1991 Mathematics Subject Classification

1991 Mathematics Subject Classification (MSC)

This is a corrected reprint of the 1991 MSC, which has been in use at MR starting with the January 1991 issue. The 1991 MSC was first printed in the Annual Index for 1990. Corrections and additions since then include the following: 11M36, 14J32, 17B69 and 53Z05 are new. Subsection 11Z50 has been relabeled 11Z05 and 73P05 has been relabeled 73P20. There are several entries in section 17 in which there have been small changes or additions in the description.

Instructions for using the
1991 Mathematics Subject Classification

These instructions apply uniformly to all fields listed. The main purpose of the classification is to help readers to find the items of present or potential interest to them as readily as possible—in MR, in Zbl, or anywhere else where this classification system is used. The review of a paper or book should be printed in the section where it will receive the broadest attention from all readers possibly interested in it—these include both people working in that area and people who are familiar with that area and apply its results and methods elsewhere (inside or outside of mathematics). It will be extremely useful for both readers and classifiers to familiarize themselves with the entire classification system and thus to become aware of all the classifications of possible interest to them.

Every paper or book reviewed in MR receives precisely one "primary" classification number, which is simply the number of the section in which the review of the item will be printed. This section should be the one that covers the principal contribution.

When a paper contains several principal contributions in different areas, the primary classification should cover the "most important" among them. A paper or book may receive one or several "secondary" classification numbers (or "cross-references") to cover any remaining principal contributions, ancillary results, motivation or origin of the problems discussed, intended or potential field of application, or other significant aspects worthy of notice.

The "primary" principal contribution is meant to be the one including the most important part of the work actually done in the paper. For example, a paper whose main overall content is the solution of a problem in graph theory, which arose in computer science and whose solution is (perhaps) at present only of interest to computer scientists, belongs primarily in 05C with a cross-reference in 68; conversely, a paper whose overall content lies mainly in computer science should receive a primary classification in 68, even if it makes heavy use of graph theory and proves several new graph-theoretic results along the way.

For an item with its primary classification in an "applied" section (68 through 94), it is recommended that a cross-reference be given to any "pure" mathematics section (00 through 65) to which the item being classified makes a contribution.

There are two types of cross-references given after many classifications in the list. The first type is of the form "{For A, see X}"; if this appears in section Y, it means that for contributions described by A one should usually assign the classification X, not Y. The other type of cross-reference merely points out related classifications; it is of the form "[See also ...]", "[See mainly ...]", etc., and the classifications listed in the brackets may, but need not, be added to the classification of a paper, or they may be used in place of the classification where the cross-reference is given. The classifier will have to judge which classification is the most appropriate for the paper at hand.

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
00A15	Bibliographies
00A20	Dictionaries and other general reference works
00A22	Formularies
00A30	Philosophy of mathematics [See also 03A05]
00A35	Methodology of mathematics, didactics
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]
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
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
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.
03A05	Philosophical and critical {For philosophy of mathematics, see 00A30}
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 and axiomatics of classical theories
03B35	Mechanization of proofs and logical operations [See also 68T15]
03B40	Combinatory logic and λ-calculus
03B45	Modal and tense logic {For provability logics, see also 03F40}
03B46	Relevance and entailment
03B48	Probability and inductive logic [See also 60A05]
03B50	Many-valued logic
03B52	Fuzzy logic [See also 94D05]
03B53	Paraconsistent logic
03B55	Intermediate logics
03B60	Other nonclassical logic

03B65   Logic of natural languages [See also 68S05, 92K20]
03B70   Logic of programming [See also 68Q55, 68Q60]
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]
03C07   Basic properties of first-order languages and structures
03C10   Quantifier elimination and related topics
03C13   Finite structures
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   Stability and related concepts
03C50   Models with special properties (saturated, rigid, etc.)
03C52   Properties of classes of models
03C55   Set-theoretic model theory
03C57   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]
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 03B45]
03C85   Second- and higher-order model theory
03C90   Nonclassical models (Boolean-valued, sheaf, etc.)
03C95   Abstract model theory
03C99   None of the above, but in this section
03Dxx   Recursion theory
03D03   Thue and Post systems, etc.
03D05   Automata and formal grammars in connection with logical questions [See also 68Qxx]
03D10   Turing machines and related notions [See also 68Q05]
03D15   Complexity of computation [See also 68Q15]
03D20   Recursive functions and relations, subrecursive hierarchies
03D25   Recursively enumerable sets and degrees
03D30   Other degrees; reducibilities
03D35   Undecidability and degrees of sets of sentences
03D40   Word problems, etc. [See also 06B25, 08A50, 20F10]
03D45   Theory of numerations, effectively presented structures [See also 03C57]
03D50   Recursive equivalence types of sets and structures, isols
03D55   Hierarchies
03D60   Recursion theory on ordinals, admissible sets, etc.
03D65   Higher-type and set recursion theory
03D70   Inductive definability
03D75   Abstract and axiomatic recursion theory
03D80   Applications of recursion theory
03D99   None of the above, but in this section
03Exx   Set theory [See also 04–XX]
03E05   Combinatorial set theory [See also 04A20]
03E10   Ordinal and cardinal numbers [See also 04A10]
03E15   Descriptive set theory [See also 04A15, 28A05, 54H05]
03E20   Other classical set theory
03E25   Axiom of choice and related propositions [See also 04A25]
03E30   Axiomatics of classical set theory and its fragments
03E35   Consistency and independence results
03E40   Other aspects of forcing and Boolean-valued models
03E45   Constructibility, ordinal definability, and related notions
03E47   Other notions of set-theoretic definability
03E50   Continuum hypothesis and Martin's axiom [See also 04A30, 54A25]
03E55   Large cardinals
03E60   Determinacy and related principles which contradict the axiom of choice
03E65   Other hypotheses and axioms
03E70   Nonclassical and second-order set theories
03E72   Fuzzy sets [See mainly 04A72]
03E75   Applications
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 03E30, 03E70]
03F40   Gödel numberings in proof theory
03F50   Metamathematics of constructive systems
03F55   Intuitionistic mathematics
03F60   Constructive and recursive analysis [See also 26E40, 46S30, 47S30]
03F65   Other constructive mathematics [See also 26E40, 46S30, 47S30]
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 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 06F35]
03G30   Categorical logic, topoi [See also 18B25]
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
04–XX   SET THEORY [See also 03Exx]
04–00   General reference works (handbooks, dictionaries, bibliographies, etc.)
04–01   Instructional exposition (textbooks, tutorial papers, etc.)
04–02   Research exposition (monographs, survey articles)
04–03   Historical (must also be assigned at least one classification number from Section 01)
04–04   Explicit machine computation and programs (not the theory of computation or programming)
04–06   Proceedings, conferences, collections, etc.
04A03   Set algebra
04A05   Relations, functions [See also 08A02]
04A10   Ordinal and cardinal numbers; generalizations [See also 03E10]
04A15   Descriptive set theory; Borel classifications, Suslin schemes, etc. [See also 03E15, 26A21, 28A05, 54H05]
04A20   Combinatorial set theory [See also 03E05, 05A05]; filters
04A25   Axiom of choice and equivalent propositions (Zorn's lemma, etc.) [See also 03E25]
04A30   Continuum hypothesis, generalized continuum hypothesis [See also 03E50, 54A25]
04A72   Fuzzy sets, fuzzy relations [See also 03E72, 94D05] {For fuzzy versions, see specific sections}
04A99   Miscellaneous topics
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   Classical combinatorial problems
05A05   Combinatorial choice problems (subsets, representatives, permutations)
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
05A20   Combinatorial inequalities
05A30 q-calculus and related topics [See also 03Dxx]
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 68Q90, 68R10, 90C35, 94C15}
05C05 Trees
05C10 Topological graph theory, embedding [See also 57M15, 57M25]
05C12 Distance in graphs
05C15 Chromatic theory of graphs and maps
05C20 Directed graphs (digraphs), tournaments
05C25 Graphs and groups [See also 20F32]
05C30 Enumeration of graphs and maps
05C35 Extremal problems [See also 90C35]
05C38 Paths and cycles [See also 90B10]
05C40 Connectivity
05C45 Eulerian and Hamiltonian graphs
05C50 Graphs and matrices
05C55 Generalized Ramsey theory
05C60 Isomorphism problems (reconstruction conjecture, perfect graphs, etc.)
05C65 Hypergraphs
05C70 Factorization, matching, covering and packing
05C75 Structural characterization of types of graphs
05C78 Graph labelling (graceful graphs, bandwidth, etc.)
05C80 Random graphs
05C85 Graph algorithms [See also 68Q20, 68R10]
05C90 Applications
05C99 None of the above, but in this section
05Dxx Extremal combinatorics
05D05 Extremal set theory
05D10 Ramsey theory
05D15 Transversal (matching) theory
05D99 None of the above, but in this section
05Exx Algebraic combinatorics
05E05 Symmetric functions
05E10 Tableaux, representations of the symmetric group [See also 20C30]
05E15 Combinatorial problems concerning the classical groups [See also 22E45, 33C80]
05E20 Group actions on designs, geometries and codes
05E25 Group actions on posets and homology groups of posets [See also 06A09]
05E30 Association schemes, strongly regular graphs
05E35 Orthogonal polynomials [See also 33C45, 33C50, 33D45]
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
06A08 Shellable posets, Cohen-Macaulay posets [See also 52B20]
06A09 Cohomology of posets [See also 05E25]
06A12 Semilattices [See also 20M10]
06A15 Galois correspondences, closure operators
06A23 Complete lattices, completions
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
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, generalizations, applications [See also 06B30, 06D10, 06F30, 18B35, 22A26, 68Q55]
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
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 03Gxx]
06D25 Post algebras [See also 03G20]
06D30 De Morgan algebras, Łukasiewicz algebras [See also 03G20]
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 space and related constructions
06E20 Ring-theoretic properties [See also 16E50, 16G30]
06E25 Boolean algebras with additional operations (diagonalizable algebras, etc.)
06E30 Boolean functions [See also 94C10]
06E99 None of the above, but in this section
06Fxx Ordered structures
06F05 Ordered semigroups [See also 20Mxx]
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
08A70 Applications of universal algebra in computer science
08A99 None of the above, but in this section
08Bxx Varieties
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
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 [See also 05B10]

