

81Q05 Closed and approximate solutions to the Schrödinger, Dirac, Klein-Gordon and other equations of quantum mechanics

81Q10 Selfadjoint operator theory in quantum theory, including spectral analysis

81Q12 Non-selfadjoint operator theory in quantum theory

81Q15 Perturbation theories for operators and differential equations

81Q20 Semiclassical techniques, including WKB and Maslov methods

81Q30 Feynman integrals and graphs; applications ofalgebraic topology and algebraic geometry [See also 14D05, 32S40]

81Q35 Quantum mechanics on special spaces: manifolds, fractals, graphs, etc.

81Q37 Quantum dots, waveguides, ratchets, etc.

81Q40 Bethe-Salpeter and other integral equations

81Q50 Quantum chaos [See also 37Dxx]

81Q60 Supersymmetry and quantum mechanics

81Q65 Alternative quantum mechanics

81Q70 Differential-geometric methods, including holonomy, Berry and Hannay phases, etc.

81Q80 Special quantum systems, such as solvable systems

81Q93 Quantum control

81Q99 None of the above, but in this section

81Rxx Groups and algebras in quantum theory

81R05 Finite-dimensional groups and algebras motivated by physics and their representations [See also 20C35, 22E70]

81R10 Infinite-dimensional groups and algebras motivated by physics, including Virasoro, Kac-Moody, W-algebras and other current algebras and their representations [See also 17B65, 17B67, 22E65, 22E67, 22E70]

81R12 Relations with integrable systems [See also 17Bxx, 37J35]

81R15 Operator algebra methods [See also 46Lxx, 81T05]

81R20 Covariant wave equations

81R25 Spinor and twistor methods [See also 32L25]

81R30 Coherent states [See also 22E45]; squeezed states [See also 81V80]

81R40 Symmetry breaking

81R50 Quantum groups and related algebraic methods [See also 16T20, 17B37]

81R60 Noncommutative geometry

81R99 None of the above, but in this section

81Sxx General quantum mechanics and problems of quantization

81S05 Canonical quantization, commutation relations and statistics

81S10 Geometry and quantization, symplectic methods [See also 53D50]

81S20 Stochastic quantization

81S22 Open systems, reduced dynamics, master equations, decoherence [See also 82C31]

81S25 Quantum stochastic calculus

81S30 Phase-space methods including Wigner distributions, etc.

81S40 Path integrals [See also 58D30]

81S99 None of the above, but in this section

81Txx Quantum field theory; related classical field theories [See also 70Sxx]

81T05 Axiomatic quantum field theory; operator algebras

81T08 Constructive quantum field theory

81T10 Model quantum field theories

81T13 Yang-Mills and other gauge theories
[See also 53C07, 58E15]

81T15 Perturbative methods of renormalization

81T16 Nonperturbative methods of renormalization

81T17 Renormalization group methods

81T18 Feynman diagrams

81T20 Quantum field theory on curved space backgrounds

81T25 Quantum field theory on lattices

81T27 Continuum limits

81T28 Thermal quantum field theory
[see also 82B30]

81T30 String and superstring theories; other extended objects (e.g., branes)
[See also 83E30]

81T40 Two-dimensional field theories, conformal field theories, etc.

81T45 Topological field theories
[See also 57R56, 58Dxx]

81T50 Anomalies

81T55 Casimir effect

81T60 Supersymmetric field theories

81T70 Quantization in field theory; cohomological methods [See also 58D29]

81T75 Noncommutative geometry methods
[See also 46L85, 46L87, 58B34]

81T80 Simulation and numerical modeling

81T99 None of the above, but in this section

81Uxx Scattering theory [See also 34A55, 34L25, 34L40, 35P25, 47A40]

81U05 2-body potential scattering theory
[See also 34E20 for WKB methods]

81U10 *n*-body potential scattering theory

81U15 Exactly and quasi-solvable systems

81U20 *S*-matrix theory, etc.

81U30 Dispersion theory, dispersion relations

81U35 Inelastic and multichannel scattering

81U40 Inverse scattering problems

81U99 None of the above, but in this section

81Vxx Applications to specific physical systems

81V05 Strong interaction, including quantum chromodynamics

81V10 Electromagnetic interaction; quantum electrodynamics

81V15 Weak interaction

81V17 Gravitational interaction
[See also 83Cxx and 83Exx]

81V19 Other fundamental interactions

81V22 Unified theories

81V25 Other elementary particle theory

81V35 Nuclear physics

81V45 Atomic physics

81V55 Molecular physics [See also 92E10]

81V65 Quantum dots [See also 82D20]

81V70 Many-body theory; quantum Hall effect

81V80 Quantum optics

81V99 None of the above, but in this section

82-XX Statistical mechanics, structure of matter

82-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

82-01 Instructional exposition (textbooks, tutorial papers, etc.)