11B25   Arithmetic progressions [See also 11N13]

11B34   Representation functions

11B37   Recurrences {For applications to special functions, see 33–XX}

11B39   Fibonacci and Lucas numbers and polynomials and generalizations

11B50   Sequences $(\bmod\, m)$

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 15A36]

11C99   None of the above, but in this section

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

11D04   Linear equations

11D09   Quadratic and bilinear equations

11D25   Cubic and quartic equations

11D41   Higher degree equations; Fermat's equation

11D57   Multiplicative and norm form 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   Modular forms, one variable

11F12   Automorphic forms, one variable

11F20   Dedekind eta function, Dedekind sums

11F22   Relationship to Lie algebras and finite simple groups

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

11F27   Theta series; Weil representation

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   Hilbert and Hilbert-Siegel modular groups and their modular and automorphic forms; Hilbert modular surfaces

11F46   Siegel modular groups and their modular and automorphic forms

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

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

11F66   Dirichlet series and functional equations in connection with modular forms

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

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

11F72   Spectral theory; Selberg trace formula

11F75   Cohomology of arithmetic groups

11F80   Galois properties

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 $\neq 1$ over global fields [See also 14H25]

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

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

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

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

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

11J89   Transcendence theory of elliptic and abelian functions

11J91   Transcendence theory of other special functions

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, 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
11M35	Hurwitz and Lerch zeta functions
11M36	Selberg zeta functions and regularized determinants
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]
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]
11P81	Elementary theory of partitions [See also 05A17]
11P82	Analytic theory of partitions
11P83	Partitions; congruences and congruential restrictions
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
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, 16H05, 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, 16H05, 16Kxx]

11R56	Adèle rings and groups
11R58	Arithmetic theory of algebraic function fields [See also 14–XX]
11R65	Class groups and Picard groups of orders
11R70	K-theory of global fields [See also 19Fxx]
11R80	Totally real and totally positive 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, 16H05, 16Kxx]
11S70	K-theory of local fields [See also 19Fxx]
11S80	Other analytic theory (analogues of beta and gamma functions, p-adic integration, etc.)
11S85	Other nonanalytic theory
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
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
11Z05	Miscellaneous applications of number theory
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
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 (in field theory)**
12G05   **Galois cohomology [See also 13A20, 16H05]**
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 34Gxx]
12H25 p-adic differential equations [See also 11S80, 14G20, 34Gxx]
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
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**
12Y05   **Computational aspects of field theory and polynomials**

13–XX   COMMUTATIVE RINGS AND ALGEBRAS
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 programs (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
13A10   Radical theory
13A15   Ideals; multiplicative ideal theory
13A18   **Valuations and their generalizations**
13A20   **Brauer groups [See also 12Gxx, 16H05]**
13A30   Associated graded rings of ideals (Rees ring, form ring) and related topics
13A35   Characteristic p methods (Frobenius endomorphism) and reduction to characteristic p [See also 13Mxx]
13A50   Invariant theory [See also 14D25]
13A99   **None of the above, but in this section**
13Bxx   **Ring extensions and related topics**
13B02   Extension theory
13B05   **Galois theory (commutative rings)**
13B10   Morphisms and derivations
13B15   **Ramification theory**
13B21   Integral dependence
13B22   Integral closure; integrally closed rings, related rings (Japanese, etc.)
13B24   Going up; going down; going between
13B25   Polynomials over commutative rings
13B30   Quotients and localization
13B35   Completion [See also 13J10]
13B40   Étale extensions and Henselization; Artin approximation [See also 13J15, 14B12]
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 18G05, 19A13]
13C11   Injective and flat modules and ideals [See also 18G05]
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
13C40   Linkage, complete intersections and determinantal ideals [See also 14M12]
13C99   **None of the above, but in this section**

13Dxx   (Co)homological methods
13D02   Syzygies
13D03   (Co)homology of commutative rings and algebras
13D05   (Co)homological dimension [See also 18G20]
13D10   Deformations and infinitesimal methods [See also 14B12, 14D15, 16S80, 32Gxx]
13D15   Grothendieck groups, K-theory [See also 14C35, 18F30, 19–XX]
13D25   Complexes
13D30   Torsion theory [See also 13C12, 18E40]
13D40   Hilbert-Samuel functions and 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
13E99   **None of the above, but in this section**
13Fxx   Arithmetic rings and other special rings [See also 12–XX]
13F05   Dedekind and Prüfer rings and their generalizations
13F07   Euclidean rings and generalizations
13F10   Principal ideal rings
13F15   Factorial rings, unique factorization domains [See also 14M05]
13F20   Polynomial rings and ideals [See also 11C08]
13F25   Formal power series rings [See also 13J05]
13F30   Valuation rings
13F40   Excellent rings
13F45   Seminormal rings
13F50   Rings with straightening laws, Hodge algebras
13F99   **None of the above, but in this section**
13G05   Integral domains
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
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]
13J99   **None of the above, but in this section**
13K05   Witt vectors and related rings
13L05   Applications of logic to commutative algebra [See also 03Cxx, 03Hxx]
13Mxx   Finite commutative rings {For number-theoretic aspects, see 11Txx}
13M05   Structure
13M10   Polynomials (commutative rings)
13M99   **None of the above, but in this section**
13Nxx   Differential algebra [See also 12H05, 14F10]
13N05   Modules of differentials [See also 16S32]
13N10   Rings of differential operators [See also 16S32, 32C38]
13N99   **None of the above, but in this section**
13Pxx   Computational aspects of commutative algebra [See also 68Q40]
13P05   Polynomials, factorization [See also 12Y05]
13P10   Polynomial ideals, Gröbner bases
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
14A15   Schemes
14A20   Generalizations (algebraic spaces, motifs)
14A22   Noncommutative algebraic geometry; algebraic supervarieties [See also 14M30, 32C11, 58A50]
14A25   Elementary questions
14A99   **None of the above, but in this section**
14Bxx   Local theory [See also 32Sxx]
14B05   Singularities [See also 14E15, 14H20, 32Sxx, 58C27]
14B07   Deformations of singularities [See also 14D15, 32Sxx]
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**
14B99 **None of the above, but in this section**
14Cxx **Cycles and subschemes**
14C05 **Parametrization (Chow and Hilbert schemes)**
14C10 **Equivalence relations**
14C15 **Rational equivalence rings**
14C17 **Intersection theory**
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 14F05, 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, Picard-Fuchs theory, etc.)**
14D07 **Variation of Hodge structures**
14D10 **Arithmetic ground fields (finite, local, global)**
14D15 **Formal methods; deformations [See also 13D10, 14B07, 16S80, 32Gxx]**
14D20 **Algebraic moduli problems, moduli of vector bundles {For analytic moduli problems, see 32G13}**
14D22 **Fine and coarse moduli spaces**
14D25 **Geometric invariants [See also 14L30]**
14D99 **None of the above, but in this section**
14Exx **Mappings and correspondences**
14E05 **Rational maps, birational correspondences**
14E07 **Birational automorphisms, Cremona group and generalizations [See also 32G20]**
14E09 **Automorphisms [See also 14J50, 14L27]**
14E10 **General correspondences**
14E15 **Global theory of singularities, resolution [See also 14B05, 32S20, 32S45]**
14E20 **Coverings, fundamental group (mappings)**
14E22 **Ramification problems [See also 11S15]**
14E25 **Embeddings**
14E30 **Minimal models**
14E35 **Results in dimension ≤ 3**
14E40 **Local structure of maps: étale, flat, etc. [See also 13–XX, 14F20]**
14E99 **None of the above, but in this section**
14Fxx **(Co)homology theory [See also 13Dxx]**
14F05 **Vector bundles, sheaves, related construction [See also 18F20, 32Lxx, 46M20]**
14F10 **Differentials and other special sheaves [See also 32C38]**
14F17 **Vanishing theorems [See also 32L20]**
14F20 **Étale and other Grothendieck topologies and cohomologies**
14F25 **Classical real and complex cohomology**
14F30 **p-adic cohomology, crystalline cohomology**
14F32 **Intersection (co)homology [See also 32S60]**
14F35 **Homotopy theory; fundamental groups [See also 14E20, 14H30]**
14F40 **de Rham cohomology [See also 14C30, 32C35, 32L10]**
14F45 **Topological properties**
14F99 **None of the above, but in this section**
14Gxx **Arithmetic problems. Diophantine geometry [See also 11Dxx, 11Gxx]**
14G05 **Rationality questions, rational points**
14G10 **Zeta-functions and related questions [See also 11G40] (Birch-Swinnerton-Dyer conjecture)**
14G15 **Finite ground fields**
14G20 **p-adic ground fields**
14G25 **Global ground fields**
14G27 **Nonalgebraically closed ground fields**
14G35 **Modular and Shimura varieties [See also 11F41, 11F46, 11G18]**
14G40 **Arithmetic varieties and schemes; Arakelov theory**
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]**
14H25 **Arithmetic ground fields [See also 11Dxx, 11G05, 14Gxx]**
14H30 **Coverings, fundamental group [See also 14E20, 14F35]**
14H35 **Correspondences [See also 14Exx]**
14H40 **Jacobians [See also 32G20]**
14H42 **Theta functions; Schottky problem [See also 14K25, 32G20]**
14H45 **Special curves and curves of low genus**

14H50 **Space curves**
14H52 **Elliptic curves [See also 11G05, 11G07, 14Kxx]**
14H55 **Riemann surfaces; Weierstrass points; gap sequences [See also 30Fxx]**
14H60 **Vector bundles on curves [See also 14F05]**
14H99 **None of the above, but in this section**
14Jxx **Surfaces and higher-dimensional varieties {For analytic theory, see 32Jxx}**
14J05 **Picard group [See also 14C22, 19A49, 32L05]**
14J10 **Families, moduli, classification: algebraic theory**
14J15 **Moduli, classification: analytic theory [See also 32G13, 32J15]**
14J17 **Singularities of surfaces**
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 **Special 3-folds [See also 14E05]**
14J32 **Calabi-Yau manifolds**
14J35 **Special 4-folds [See also 14E05]**
14J40 **Special n-folds**
14J45 **Fano varieties**
14J50 **Automorphisms of surfaces and higher-dimensional varieties [See also 14E09]**
14J60 **Vector bundles on surfaces and higher-dimensional varieties [See also 14F05, 32Lxx]**
14J70 **Hypersurfaces**
14J99 **None of the above, but in this section**
14Kxx **Abelian varieties and schemes**
14K02 **Isogeny**
14K05 **Algebraic theory**
14K10 **Algebraic moduli, classification**
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**
14K30 **Picard schemes, higher Jacobians [See also 14H40, 32G20]**
14K99 **None of the above, but in this section**
14Lxx **Group schemes {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]**
14L27 **Automorphism groups [See also 14E09]**
14L30 **Group actions on varieties or schemes (quotients) [See also 14D25]**
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 13C14, 13F45, 13H10]**
14M06 **Linkage [See also 13C40]**
14M07 **Low-codimension problems [See also 14Cxx]**
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 varieties**
14M25 **Toric varieties, Newton polyhedra**
14M30 **Supervarieties [See also 14A22, 32C11, 58A50]**
14M99 **None of the above, but in this section**
14Nxx **Classical methods and problems [See also 51–XX]**
14N05 **Projective techniques [See also 51N35]**
14N10 **Enumerative problems (combinatorial problems)**
14N99 **None of the above, but in this section**
14Pxx **Real algebraic and real analytic geometry**
14P05 **Real algebraic sets [See also 12Dxx]**
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 12–04, 68Q40]**
14Q05 **Curves**
14Q10 **Surfaces, hypersurfaces**
14Q15 **Higher-dimensional varieties**
14Q20 **Effectivity**
14Q99 **None of the above, but in this section**

15–XX   **LINEAR AND MULTILINEAR ALGEBRA; MATRIX THEORY (finite and infinite)**
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.
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]
15A18   Eigenvalues, singular values, and eigenvectors
15A21   Canonical forms, reductions, classification
15A22   Matrix pencils [See also 47A56]
15A23   Factorization of matrices
15A24   Matrix equations and identities
15A27   Commutativity
15A30   Algebraic systems of matrices [See also 16S50, 20Gxx, 20Hxx]
15A33   Matrices over special rings (quaternions, finite fields, etc.)
15A36   Matrices of integers [See also 11C20]
15A39   Linear inequalities
15A42   Inequalities involving eigenvalues and eigenvectors
15A45   Miscellaneous inequalities involving matrices
15A48   Positive matrices and their generalizations; cones of matrices
15A51   Stochastic matrices
15A52   Random matrices
15A54   Matrices over function rings in one or more variables
15A57   Other types of matrices (Hermitian, skew-Hermitian, etc.)
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, 14D25]
15A75   Exterior algebra, Grassmann algebras
15A78   Other algebras built from modules
15A90   Applications of matrix theory to physics
15A99   Miscellaneous topics

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, 16E10) [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
16D15   1-sided ideals
16D20   Bimodules
16D25   2-sided ideals
16D30   Maximal and prime 2-sided ideals [See also 16N60, 16D60], simple rings (except as in 16Kxx)
16D40   Free, projective, and flat modules and ideals [See also 18G05, 19A13]
16D50   Injective modules, self-injective rings [See also 16L60, 18G05]
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 16G60]
16D90   Module categories [See also 16Exx, 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 and results [See also 18Gxx]
16E10   Homological dimension
16E20   Grothendieck groups, K-theory, etc. [See also 18F30, 19–XX]
16E30   Homological functors on modules
16E40   Hochschild and other homology and cohomology theories for rings

16E50   von Neumann regular rings and generalizations
16E60   Semihereditary and hereditary rings, free ideal rings, Sylvester rings, etc.
16E70   Other rings of low global or flat dimension
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 16H05]
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
16H05   Orders and arithmetic, separable algebras, Azumaya algebras [See also 11R52, 11R54, 11S45, 13A20]
16Kxx   Division rings and semisimple Artinian rings [See also 12E15, 15A30]
16K20   Finite-dimensional {For Brauer group theory, see 12Gxx, 13A20; for crossed products, see 16S35}
16K40   Infinite-dimensional and general
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 16D30, 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, Gel′fand-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)
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]
16S40   Smash products of general Hopf actions [See also 16W30]
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 14D15]
16S90   Maximal ring of quotients, 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
16Uxx   Conditions on elements (including elements of matrix rings, etc.)
16U10   Integral domains
16U20   Ore rings, multiplicative sets, Ore localization
16U30   Divisibility, noncommutative UFDs
16U50   Algebraicity and local finiteness [See also 16N40]
16U60   Units, groups of units, general linear groups
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, actions of groups and semigroups and their fixed rings
16W25 Derivations, actions of Lie algebras
16W30 Coalgebras, bialgebras, Hopf algebras [See also 57T05, 16S30–16S40]; rings, modules, etc. on which these act
16W50 Graded rings and modules
16W55 "Super" (or "skew") structure [See also 17A70, 17B70, 17C70] {For exterior algebras, see 15A75; for Clifford algebras, see 11E88, 15A66}
16W60 Filtrations and valuations, generalizations of Euclidean algorithm, completions, formal power series and related constructions [See also 13Jxx]
16W80 Topological and ordered rings and modules [See also 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