82-02 Research exposition (monographs, survey articles)

82-03 Historical (must also be assigned at least one classification number from Section 01)

82-04 Explicit machine computation and programs (not the theory of computation or programming)

82-05 Experimental papers

82-06 Proceedings, conferences, collections, etc.

82-08 Computational methods

82Bxx Equilibrium statistical mechanics

82B03 Foundations

82B05 Classical equilibrium statistical mechanics (general)

82B10 Quantum equilibrium statistical mechanics (general)

82B20 Lattice systems (Ising, dimer, Potts, etc.) andsystems on graphs

82B21 Continuum models (systems of particles, etc.)

82B23 Exactly solvable models; Bethe ansatz

82B24 Interface problems; diffusion-limited aggregation

82B26 Phase transitions (general)

82B27 Critical phenomena

82B28 Renormalization group methods
[See also 81T17]

82B30 Statistical thermodynamics
[See also 80-XX]

82B31 Stochastic methods

82B35 Irreversible thermodynamics, including
Onsager-Machlup theory
[See also 92E20]

82B40 Kinetic theory of gases

82B41 Random walks, random surfaces, lattice
animals, etc. [See also 60G50, 82C41]

82B43 Percolation [See also 60K35]

82B44 Disordered systems (random Ising mod-
els, random Schrödinger operators, etc.)

82B80 Numerical methods (Monte Carlo, series
resummation, etc.)
[See also 65-XX, 81T80]

82B99 None of the above, but in this section

**82Cxx Time-dependent statistical mechanics
(dynamic and nonequilibrium)**

82C03 Foundations

82C05 Classical dynamic and nonequilibrium
statistical mechanics (general)

82C10 Quantum dynamics and nonequilib-
rium statistical mechanics (general)

82C20 Dynamic lattice systems (kinetic Ising,
etc.) andsystems on graphs

82C21 Dynamic continuum models
(systems of particles, etc.)

82C22 Interacting particle systems
[See also 60K35]

82C23 Exactly solvable dynamic models
[See also 37K60]

82C24 Interface problems; diffusion-limited ag-
gregation

82C26 Dynamic and nonequilibrium phase
transitions (general)

82C27 Dynamic critical phenomena

82C28 Dynamic renormalization group meth-
ods [See also 81T17]

82C31 Stochastic   methods   (Fokker-Planck,
Langevin, etc.) [See also 60H10]

82C32 Neural nets
[See also 68T05, 91E40, 92B20]

82C35 Irreversible thermodynamics, including
Onsager-Machlup theory

82C40 Kinetic theory of gases

82C41 Dynamics of random walks, random
surfaces, lattice animals, etc.
[See also 60G50]

82C43 Time-dependent percolation
[See also 60K35]

82C44 Dynamics of disordered systems
(random Ising systems, etc.)

82C70 Transport processes

82C80 Numerical methods (Monte Carlo, series
resummation, etc.)

82C99 None of the above, but in this section

**82Dxx Applications to specific types of physi-
cal systems**

82D05 Gases

82D10 Plasmas

82D15 Liquids

82D20 Solids

82D25 Crystals (For crystallographic group the-
ory, see 20H15)

82D30 Random media, disordered materials
(including   liquid   crystals   and   spin
glasses)

82D35 Metals

82D37 Semiconductors

82D40 Magnetic materials

82D45 Ferroelectrics

82D50 Superfluids

82D55 Superconductors

82D60 Polymers

82D75 Nuclear reactor theory;
neutron transport

82D77 Quantum wave guides, quantum wires
[See also 78A50]

82D80 Nanostructures and nanoparticles

82D99 None of the above, but in this section

83-XX Relativity and gravitational
theory

83-00 General reference works (handbooks,
dictionaries, bibliographies, etc.)

83-01 Instructional exposition
(textbooks, tutorial papers, etc.)

83-02 Research exposition (monographs,
survey articles)

83-03 Historical (must also be assigned at least one classification number from Section 01)

83-04 Explicit machine computation and programs (not the theory of computation or programming)

83-05 Experimental work

83-06 Proceedings, conferences, collections, etc.

83-08 Computational methods

83Axx Special relativity

83A05 Special relativity

83A99 None of the above, but in this section

83Bxx Observational and experimental questions

83B05 Observational and experimental questions

83B99 None of the above, but in this section

83Cxx General relativity

83C05 Einstein's equations (general structure, canonical formalism, Cauchy problems)

83C10 Equations of motion

83C15 Exact solutions

83C20 Classes of solutions; algebraically special solutions, metrics with symmetries

83C22 Einstein-Maxwell equations

83C25 Approximation procedures, weak fields

83C27 Lattice gravity, Regge calculus and other discrete methods

83C30 Asymptotic procedures (radiation, news functions, $\mathcal{H}$-spaces, etc.)

83C35 Gravitational waves

83C40 Gravitational energy and conservation laws; groups of motions

83C45 Quantization of the gravitational field

83C47 Methods of quantum field theory [See also 81T20]

83C50 Electromagnetic fields

83C55 Macroscopic interaction of the gravitational field with matter (hydrodynamics, etc.)

83C57 Black holes

83C60 Spinor and twistor methods; Newman-Penrose formalism

83C65 Methods of noncommutative geometry [See also 58B34]

83C75 Space-time singularities, cosmic censorship, etc.

83C80 Analogues in lower dimensions

83C99 None of the above, but in this section

83Dxx Relativistic gravitational theories other than Einstein's, including asymmetric field theories

83D05 Relativistic gravitational theories other than Einstein's, including asymmetric field theories

83D99 None of the above, but in this section

83Exx Unified, higher-dimensional and super field theories

83E05 Geometrodynamics

83E15 Kaluza-Klein and other higher-dimensional theories

83E30 String and superstring theories [See also 81T30]

83E50 Supergravity

83E99 None of the above, but in this section

83Fxx Cosmology

83F05 Cosmology

83F99 None of the above, but in this section

85-XX Astronomy and astrophysics (For celestial mechanics, see 70F15)

85-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

85-01 Instructional exposition (textbooks, tutorial papers, etc.)

85-02 Research exposition (monographs, survey articles)

85-03 Historical (must also be assigned at least one classification number from Section 01)

85-04 Explicit machine computation and programs (not the theory of computation or programming)

85-05 Experimental work

85-06 Proceedings, conferences, collections, etc.

85-08 Computational methods

**85Axx Astronomy and astrophysics
(For celestial mechanics, see 70F15)**

85A04 General

85A05 Galactic and stellar dynamics

85A15 Galactic and stellar structure

85A20 Planetary atmospheres

85A25 Radiative transfer

85A30 Hydrodynamic and hydromagnetic problems [See also 76Y05]

85A35 Statistical astronomy

85A40 Cosmology
(For relativistic cosmology, see 83F05)

85A99 Miscellaneous topics

86-XX Geophysics
[See also 76U05, 76V05]

86-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

86-01 Instructional exposition
(textbooks, tutorial papers, etc.)

86-02 Research exposition (monographs, survey articles)

86-03 Historical (must also be assigned at least one classification number from Section 01)

86-04 Explicit machine computation and programs (not the theory of computation or programming)

86-05 Experimental work

86-06 Proceedings, conferences, collections, etc.

86-08 Computational methods

86Axx Geophysics [See also 76U05, 76V05]

86A04 General

86A05 Hydrology, hydrography, oceanography [See also 76Bxx, 76E20, 76Q05, 76Rxx, 76U05]

86A10 Meteorology and atmospheric physics [See also 76Bxx, 76E20, 76N15, 76Q05, 76Rxx, 76U05]

86A15 Seismology

86A17 Global dynamics, earthquake problems

86A20 Potentials, prospecting

86A22 Inverse problems [See also 35R30]

86A25 Geo-electricity and geomagnetism [See also 76W05, 78A25]

86A30 Geodesy, mapping problems

86A32 Geostatistics

86A40 Glaciology

86A60 Geological problems

86A99 Miscellaneous topics

90-XX Operations research, mathematical programming

90-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

90-01 Instructional exposition
(textbooks, tutorial papers, etc.)

90-02 Research exposition (monographs, survey articles)

90-03 Historical (must also be assigned at least one classification number from Section 01)

90-04 Explicit machine computation and programs (not the theory of computation or programming)

90-06 Proceedings, conferences, collections, etc.