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
17A10 Commutative power-associative
17A15 Noncommutative Jordan algebras
17A20 Flexible algebras
17A25 Nodal algebras
17A30 Algebras satisfying other identities
17A35 Division algebras
17A36 Automorphisms, derivations, other operators
17A40 Ternary compositions
17A42 Other n-ary compositions
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 algebras
17B05 Structure theory
17B10 Representations, algebraic theory (weights)
17B15 Representations, analytic theory
17B20 Simple, semisimple, reductive algebras (roots)
17B25 Exceptional algebras
17B30 Solvable, nilpotent algebras
17B35 Universal enveloping algebras [See also 16S30]
17B37 Quantum groups and related deformations [See also 16W30, 81R50, 82B23]
17B40 Automorphisms, derivations, other operators
17B45 Lie algebras of linear algebraic groups [See also 14Lxx and 20Gxx]
17B50 Modular Lie algebras
17B55 Homological methods in Lie algebras and superalgebras
17B56 Cohomology of Lie algebras and superalgebras
17B60 Lie rings associated with other structures (associative, Jordan, etc.) [See also 15A30, 16W10, 17C40, 17C50]
17B65 Infinite-dimensional Lie algebras and superalgebras [See also 22E65]
17B66 Lie algebras of vector fields and related algebras
17B67 Kac-Moody algebras (structure and representation theory)
17B68 Virasoro and related algebras
17B69 Vertex operators
17B70 Graded Lie algebras
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
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, neocategories [See also 20Lxx]
18A15 Foundations, relations to logic and deductive systems [See also 03–XX]
18A20 Epimorphisms, monomorphisms, special classes of morphisms, null morphisms, factorization (bicategories)
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 (via images, coimages, dominions, codominions), substructures, quotient structures, congruences, amalgams
18A35 Categories admitting limits (complete categories), functors commuting with limits, continuous functors, completions
18A40 Adjoint functors (representable functors, universal constructions, reflective subcategories, reflections, etc.), constructions of adjoints (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, 20Lxx, 20Mxx]
18B99 None of the above, but in this section
18Cxx Categories and algebraic 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
18C99 None of the above, but in this section
18Dxx Categories with structure
18D05 Double categories, 2-categories, bicategories, hypercategories
18D10 Monoidal categories (= multiplicative 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.)
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, 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, 55Uxx]
18G05   Projectives and injectives [See also 13C10, 13C11, 16D40, 16D50]
18G10   Resolutions; derived functors [See also 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   Nonabelian homotopical algebra
18G60   Other (co)homology theories (cyclic, dihedral, etc.) [See also 19D55, 46L80, 58B30, 58G12]
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 [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 58G12]
19K56   Index theory [See also 58G12]
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]
19L64   Computations, geometric applications
19L99   None of the above, but in this section
19M05   Miscellaneous applications of K-theory

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 programs (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 algebraic, geometric, or combinatorial structures [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]
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 multipliers
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   Classification of simple and nonsolvable groups
20D06   Simple groups: alternating groups and groups of Lie type [See also 20Gxx, 22Exx]

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**
20D50   **Covering of subgroups**
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**
20E08   **Groups acting on trees**
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**
20E28   **Maximal subgroups**
20E32   **Simple groups [See also 20D05]**
20E34   **General structure theorems**
20E36   **General theorems concerning automorphisms of groups**
20E42   **Groups with a BN-pair; buildings [See also 51E24]**
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, 68Qxx]**
20F12   **Commutator calculus**
20F14   **Derived series, central series, and generalizations**
20F16   **Solvable groups, supersolvable groups**
20F17   **Formations of groups, Fitting classes [See also 20D10]**
20F18   **Nilpotent groups**
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**
20F32   **Geometric group theory [See also 05C25, 20Exx, 20Gxx]**
20F34   **Fundamental groups and their automorphisms [See also 57M05, 57Sxx, 22E40]**
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   **Coxeter groups [See also 22E40]**
20F60   **Ordered groups [See mainly 06F15]**
20F99   **None of the above, but in this section**
20Gxx   **Linear algebraic groups (classical groups) {For arithmetic theory, see 11E57, 11H06; for geometric theory, see 14Lxx, 22Exx; for other methods in representation theory, see 15A30, 22E45, 22E46, 22E47, 22E50, 22E55}**
20G05   **Representation 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**
20G45   **Applications to physics; explicit representations**
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 finite groups**
20J10   **Groups arising as cohomology groups**
20J15   **Category of groups**
20J99   **None of the above, but in this section**
20Kxx   **Abelian groups**
20K01   **Finite abelian groups**
20K05   **Finitely generated groups**
20K10   **Torsion groups, primary groups and generalized primary groups**
20K12   **Ulm sequences**
20K15   **Torsion free groups, finite rank**
20K20   **Torsion free groups, infinite rank**
20K21   **Mixed groups**
20K25   **Direct sums, direct products, etc.**
20K26   **Indecomposable groups**
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   **General theory**
20L10   **Connections with group theory**
20L13   **Mappings of groupoids**
20L15   **Connections with topology**
20L17   **Connections with category theory**
20L99   **None of the above, but in this section**
20Mxx   **Semigroups**
20M05   **Free semigroups, generators and relations, word problems**
20M07   **Varieties of semigroups**
20M10   **General structure theory**
20M11   **Radical theory**
20M12   **Ideal theory**
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**
20M35   **Semigroups in automata theory, linguistics, etc. [See also 03D05, 68Qxx, 68S05]**
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]**
20N07   **Mappings of loops**
20N10   **Ternary systems (heaps, semiheaps, heapoids, etc.)**
20N15   **n-ary systems**
20N20   **Hypergroups**
20N25   **Fuzzy groups [See also 04A72]**
20N99   **None of the above, but in this section**
20P05   **Probabilistic methods in group theory**

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; for dual spaces of operator algebras and topological groups, see 47D35}**
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)
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
22C05   Compact groups
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 arising from group representations [See also 46Lxx]
22D30   Induced representations
22D35   Duality theorems
22D40   Ergodic theory on groups [See also 28Dxx, 43A60]
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 [See also 11R56]
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 17B35]
22E50   Representations of Lie and linear algebraic groups over local fields
22E55   Representations of Lie and linear algebraic groups over global fields and adèle rings [See also 20G05]
22E60   Lie algebras of Lie groups {For the algebraic theory of Lie algebras, see 17Bxx}
22E65   Infinite-dimensional Lie groups and their Lie algebras [See also 17B65, 58B25, 58H05]
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

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 39B12, 47H10, 54H25, 58F08, 58F13]
26A21   Classification of real functions; Baire classification of sets and functions [See also 04A15, 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, 03F65]
26E50   Fuzzy real analysis [See also 04A72, 28E10]
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, 04A15, 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 measures
28A80   Fractals [See also 58Fxx]
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, 90A14]
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, 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, 47A35, 54H20, 58Fxx, 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 04A72, 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 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 34A20, 39–XX, 58F08, 58F23]
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
30D50   Blaschke products, bounded mean oscillation, bounded characteristic, bounded functions, functions with positive real part
30D55 H^p-classes
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 (pseudo-analytic, 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
30H05   Spaces and algebras of analytic functions [See also 32E25, 46Exx, 46J15]