90-08 Computational methods

90Bxx Operations research and management science

90B05 Inventory, storage, reservoirs

90B06 Transportation, logistics

90B10 Network models, deterministic

90B15 Network models, stochastic

90B18 Communication networks [See also 68M10, 94A05]

90B20 Traffic problems

90B22 Queues and service [See also 60K25, 68M20]

90B25 Reliability, availability, maintenance, inspection [See also 60K10, 62N05]

90B30 Production models

90B35 Scheduling theory, deterministic [See also 68M20]

90B36 Scheduling theory, stochastic [See also 68M20]

90B40 Search theory

90B50 Management decision making, including multiple objectives [See also 90C29, 90C31, 91A35, 91B06]

90B60 Marketing, advertising [See also 91B60]

90B70 Theory of organizations, manpower planning [See also 91D35]

90B80 Discrete location and assignment
[See also 90C10]

90B85 Continuous location

90B90 Case-oriented studies

90B99 None of the above, but in this section

90Cxx Mathematical programming
[See also 49Mxx, 65Kxx]

90C05 Linear programming

90C06 Large-scale problems

90C08 Special problems of linear programming
(transportation, multi-index, etc.)

90C09 Boolean programming

90C10 Integer programming

90C11 Mixed integer programming

90C15 Stochastic programming

90C20 Quadratic programming

90C22 Semidefinite programming

90C25 Convex programming

90C26 Nonconvex programming,
global optimization

90C27 Combinatorial optimization

90C29 Multi-objective and goal programming

90C30 Nonlinear programming

90C31 Sensitivity, stability, parametric
optimization

90C32 Fractional programming

90C33 Complementarity and equilibrium prob-
lems andvariational inequalities (finite
dimensions)

90C34 Semi-infinite programming

90C35 Programming involving graphs or net-
works [See also 90C27]

90C39 Dynamic programming [See also 49L20]

90C40 Markov and semi-Markov decision pro-
cesses

90C46 Optimality conditions, duality
[See also 49N15]

90C47 Minimax problems [See also 49K35]

90C48 Programming in abstract spaces

90C49 Extreme-point and pivoting methods

90C51 Interior-point methods

90C52 Methods of reduced gradient type

90C53 Methods of quasi-Newton type

90C55 Methods of successive quadratic pro-
gramming type

90C56 Derivative-free methods and methods
usinggeneralized derivatives
[See also 49J52]

90C57 Polyhedral combinatorics, branch-and-
bound, branch-and-cut

90C59 Approximation methods and heuristics

90C60 Abstract computational complexity for
mathematical programming problems
[See also 68Q25]

90C70 Fuzzy programming

90C90 Applications of mathematical program-
ming

90C99 None of the above, but in this section

91-XX Game theory, economics, social and behavioral sciences

91-00 General reference works (handbooks,
dictionaries, bibliographies, etc.)

91-01 Instructional exposition
(textbooks, tutorial papers, etc.)

91-02 Research exposition (monographs,
survey articles)

91-03 Historical (must also be assigned at least
one classification number from section
01)

91-04 Explicit machine computation and pro-
grams (not the theory of computation or
programming)

91-06 Proceedings, conferences, collections,
etc.

91-08 Computational methods

91Axx Game theory

91A05 2-person games

91A06 n-person games, $n > 2$

91A10 Noncooperative games

91A12 Cooperative games

91A13 Games with infinitely many players

91A15 Stochastic games

91A18 Games in extensive form

91A20 Multistage and repeated games

91A22 Evolutionary games

91A23 Differential games [See also 49N70]

91A24 Positional games (pursuit and evasion,
etc.) [See also 49N75]

91A25 Dynamic games

91A26 Rationality, learning

91A28 Signaling, communication

91A30 Utility theory for games [See also 91B16]

91A35 Decision theory for games
[See also 62Cxx, 91B06, 90B50]

91A40 Game-theoretic models

91A43 Games involving graphs
[See also 05C57]

91A44 Games involving topology or set theory

91A46 Combinatorial games

91A50 Discrete-time games

91A55 Games of timing

91A60 Probabilistic games; gambling
[See also 60G40]

91A65 Hierarchical games

91A70 Spaces of games

91A80 Applications of game theory

91A90 Experimental studies

91A99 None of the above, but in this section

**91Bxx Mathematical economics
(For econometrics, see 62P20)**

91B02 Fundamental topics (basic mathematics, methodology; applicable to economics in general)

91B06 Decision theory
[See also 62Cxx, 90B50, 91A35]

91B08 Individual preferences

91B10 Group preferences

91B12 Voting theory

91B14 Social choice

91B15 Welfare economics

91B16 Utility theory

91B18 Public goods

91B24 Price theory and market structure

91B25 Asset pricing models

91B26 Market models (auctions, bargaining, bidding, selling, etc.)

91B30 Risk theory, insurance

91B32 Resource and cost allocation

91B38 Production theory, theory of the firm

91B40 Labor market, contracts

91B42 Consumer behavior, demand theory

91B44 Informational economics

91B50 General equilibrium theory

91B51 Dynamic stochastic general equilibrium theory

91B52 Special types of equilibria

91B54 Special types of economies

91B55 Economic dynamics

91B60 Trade models

91B62 Growth models

91B64 Macro-economic models
(monetary models, models of taxation)

91B66 Multisectoral models

91B68 Matching models

91B69 Heterogeneous agent models

91B70 Stochastic models

91B72 Spatial models

91B74 Models of real-world systems

91B76 Environmental economics (natural resource models, harvesting, pollution, etc.)

91B80 Applications of statistical and quantum mechanics to economics (econophysics)

91B82 Statistical methods; economic indices and measures

91B84 Economic time series analysis
[See also 62M10]

91B99 None of the above, but in this section

91Cxx Social and behavioral sciences: general topics (For statistics, see 62-XX)

91C05 Measurement theory

91C15 One- and multidimensional scaling

91C20 Clustering [See also 62H30]

91C99 None of the above, but in this section

**91Dxx Mathematical sociology
(including anthropology)**

91D10 Models of societies, social and urban evolution

91D20 Mathematical geography and demography

91D25 Spatial models [See also 91B72]

91D30 Social networks

91D35 Manpower systems
[See also 91B40, 90B70]

91D99 None of the above, but in this section

91Exx Mathematical psychology

91E10 Cognitive psychology

91E30 Psychophysics and psychophysiology; perception

91E40 Memory and learning [See also 68T05]

91E45 Measurement and performance

91E99 None of the above, but in this section

91Fxx Other social and behavioral sciences (mathematical treatment)

91F10 History, political science

91F20 Linguistics [See also 03B65, 68T50]

91F99 None of the above, but in this section

91Gxx Mathematical finance

91G10 Portfolio theory

91G20 Derivative securities

91G30 Interest rates (stochastic models)

91G40 Credit risk

91G50 Corporate finance

91G60 Numerical methods (including Monte Carlo methods)

91G70 Statistical methods, econometrics

91G80 Financial applications of other theories (stochastic control, calculus of variations, PDE, SPDE, dynamical systems)

91G99 None of the above, but in this section

92-XX Biology and other natural sciences

92-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

92-01 Instructional exposition (textbooks, tutorial papers, etc.)

92-02 Research exposition (monographs, survey articles)

92-03 Historical (must also be assigned at least one classification number from Section 01)

92-04 Explicit machine computation and programs (not the theory of computation or programming)

92-06 Proceedings, conferences, collections, etc.

92-08 Computational methods

92Bxx Mathematical biology in general

92B05 General biology and biomathematics

92B10 Taxonomy, statistics

92B15 General biostatistics [See also 62P10]

92B20 Neural networks, artificial life and related topics [See also 68T05, 82C32, 94Cxx]

92B25 Biological rhythms and synchronization

92B99 None of the above, but in this section

92Cxx Physiological, cellular and medical topics

92C05 Biophysics

92C10 Biomechanics [See also 74L15]

92C15 Developmental biology, pattern formation

92C17 Cell movement (chemotaxis, etc.)

92C20 Neural biology

92C30 Physiology (general)

92C35 Physiological flow [See also 76Z05]

92C37 Cell biology

92C40 Biochemistry, molecular biology

92C42 Systems biology, networks

92C45 Kinetics in biochemical problems (pharmacokinetics, enzyme kinetics, etc.) [See also 80A30]

92C50 Medical applications (general)

92C55 Biomedical imaging and signal processing [See also 44A12, 65R10]

92C60 Medical epidemiology

92C80 Plant biology

92C99 None of the above, but in this section

92Dxx Genetics and population dynamics

92D10 Genetics (For genetic algebras, see 17D92)

92D15 Problems related to evolution

92D20 Protein sequences, DNA sequences

92D25 Population dynamics (general)

92D30 Epidemiology

92D40 Ecology

92D50 Animal behavior

92D99 None of the above, but in this section

92Exx Chemistry (For biochemistry, see 92C40)

92E10 Molecular structure (graph-theoretic methods, methods of differential topology, etc.)