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 32F05]**
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**
31D05	**Axiomatic potential theory**
32–XX	**SEVERAL COMPLEX VARIABLES AND ANALYTIC SPACES** {For infinite-dimensional holomorphy, see also 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, tube domains, etc.)**
32A10	**Holomorphic functions**
32A15	**Entire functions**
32A17	**Special families of functions (e.g. normal families)**
32A20	**Meromorphic functions**
32A22	**Nevanlinna theory (local); growth estimates; other inequalities {For geometric theory, see 32H25, 32H30}**
32A25	**Integral representation**
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 [See also 32M15, 42B30, 43A85, 46J15]**
32A37	**Other spaces of holomorphic functions (e.g. bounded mean oscillation (BMOA), vanishing mean oscillation (VMOA) in n dimensions) [See also 46Exx]**
32A40	Boundary behavior
32A45	**Hyperfunctions [See also 46F15]**
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**
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	**General theory of analytic spaces**
32C05	**Real-analytic manifolds, real-analytic spaces [See also 14Pxx, 58A07]**
32C07	**Real-analytic sets, complex Nash functions [See also 14P15, 14P20]**
32C10	**Complex manifolds {For almost complex manifolds, see 53C15}**
32C11	**Complex supergeometry [See also 14A22, 14M30, 58A50]**
32C15	**Complex spaces**
32C16	**CR-manifolds**
32C17	**Kähler geometry {For differential-geometric methods, see 53C55}**
32C18	**Topology of analytic spaces**
32C20	**Normal 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 [See also 14F10, 16S32, 35A27, 58G07]**
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**
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**
32E25	**Algebras of holomorphic functions [See also 30H05, 46J10, 46J15]**
32E30	**Holomorphic and polynomial approximation, Runge pairs, interpolation**
32E35	**Global boundary behavior of holomorphic functions**
32E99	**None of the above, but in this section**
32Fxx	**Geometric convexity, partial differential operators**
32F05	**Plurisubharmonic functions and generalizations [See also 31C10]**
32F07	**Complex Monge-Ampère operator**
32F10	**q-convexity, q-concavity**
32F15	**Pseudoconvex domains**
32F20	**$\bar{\partial}$- and $\bar{\partial}_b$-Neumann problems [See also 35N15]**
32F25	**Real submanifolds in complex manifolds**
32F30	**Pseudoconvex manifolds**
32F40	**CR structures, (tangential) CR operators and generalizations**
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 [See also 34A20]**
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**
32H10	**Bergman kernel function, representative domains**
32H15	**Invariant metrics and pseudodistances**
32H20	**Hyperbolic complex manifolds**
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 holomorphic maps**
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 $(n \geq 4)$**
32J20	**Algebraicity criteria**
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 in this section)**
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 fiber bundles and generalizations**
32L07	**Hermite-Einstein bundles; Kähler-Einstein metrics [See also 53C07]**
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
32L30   Holomorphic foliations [See also 58F18]
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 of 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 [See also 22E10, 22E40, 53C35, 57T15]
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
32P05   Non-Archimedean complex analysis (should also be assigned at least one other classification number from Section 32 describing the type of problem)
32Sxx   Singularities
32S05   Local singularities [See also 14B05]
32S10   Invariants of analytic local rings
32S15   Equisingularity (topological and analytic) [See also 14E15]
32S20   Global theory of singularities; cohomological properties [See also 14E15]
32S25   (Hyper-) surface 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 58C27]
32S65   Singularities of holomorphic vector fields
32S70   Other operations on singularities

33–XX   SPECIAL FUNCTIONS {33–XX deals with the properties of functions as functions. For orthogonal functions, see also 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 integrals, Fresnel integrals)
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 (Chebyshev, Legendre, Gegenbauer, Jacobi, Laguerre, Hermite, Hahn, etc.)
33C50   Orthogonal polynomials and functions in several variables
33C55   Spherical functions, spherical harmonics, ultraspherical polynomials
33C60   Hypergeometric integrals and functions defined by them (E, G and H functions)
33C65   Appell, Horn and Lauricella functions
33C70   Other hypergeometric functions and integrals in several variables
33C75   Elliptic integrals as hypergeometric functions
33C80   Connections with groups, algebras, root systems 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
33D10   Basic theta functions
33D15   Basic hypergeometric functions in one variable
33D20   Generalized basic hypergeometric series
33D45   Basic orthogonal polynomials and functions in one and several variables

33D55   Basic spherical functions, spherical harmonics (continuous and discrete)
33D60   Basic hypergeometric integrals and functions defined by them
33D65   Bibasic functions and multiple bases
33D70   Other basic hypergeometric functions and integrals in several variables
33D80   Connections with groups, 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
33E15   Other wave functions
33E20   Other functions defined by series and integrals
33E30   Other functions coming from differential, difference and integral equations
33E99   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
34A09   Implicit equations
34A12   Initial value problems, existence, uniqueness, continuous dependence and continuation of solutions
34A20   Differential equations in the complex domain [See also 30D05, 32G34]
34A25   Analytical theory: series, transformations, transforms, operational calculus, etc. [See also 44–XX, 47E05]
34A26   Geometric methods in differential equations
34A30   Linear equations and systems
34A34   Nonlinear equations and systems, general
34A35   Differential equations of infinite order
34A37   Differential equations with impulses
34A40   Differential inequalities
34A45   Theoretical approximation of solutions
34A46   Theoretical solution methods other than approximations
34A47   Bifurcation
34A50   Numerical approximation of solutions {For numerical analysis, see 65Lxx}
34A55   Inverse problems
34A60   Equations with multivalued right-hand sides [See also 49J24, 49K24]
34A65   Stiff equations
34A99   None of the above, but in this section
34Bxx   Boundary value problems {For ordinary differential operators, see 34Lxx}
34B05   Linear equations
34B10   Multipoint boundary value problems
34B15   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.)
34B99   None of the above, but in this section
34Cxx   Qualitative theory [See also 58Fxx]
34C05   Location of integral curves, singular points, limit cycles
34C10   Oscillation theory, zeros, disconjugacy and comparison theory
34C11   Growth, boundedness, comparison of solutions
34C15   Nonlinear oscillations
34C20   Transformation and reduction of equations and systems, normal forms
34C23   Bifurcation [See mainly 58F14]
34C25   Periodic solutions
34C27   Almost-periodic solutions
34C28   Other types of "recurrent" solutions
34C29   Averaging method
34C30   Manifolds of solutions
34C35   Dynamical systems [See also 54H20, 58Fxx, 70–XX]
34C37   Homoclinic and heteroclinic solutions [See also 58F15]
34C40   Equations and systems on manifolds [See mainly 58Fxx, 58Gxx]
34C45   Method of integral manifolds
34C50   Method of accelerated convergence
34C99   None of the above, but in this section
34Dxx   Stability theory [See also 58F10, 93Dxx]
34D05   Asymptotic properties
34D08   Lyapunov exponents
34D10   Perturbations
34D15   Singular perturbations

34D20   Lyapunov stability
34D25   Popov-type stability
34D30   Structural stability and analogous concepts [See also 58F10, 58F12]
34D35   Stability of manifolds of solutions
34D40   Ultimate boundedness
34D45   Attractors
34D99   None of the above, but in this section
34Exx   Asymptotic theory
34E05   Asymptotic expansions
34E10   Perturbations, asymptotics
34E15   Singular perturbations, general theory
34E20   Singular perturbations, turning point theory, WKB methods
34E99   None of the above, but in this section
34F05   Equations and systems with randomness [See also 34K50, 60H10, 93E03]
34Gxx   Differential equations in abstract spaces [See also 58D25]
34G10   Linear equations [See also 47Axx, 47Bxx, 47D06, 47D09]
34G20   Nonlinear equations [See also 47Hxx]
34G99   None of the above, but in this section
34H05   Control problems [See also 49J25, 49K25, 93C15]
34Kxx   Functional-differential and differential-difference equations, with or without deviating arguments
34K05   General theory
34K10   Boundary value problems
34K15   Qualitative theory
34K20   Stability theory
34K25   Asymptotic theory
34K30   Equations in abstract spaces [See also 34Gxx]
34K35   Control problems [See also 49J25, 49K25, 93C15]
34K40   Neutral equations
34K50   Stochastic delay equations [See also 34F05, 60Hxx]
34K99   None of the above, but in this section
34Lxx   Ordinary differential operators [See also 47E05]
34L05   General spectral theory
34L10   Eigenfunction expansions, completeness of eigenfunctions
34L15   Estimation of eigenvalues, upper and lower bounds
34L20   Asymptotic distribution of eigenvalues, asymptotic theory of eigenfunctions
34L25   Scattering theory
34L30   Nonlinear ordinary differential operators
34L40   Particular operators (Dirac, one-dimensional Schrödinger, etc.)
34L99   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 theory
35A05   General existence and uniqueness theorems
35A07   Local existence and uniqueness theorems [See also 35H05, 35Sxx]
35A08   Fundamental solutions
35A10   Cauchy-Kovalevskaya theorems
35A15   Variational methods
35A20   Analytic methods, singularities
35A22   Transform methods (e.g. integral transforms)
35A25   Other special methods
35A27   Microlocal methods; methods of sheaf theory and homological algebra in PDE [See also 32C38, 58G07]
35A30   Geometric theory, characteristics, transformations [See also 58G35, 58G37]
35A35   Theoretical approximation to solutions
35A40   Numerical approximation to solutions {For numerical analysis, see 65Mxx, 65Nxx, 65P05}
35A99   None of the above, but in this section
35Bxx   Qualitative properties of solutions
35B05   General behavior of solutions of PDE (comparison theorems; oscillation, zeros and growth of solutions; mean value theorems)
35B10   Periodic solutions
35B15   Almost periodic solutions
35B20   Perturbations
35B25   Singular perturbations
35B27   Homogenization; partial differential equations in media with periodic structure [See also 73B27, 76D30]
35B30   Dependence of solutions of PDE on initial and boundary data, parameters [See also 58F14]
35B32   Bifurcation [See also 58F14]
35B35   Stability, boundedness

35B37   PDE in connection with control problems [See also 49J20, 49K20, 93C20]
35B40   Asymptotic behavior of solutions
35B45   A priori estimates
35B50   Maximum principles
35B60   Continuation and prolongation of solutions of PDE [See also 58A15, 58A17, 58Hxx]
35B65   Smoothness/regularity of solutions of PDE
35B99   None of the above, but in this section
35Cxx   Representations of solutions
35C05   Solutions in closed form
35C10   Series solutions, expansion theorems
35C15   Integral representations of solutions of PDE
35C20   Asymptotic expansions
35C99   None of the above, but in this section
35Dxx   Generalized solutions of partial differential equations
35D05   Existence of generalized solutions
35D10   Regularity of generalized 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   General theory of linear first-order PDE
35F10   Initial value problems for linear first-order PDE, linear evolution equations
35F15   Boundary value problems for linear first-order PDE
35F20   General theory of nonlinear first-order PDE
35F25   Initial value problems for nonlinear first-order PDE, nonlinear evolution equations
35F30   Boundary value problems for nonlinear first-order PDE
35F99   None of the above, but in this section
35Gxx   General higher-order equations and systems
35G05   General theory of linear higher-order PDE
35G10   Initial value problems for linear higher-order PDE, linear evolution equations
35G15   Boundary value problems for linear higher-order PDE
35G20   General theory of nonlinear higher-order PDE
35G25   Initial value problems for nonlinear higher-order PDE, nonlinear evolution equations
35G30   Boundary value problems for nonlinear higher-order PDE
35G99   None of the above, but in this section
35H05   Hypoelliptic equations and systems [See also 58Gxx]
35Jxx   Partial differential equations of elliptic type [See also 58G05, 58G10]
35J05   Laplace equation, reduced wave equation (Helmholtz), Poisson equation [See also 31Axx, 31Bxx]
35J10   Schrödinger operator [See also 35Pxx]
35J15   General theory of second-order elliptic equations
35J20   Variational methods for second-order elliptic equations
35J25   Boundary value problems for second-order elliptic equations
35J30   General theory of 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
35J45   General theory of elliptic systems of PDE
35J50   Variational methods for elliptic systems
35J55   Boundary value problems for elliptic systems
35J60   Nonlinear PDE of elliptic type
35J65   Nonlinear boundary value problems for linear elliptic PDE; boundary value problems for nonlinear elliptic PDE
35J67   Boundary values of solutions to elliptic PDE
35J70   Elliptic partial differential equations of degenerate type
35J85   Unilateral problems and variational inequalities for elliptic PDE [See also 35R35, 49J40]
35J99   None of the above, but in this section
35Kxx   Parabolic equations and systems [See also 35Bxx, 35Dxx, 35R30, 35R35, 58G11]
35K05   Heat equation
35K10   General theory of second-order parabolic equations
35K15   Initial value problems for second-order parabolic equations
35K20   Boundary value problems for second-order parabolic equations
35K22   Evolution equations (any order in the spatial derivatives) [See also 58D25]
35K25   General theory of higher-order parabolic equations
35K30   Initial value problems for higher-order parabolic equations
35K35   Boundary value problems for higher-order parabolic equations
35K40   General theory of parabolic systems of PDE
35K45   Initial value problems for parabolic systems
35K50   Boundary value problems for parabolic systems

35K55   **Nonlinear PDE of parabolic type**
35K57   **Reaction-diffusion equations**
35K60   **Nonlinear boundary value problems for linear parabolic PDE; boundary value problems for nonlinear parabolic PDE**
35K65   **Parabolic partial differential equations of degenerate type**
35K70   **Ultraparabolic, pseudoparabolic PDE, etc.**
35K85   **Unilateral problems and variational inequalities for parabolic PDE [See also 35R35, 49J40]**
35K99   **None of the above, but in this section**
35Lxx   **Partial differential equations of hyperbolic type [See also 58G16]**
35L05   **Wave equation**
35L10   **General theory of second-order hyperbolic equations**
35L15   **Initial value problems for second-order hyperbolic equations**
35L20   **Boundary value problems for second-order hyperbolic equations**
35L25   **General theory of higher-order hyperbolic equations**
35L30   **Initial value problems for higher-order hyperbolic equations**
35L35   **Boundary value problems for higher-order hyperbolic equations**
35L40   **General theory of hyperbolic systems of first-order PDE**
35L45   **Initial value problems for hyperbolic systems of first-order PDE**
35L50   **Boundary value problems for hyperbolic systems of first-order PDE**
35L55   **Hyperbolic systems of higher-order PDE**
35L60   **Nonlinear first-order PDE of hyperbolic type**
35L65   **Conservation laws**
35L67   **Shocks and singularities [See also 58C27, 76L05]**
35L70   **Nonlinear second-order PDE of hyperbolic type**
35L75   **Nonlinear hyperbolic PDE of higher (> 2) order**
35L80   **Hyperbolic PDE of degenerate type**
35L85   **Unilateral problems; variational inequalities for hyperbolic PDE [See also 35R35, 49J40]**
35L99   **None of the above, but in this section**
35Mxx   **Partial differential equations of special type (mixed, composite, etc.) {For degenerate types, see 35J70, 35K65, 35L80}**
35M10   **PDE of mixed type**
35M20   **PDE of composite type**
35M99   **None of the above, but in this section**
35Nxx   **Overdetermined systems [See also 58G05, 58G07, 58Hxx]**
35N05   **Overdetermined systems with constant coefficients**
35N10   **Overdetermined systems with variable coefficients (general)**
35N15   **$\bar{\partial}$-Neumann problem and generalizations; formal complexes [See also 32F20 and 58G05]**
35N99   **None of the above, but in this section**
35Pxx   **Spectral theory and eigenvalue problems for partial differential operators [See also 47Axx, 47Bxx, 47F05]**
35P05   **General spectral theory of PDE**
35P10   **Completeness of eigenfunctions, eigenfunction expansions for PDO**
35P15   **Estimation of eigenvalues, upper and lower bounds**
35P20   **Asymptotic distribution of eigenvalues and eigenfunctions for PDO**
35P25   **Scattering theory for PDE [See also 47A40]**
35P30   **Nonlinear eigenvalue problems, nonlinear spectral theory for PDO**
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 equation and generalizations**
35Q15   **Riemann-Hilbert problems [See also 30E25, 31A25, 31B20]**
35Q30   **Stokes and Navier-Stokes equations [See also 76D05, 76D07, 76N10]**
35Q35   **Other equations arising in fluid mechanics**
35Q40   **Equations from quantum mechanics**
35Q51   **Solitons [See also 58F07]**
35Q53   **KdV-like equations (Korteweg-de Vries, Burgers, sine-Gordon, sinh-Gordon, etc.) [See also 58F07]**
35Q55   **NLS-like (nonlinear Schrödinger) equations [See also 58F07]**
35Q58   **Other completely integrable equations [See also 58F07]**
35Q60   **Equations of electromagnetic theory and optics**
35Q72   **Other equations from mechanics**
35Q75   **PDE in relativity**
35Q80   **Applications of PDE in areas other than physics**
35Q99   **None of the above, but in this section**
35Rxx   **Miscellaneous topics involving partial differential equations {For equations on manifolds, see 58Gxx; for manifolds of solutions, see 58Bxx; for stochastic PDE, see also 60H15}**
35R05   **PDE with discontinuous coefficients or data**
35R10   **Partial functional-differential or differential-difference equations, with or without deviating arguments**
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, 47H15, 47H20]**
35R25   **Improperly posed problems for PDE**
35R30   **Inverse problems (undetermined coefficients, etc.) for PDE**
35R35   **Free boundary problems for PDE**
35R45   **Partial differential inequalities**

35R50   **Partial differential equations of infinite order**
35R60   **Partial differential equations with randomness [See also 60H15]**
35R70   **PDE with multivalued 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, 58G15]**
35S05   **General theory of ΨDO**
35S10   **Initial value problems for ΨDO**
35S15   **Boundary value problems for ΨDO**
35S30   **Fourier integral operators**
35S35   **Topological aspects: intersection cohomology, stratified sets, etc. [See also 32C38, 32S40, 32S60, 58G07]**
35S50   **Paradifferential operators**
35S99   **None of the above, but in this section**