92E20 Classical flows, reactions, etc. [See also 80A30, 80A32]

92E99 None of the above, but in this section

**92Fxx Other natural sciences
(should also be assigned at least one
other classification number in this
section)**

92F05   Other natural sciences
(should also be assigned at least one
other classification number in section 92)

92F99   None of the above, but in this section

93-XX Systems theory; control
(For optimal control, see 49-XX)

93-00   General reference works (handbooks,
dictionaries, bibliographies, etc.)

93-01   Instructional exposition
(textbooks, tutorial papers, etc.)

93-02   Research exposition (monographs,
survey articles)

93-03   Historical (must also be assigned at least
one classification number from Section
01)

93-04   Explicit machine computation and pro-
grams (not the theory of computation or
programming)

93-06   Proceedings, conferences, collections,
etc.

93Axx General

93A05   Axiomatic system theory

93A10   General systems

93A13   Hierarchical systems

93A14   Decentralized systems

93A15   Large scale systems

93A30   Mathematical modeling (models of sys-
tems, model-matching, etc.)

93A99   None of the above, but in this section

**93Bxx Controllability, observability, and sys-
tem structure**

93B03   Attainable sets

93B05   Controllability

93B07   Observability

93B10   Canonical structure

93B11   System structure simplification

93B12   Variable structure systems

93B15   Realizations from input-output data

93B17   Transformations

93B18   Linearizations

93B20   Minimal systems representations

93B25   Algebraic methods

93B27   Geometric methods

93B28   Operator-theoretic methods
[See also 47A48, 47A57, 47B35, 47N70]

93B30   System identification

93B35   Sensitivity (robustness)

93B36 H^∞-control

93B40   Computational methods

93B50   Synthesis problems

93B51   Design techniques (robust design, com-
puter-aided design, etc.)

93B52   Feedback control

93B55   Pole and zero placement problems

93B60   Eigenvalue problems

93B99   None of the above, but in this section

93Cxx Control systems

93C05   Linear systems

93C10   Nonlinear systems

93C15   Systems governed by ordinary differen-
tial equations [See also 34H05]

93C20   Systems governed by partial differential
equations

93C23   Systems   governed   by   functional-
differential equations [See also 34K35]

93C25   Systems in abstract spaces

93C30   Systems governed by functional rela-
tions other than differential equations
(such as hybrid and switching systems)

93C35   Multivariable systems

93C40   Adaptive control

93C41   Problems with incomplete information

93C42   Fuzzy control systems

93C55   Discrete-time systems

93C57   Sampled-data systems

93C62   Digital systems

93C65   Discrete event systems

93C70   Time-scale analysis and singular pertur-
bations

93C73   Perturbations

93C80   Frequency-response methods

93C83   Control problems involving computers
(process control, etc.)

93C85   Automated systems (robots, etc.)
[See also 68T40, 70B15, 70Q05]

93C95   Applications

93C99   None of the above, but in this section

93Dxx Stability

93D05 Lyapunov and other classical stabilities (Lagrange, Poisson, L^p, l^p, etc.)

93D09 Robust stability

93D10 Popov-type stability of feedback systems

93D15 Stabilization of systems by feedback

93D20 Asymptotic stability

93D21 Adaptive or robust stabilization

93D25 Input-output approaches

93D30 Scalar and vector Lyapunov functions

93D99 None of the above, but in this section

93Exx Stochastic systems and control

93E03 Stochastic systems, general

93E10 Estimation and detection [See also 60G35]

93E11 Filtering [See also 60G35]

93E12 System identification

93E14 Data smoothing

93E15 Stochastic stability

93E20 Optimal stochastic control

93E24 Least squares and related methods

93E25 Other computational methods

93E35 Stochastic learning and adaptive control

93E99 None of the above, but in this section

94-XX Information and communication, circuits

94-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

94-01 Instructional exposition (textbooks, tutorial papers, etc.)

94-02 Research exposition (monographs, survey articles)

94-03 Historical (must also be assigned at least one classification number from Section 01)

94-04 Explicit machine computation and programs (not the theory of computation or programming)

94-06 Proceedings, conferences, collections, etc.

94Axx Communication, information

94A05 Communication theory [See also 60G35, 90B18]

94A08 Image processing (compression, reconstruction, etc.) [See also 68U10]

94A11 Application of orthogonal and other special functions

94A12 Signal theory (characterization, reconstruction, filtering, etc.)

94A13 Detection theory

94A14 Modulation and demodulation

94A15 Information theory, general [See also 62B10, 81P94]

94A17 Measures of information, entropy

94A20 Sampling theory

94A24 Coding theorems (Shannon theory)

94A29 Source coding [See also 68P30]

94A34 Rate-distortion theory

94A40 Channel models (including quantum)

94A45 Prefix, length-variable, comma-free codes [See also 20M35, 68Q45]

94A50 Theory of questionnaires

94A55 Shift register sequences and sequences over finite alphabets

94A60 Cryptography [See also 11T71, 14G50, 68P25, 81P94]

94A62 Authentication and secret sharing [See also 81P94]

94A99 None of the above, but in this section

94Bxx Theory of error-correcting codes and error-detecting codes

94B05 Linear codes, general

94B10 Convolutional codes

94B12 Combined modulation schemes (including trellis codes)

94B15 Cyclic codes

94B20 Burst-correcting codes

94B25 Combinatorial codes

94B27 Geometric methods (including applications of algebraic geometry) [See also 11T71, 14G50]

94B30 Majority codes

94B35 Decoding

94B40 Arithmetic codes [See also 11T71, 14G50]

94B50 Synchronization error-correcting codes

94B60 Other types of codes

94B65 Bounds on codes

94B70 Error probability

94B75 Applications of the theory of convex sets and geometry of numbers (covering radius, etc.) [See also 11H31]

94B99 None of the above, but in this section

94Cxx Circuits, networks

94C05 Analytic circuit theory

94C10 Switching theory, application of Boolean algebra; Boolean functions
[See also 06E30]

94C12 Fault detection; testing

94C15 Applications of graph theory
[See also 05Cxx, 68R10]

94C30 Applications of design theory
[See also 05Bxx]

94C99 None of the above, but in this section

**94Dxx Fuzzy sets and logic (in connection with questions of Section 94)
[See also 03B52, 03E72, 28E10]**

94D05 Fuzzy sets and logic (in connection with questions of Section 94)
[See also 03B52, 03E72, 28E10]

94D99 None of the above, but in this section

97-XX Mathematics education

97-00 General reference works (handbooks, dictionaries, bibliographies, etc.)

97-01 Instructional exposition
(textbooks, tutorial papers, etc.)

97-02 Research exposition (monographs, survey articles)

97-03 Historical (must also be assigned at least one classification number from Section 01)

97-04 Explicit machine computation and programs (not the theory of computation or programming)

97-06 Proceedings, conferences, collections, etc.

97Axx General, mathematics and education

97A10 Comprehensive works, reference books

97A20 Recreational mathematics, games
[See also 00A08]

97A30 History of mathematics and mathematics education [See also 01-XX]

97A40 Mathematics and society

97A50 Bibliographies [See also 01-00]

97A70 Theses and postdoctoral theses

97A80 Popularization of mathematics

97A99 None of the above, but in this section

97Bxx Educational policy and systems

97B10 Educational research and planning

97B20 General education

97B30 Vocational education

97B40 Higher education

97B50 Teacher education
(For research aspects, see 97C70)

97B60 Adult and further education

97B70 Syllabuses, educational standards

97B99 None of the above, but in this section

97Cxx Psychology of mathematics education, research in mathematics education

97C10 Comprehensive works

97C20 Affective behavior

97C30 Cognitive processes, learning theories

97C40 Intelligence and aptitudes

97C50 Language and verbal communities

97C60 Sociological aspects of learning

97C70 Teaching-learning processes

97C99 None of the above, but in this section

97Dxx Education and instruction in mathematics

97D10 Comprehensive works, comparative studies

97D20 Philosophical and theoretical contributions (maths didactics)

97D30 Objectives and goals

97D40 Teaching methods and classroom techniques

97D50 Teaching problem solving and heuristic strategies
(For research aspects, see 97Cxx)