39–XX   FINITE DIFFERENCES 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 58Fxx}**
39A05   **General**
39A10   **Difference equations [See also 33Dxx]**
39A11   **Stability of difference equations**
39A12   **Discrete version of topics in analysis**
39A70   **Difference operators [See also 47B39]**
39A99   **None of the above, but in this section**
39Bxx   **Functional equations [See also 30D05]**
39B05   **General**
39B12   **Iteration theory, iterative and composite equations [See also 26A18, 30D05, 58F08]**
39B22   **Equations for real functions**
39B32   **Equations for complex functions [See also 30D05]**
39B42   **Matrix and operator equations**
39B52   **Equations for functions with more general domains and/or ranges**
39B62   **Systems of functional equations**
39B72   **Inequalities involving unknown functions [See also 26A51, 26Dxx]**
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**
40A99   **None of the above, but in this section**
40B05   **Multiple sequences and series (should also be assigned at least one other classification number 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**

40F05   Absolute and strong summability
40Gxx   Special methods of summability
40G05   Cesàro, Euler, Nörlund and Hausdorff methods
40G10   Abel, Borel and power series methods
40G99   None of the above, but in this section
40H05   Functional analytic methods in summability
40J05   Summability in abstract structures [See also 43A55, 46A35, 46B15]

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.
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   Miscellaneous topics

42–XX   FOURIER ANALYSIS
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   Fourier 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 of Fourier and trigonometric series
42A24   Summability of Fourier and trigonometric series
42A28   Absolute convergence, absolute summability
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   Fourier 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 integrals (Calderón-Zygmund, etc.)
42B25   Maximal functions, Littlewood-Paley theory
42B30 H^p-spaces
42B99   None of the above, but in this section
42Cxx   Nontrigonometric Fourier 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   Series of general orthogonal functions, generalized Fourier expansions, nonorthogonal expansions
42C20   Rearrangements and other transformations of Fourier and other orthogonal series
42C25   Uniqueness and localization for orthogonal series
42C30   Completeness of sets of functions
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.
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 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 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, 33C65, 33D55]
43A95   Categorical methods [See also 46Mxx]
43A99   Miscellaneous topics

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.**
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	**Miscellaneous topics**
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.**
45A05	**Linear integral equations**
45B05	**Fredholm integral equations**
45C05	**Eigenvalue problems** [See also 34Lxx, 35Pxx, 45P05, 47A75]
45D05	**Volterra integral equations** [See also 34A12]
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 47H15]
45G05	**Singular nonlinear integral equations**
45G10	**Other nonlinear integral equations**
45G15	**Systems of nonlinear integral equations**
45H05	**Miscellaneous special kernels** [See also 44A15]
45J05	**Integro-ordinary differential equations**
45K05	**Integro-partial differential equations**
45Lxx	**Approximation of solutions**
45L05	**Theoretical approximation of solutions**
45L10	**Numerical approximation of solutions** {For numerical analysis, see 65R20}
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**
45N05	**Abstract integral equations, integral equations in abstract spaces**
45P05	**Integral operators** [See also 47B38, 47G10]
46–XX	**FUNCTIONAL ANALYSIS** {For manifolds modeled on topological linear spaces, see 57N20, 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 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, 47D15, 47D50]
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]
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**
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-Mil'man 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, 47D15, 47D50]
46B40	**Ordered normed spaces** [See also 46A40, 46B42]
46B42	**Banach lattices** [See also 46A40, 46B40]
46B45	**Banach sequence spaces** [See also 46A45]
46B70	**Interpolation between normed linear spaces** [See also 46M35]
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)**
46C15	**Characterizations of Hilbert spaces**
46C20	**Spaces with indefinite inner product**
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, 32E25, 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)**
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]
46E99	**None of the above, but in this section**
46Fxx	**Distributions, generalized functions, distribution spaces** {For distribution theory on nonlinear spaces, see 58Cxx}
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, 58G07]
46F20 Distributions and ultradistributions as boundary values of analytic functions [See also 30D40, 30E25, 32A40]
46F25 Distributions on infinite-dimensional spaces [See also 58C35]
46F99 None of the above, but in this section
46Gxx Measure, integration, derivative, holomorphy (all involving infinite-dimensional spaces) [See also 28–XX]{For nonlinear functional analysis, see 47Hxx, 58–XX, especially 58Cxx}
46G05 Derivatives [See also 58C20, 58C25]
46G10 Vector-valued measures and integration [See also 28Bxx, 46B22]
46G12 Measure and integration on abstract linear spaces [See also 28C20]
46G15 Functional analytic lifting theory [See also 28A51]
46G20 Infinite-dimensional holomorphy [See also 32–XX, 46E50, 58B12, 58C10]
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 47D30, and also 47D25, 47D50]
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 30D55, 30H05, 32A35, 32A37, 32E25, 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]
46L05 General theory of C^*-algebras
46L10 General theory of von Neumann algebras
46L30 States
46L35 Classifications of C^*-algebras, factors
46L37 Subfactors and their classification
46L40 Automorphisms
46L45 Decomposition theory for C^*-algebras
46L50 Noncommutative measure, integration and probability
46L55 Noncommutative dynamical systems [See also 28Dxx, 54H20, 58Fxx]
46L57 Derivations, dissipations and positive semigroups in C^*-algebras
46L60 Applications of selfadjoint operator algebras to physics [See also 46N50, 46N55, 47D45, 81T05, 82B10, 82C10]
46L70 Nonassociative selfadjoint operator algebras [See also 46H70, 46K70]
46L80 K-theory and operator algebras (including cyclic theory) [See also 18F25, 19Kxx, 46M20, 55Rxx, 58G12]
46L85 Noncommutative topology [See also 58B30, 58G12]
46L87 Noncommutative differential geometry [See also 58B30, 58G12]
46L89 Other "noncommutative" mathematics based on C^*-algebra theory [See also 58B30, 58G12]
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 Functors {For K-theory and EXT, see 19K33, 46L80, 46M20}
46M20 Methods of algebraic topology (cohomology, sheaf and bundle theory, etc.) [See also 14F05, 18Fxx, 19Kxx, 32Cxx, 32Lxx, 46L80, 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 03F65]
46S40 Fuzzy functional analysis [See also 04A72]
46S50 Functional analysis in probabilistic metric linear spaces
46S99 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.)
47A10 Spectrum, resolvent
47A11 Local spectral properties
47A12 Numerical range
47A13 Several-variable spectral theory
47A15 Invariant subspaces
47A20 Dilations, extensions, compressions
47A25 Spectral sets
47A30 Norms (inequalities, more than one norm, etc.)
47A35 Ergodic theory [See also 28Dxx]
47A40 Scattering theory [See also 34L25, 35P25, 81Uxx]
47A45 Canonical models for contractions and nonselfadjoint operators
47A48 Operator colligations (= nodes)
47A50 Equations and inequalities involving linear operators, with vector unknowns
47A53 (Semi-) Fredholm operators; index theories [See also 58B10, 58G12]
47A55 Perturbation theory
47A56 Functions whose values are linear operators (operator and matrix pencils, etc.)
47A57 Operator methods in interpolation, moment and extension problems [See also 30E05, 42A70, 42A82]
47A58 Operator approximation theory
47A60 Functional calculus
47A62 Equations involving linear operators, with operator unknowns
47A63 Operator inequalities, operator means, shorted operators, etc.
47A65 Structure theory
47A66 (Non)quasitriangular, (non)quasidiagonal 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 49Rxx]
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 47D50]
47B15 Hermitian and normal operators (spectral measures, functional calculus, etc.)
47B20 Subnormal operators, hyponormal operators, etc.
47B25 Symmetric and selfadjoint operators (unbounded)
47B35 Toeplitz operators, Hankel operators, Wiener-Hopf operators [See also 45P05, 47G10 for other integral operators; see also 32H10, 32M15]
47B37 Operators on special spaces (weighted shifts, operators on sequence spaces, etc.)