97D60 Student assessment, achievement control and rating

97D70 Learning difficulties and student errors

97D80 Teaching units and draft lessons

97D99 None of the above, but in this section

97Exx Foundations of mathematics

97E10 Comprehensive works

97E20 Philosophy and mathematics

97E30 Logic

97E40 Language of mathematics

97E50 Reasoning and proving in the mathematics classroom

97E60 Sets, relations, set theory

97E99 None of the above, but in this section

97Fxx Arithmetic, number theory

97F10 Comprehensive works

97F20 Pre-numerical stage, concept of numbers

97F30 Natural numbers

97F40 Integers, rational numbers

97F50 Real numbers, complex numbers

97F60 Number theory

97F70 Measures and units

97F80 Ratio and proportion, percentages

97F90 Real life mathematics, practical arithmetic

97F99 None of the above, but in this section

97Gxx Geometry

97G10 Comprehensive works

97G20 Informal geometry

97G30 Areas and volumes

97G40 Plane and solid geometry

97G50 Transformation geometry

97G60 Plane and spherical trigonometry

97G70 Analytic geometry. Vector algebra

97G80 Descriptive geometry

97G99 None of the above, but in this section

97Hxx Algebra

97H10 Comprehensive works

97H20 Elementary algebra

97H30 Equations and inequalities

97H40 Groups, rings, fields

97H50 Ordered algebraic structures

97H60 Linear algebra

97H99 None of the above, but in this section

97Ixx Analysis

97I10 Comprehensive works

97I20 Mappings and functions

97I30 Sequences and series

97I40 Differential calculus

97I50 Integral calculus

97I60 Functions of several variables

97I70 Functional equations

97I80 Complex analysis

97I99 None of the above, but in this section

97Kxx Combinatorics, graph theory, probability theory, statistics

97K10 Comprehensive works

97K20 Combinatorics

97K30 Graph theory

97K40 Descriptive statistics

97K50 Probability theory

97K60 Distributions and stochastic processes

97K70 Foundations and methodology of statistics

97K80 Applied statistics

97K99 None of the above, but in this section

97Mxx Mathematical modeling, applications of mathematics

97M10 Modeling and interdisciplinarity

97M20 Mathematics in vocational training and career education

97M30 Financial and insurance mathematics

97M40 Operations research, economics

97M50 Physics, astronomy, technology, engineering

97M60 Biology, chemistry, medicine

97M70 Behavioral and social sciences

97M80 Arts, music, language, architecture

97M99 None of the above, but in this section

97Nxx Numerical mathematics

97N10 Comprehensive works

97N20 Rounding, estimation, theory of errors

97N30 Numerical algebra

97N40 Numerical analysis

97N50 Interpolation and approximation

97N60 Mathematical programming

97N70 Discrete mathematics

97N80 Mathematical software, computer programs

97N99 None of the above, but in this section

97Pxx Computer science

97P10 Comprehensive works

97P20 Theory of computer science

97P30 System software

97P40 Programming languages
97P50 Programming techniques
97P60 Hardware
97P70 Computer science and society
97P99 None of the above, but in this section

97Qxx Computer science education
97Q10 Comprehensive works
97Q20 Affective aspects in teaching computer science
97Q30 Cognitive processes
97Q40 Sociological aspects
97Q50 Objectives
97Q60 Teaching methods and classroom techniques
97Q70 Student assessment
97Q80 Teaching units
97Q99 None of the above, but in this section

97Rxx Computer science applications
97R10 Comprehensive works, collections of programs

97R20 Applications in mathematics
97R30 Applications in sciences
97R40 Artificial intelligence
97R50 Data bases, information systems
97R60 Computer graphics
97R70 User programs, administrative applications
97R80 Recreational computing
97R99 None of the above, but in this section

97Uxx Educational material and media, educational technology
97U10 Comprehensive works
97U20 Textbooks. Textbook research
97U30 Teachers' manuals and planning aids
97U40 Problem books. Competitions. Examinations
97U50 Computer assisted instruction; e-learning
97U60 Manipulative materials
97U70 Technological tools, calculators
97U80 Audiovisual media
97U99 None of the above, but in this section

Zentralblatt MATH Database

To make access to the world of information on mathematics most convenient to you we have set up a number of mirror servers from which you may choose the one that is nearest to you.

Berlin, Deutschland (Zentralblatt MATH)
`www.emis.de/ZMATH/`

Strasbourg, France (IRMA)
`zmath.u-strasb.fr/zmath/`

Berkeley, USA (MSRI)
`zb.msri.org/ZMATH/`

Göttingen, Deutschland (SUB Göttingen)
`zmath.sub.uni-goettingen.de`

Warszawa, Polska (ICM, University of Warsaw)
`vls.icm.edu.ol/ZMATH/`

Beijing, P. R. China (Tsinghua University Library)
`zmath.lib.tsinghua.edu.cn`

Moscow, Russian Federation (Steklov Institute, Russ. Acad. Sci)
`emis.mi.ras.ru/ZMATH/`

Ithaca, USA (Cornell University)
`zmath.library.cornell.edu`