47B38 Operators on function spaces (including composition operators, kernel operators)
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 (= operators on spaces of operators)
47B50 Operators on spaces with an indefinite metric
47B60 Operators on ordered spaces
47B65 Positive operators and order-bounded operators
47B80 Random operators [See also 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 Algebraic systems of linear operators [See also 46Lxx]
47D03 (Semi)groups of linear operators {For nonlinear operators, see 47H20; see also 20M20}
47D06 One-parameter semigroups and linear evolution equations
47D07 Markov semigroups {For Markov processes, see 60Jxx}
47D09 Operator cosine functions and higher-order Cauchy problems
47D15 Linear spaces of operators [See also 46A32, 46B28]
47D20 Convex sets and cones of operators [See also 90C25, 90C31]
47D25 Operator algebras on Hilbert space
47D27 Dual operator algebras
47D30 Operator algebras on Banach spaces and other linear topological spaces
47D35 Dual spaces of operator algebras and topological groups
47D40 Algebras of unbounded operators
47D45 Applications of operator algebras to physics [See also 46L60, 46N50, 46N55, 47N50, 47N55]
47D50 Operator ideals
47D99 None of the above, but in this section
47E05 Ordinary differential operators [See also 34Bxx, 34Lxx, 58F19]
47F05 Partial differential operators [See also 35Pxx, 58G05]
47Gxx Integral, integro-differential, and pseudodifferential operators
47G10 Integral operators [See also 45P05]
47G20 Integro-differential operators [See also 45J05, 45K05]
47G30 Pseudodifferential operators [See also 35Sxx, 58G15]
47G99 None of the above, but in this section
47Hxx Nonlinear operators {For global and geometric aspects, see 58–XX, especially 58Cxx}
47H04 Set-valued operators [See also 28B20, 54C60, 58C06]
47H05 Monotone operators (with respect to duality)
47H06 Accretive operators, dissipative operators, etc.
47H07 Monotone and positive operators on ordered Banach spaces or other ordered topological vector spaces
47H09 Nonexpansive mappings, and their generalizations (ultimately compact mappings, measures of noncompactness, A-proper mappings, K-set contractions, etc.)
47H10 Fixed-point theorems [See also 54H25, 55M20, 58C30]
47H11 Degree theory [See also 55M25, 58C30]
47H12 Spectral theory of nonlinear operators [See also 58C40]
47H15 Equations involving nonlinear operators [See also 58E07 for abstract bifurcation theory]
47H17 Methods for solving equations involving nonlinear operators [See also 58C15] {For numerical analysis, see 65J15}
47H19 Inequalities involving nonlinear operators [See also 49J27, 49J40, 49K27]
47H20 Semigroups of nonlinear operators and nonlinear evolution equations [See also 58D07]
47H30 Particular nonlinear operators (superposition, Hammerstein, Nemytskiĭ, Uryson, hysteresis operators, etc.) [See also 45P05]
47H40 Random operators [See also 60H25]
47H99 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 quantum physics
47N55 Applications in statistical physics
47N60 Applications in biology and other sciences
47N70 Applications in systems theory, circuits, etc.
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 03F65]
47S40 Fuzzy operator theory [See also 04A72]
47S50 Operator theory in probabilistic metric linear spaces
47S99 None of the above, but in this section
49–XX CALCULUS OF VARIATIONS AND OPTIMAL CONTROL; OPTIMIZATION [See also 34H05, 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 theory for optimal solutions
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
49J22 Optimal control problems involving integral equations
49J24 Optimal control problems involving differential inclusions
49J25 Optimal control problems involving equations with retarded arguments [See also 34K35]
49J27 Problems in abstract spaces [See also 90C48]
49J30 Optimal solutions belonging to restricted classes (Lipschitz controls, bang-bang controls, etc.)
49J35 Minimax problems
49J40 Variational methods including variational inequalities
49J45 Problems involving semicontinuity and convergence
49J50 Fréchet and Gateaux differentiability [See also 46G05, 58C20]
49J52 Nonsmooth analysis (other weak concepts of optimality) [See also 58C20, 90C48]
49J55 Problems involving randomness [See also 93E20]
49J99 None of the above, but in this section
49Kxx Necessary conditions and sufficient conditions for optimality
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
49K22 Problems involving integral equations
49K24 Problems involving differential inclusions
49K25 Problems involving equations with retarded arguments [See also 34K35]
49K27 Problems in abstract spaces [See also 90C48, 93C25]
49K30 Optimal solutions belonging to restricted classes
49K35 Minimax problems
49K40 Sensitivity of optimal solutions in the presence of perturbations
49K45 Problems involving randomness [See also 93E20]
49K99 None of the above, but in this section
49Lxx Carathéodory, Hamilton-Jacobi theories, including dynamic programming
49L05 Free problems and problems involving ordinary differential equations
49L10 Free problems and problems involving partial differential equations
49L15 Problems in abstract spaces or problems involving functional relations other than differential equations
49L20 Dynamic programming method
49L25 Viscosity solutions
49L99 None of the above, but in this section
49Mxx Methods of successive approximations {For discrete problems, see 90Cxx; see also 65Kxx}
49M05 Methods based on necessary conditions
49M07 Gradient methods
49M10 Methods of steepest descent type
49M15 Methods of Newton-Raphson, Galerkin and Ritz types
49M20 Methods of relaxation type
49M25 Finite difference methods
49M27 Decomposition methods
49M29 Multiplier methods
49M30 Other methods, not based on necessary conditions (penalty function, etc.)
49M35 Methods of linear programming type [See also 90C05]
49M37 Nonlinear programming [See also 90C30]
49M39 Semi-infinite programming [See also 90C34]
49M40 Methods of quadratic programming type [See also 90C20]
49M45 Methods of convex programming type [See also 90C25]
49M49 Geometric programming [See also 90C28]
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 [See also 93C57]**
49N30   **Problems with incomplete information [See also 93C41]**
49N35   **Closed-loop controls**
49N40   **Open-loop controls**
49N45   **Inverse problems in calculus of variations**
49N50   **Inverse problems in optimal control theory**
49N55   **Noneconomic applications of optimal control theory and differential games [See also 90D25]**
49N60   **Regularity of solutions in the calculus of variations**
49N65   **Applications of measurable selections to control theory [See also 28B20, 26E25]**
49N99   **None of the above, but in this section**
49Qxx   **Manifolds [See also 58Fxx]**
49Q05   **Minimal surfaces [See also 53A10, 58E12]**
49Q10   **Optimization of the shape other than minimal surfaces [See also 73K40, 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**
49Q25   **Surface area**
49Q99   **None of the above, but in this section**
49Rxx   **Variational methods {For eigenvalues of operators, see 47A75}**
49R05   **Variational approach to eigenvalues**
49R10   **Rayleigh-Ritz methods**
49R15   **Weinstein and Aronszajn methods, intermediate problems**
49R20   **Linear operators in Hilbert spaces**
49R99   **None of the above, but in this section**
49S05   **Variational principles of physics**

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 embeddable 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**
51C05   **Ring geometry (Hjelmslev, Barbilian, etc.)**
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**
51G05   **Ordered geometries (ordered incidence structures, etc.)**
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**
51P05   **Geometry and physics (should also be assigned at least one other classification number from Sections 70–86)**

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]
52A27	Approximation by convex sets
52A30	Variants of convex sets (star-shaped, (m, n)-convex, etc.)
52A35	Helly-type theorems
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 06A08, 13F20, 13Hxx]
52B30	Arrangements of hyperplanes
52B35	Gale and other diagrams
52B40	Matroids (realizations in the context of convex polytopes, convexity in combinatorial structures, etc.) [See also 05B35]
52B45	Dissections and valuations (Hilbert's third problem, etc.)
52B55	Computational aspects related to convexity {For computational geometry and algorithms, see 68Q20, 68Q25, 68U05; for numerical algorithms, see 65Yxx}
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]
52C25	Rigidity and flexibility of structures [See also 70B15]
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-dimension and -codimension 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
53A50	Spinor 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 32L07]
53C10	G-structures
53C12	Foliations (differential geometric aspects) [See also 57R30, 57R32]
53C15	General geometric structures on manifolds (almost complex, contact, symplectic, almost product structures, etc.)
53C20	Global Riemannian geometry, including pinching [See also 31C12, 58B20]
53C21	Methods of Riemannian geometry, including PDE methods; curvature restrictions [See also 58G30]
53C22	Geodesics [See also 58E10]
53C23	Global topological methods (à la Gromov)
53C25	Special Riemannian manifolds (Einstein, Sasakian, etc.)
53C30	Homogeneous manifolds [See also 14M15, 14M17, 32M10, 57T15]
53C35	Symmetric spaces [See also 32M15, 57T15]
53C40	Global submanifolds [See also 53B25]
53C42	Immersions (minimal, prescribed curvature, tight, etc.) [See also 49Q05, 49Q10, 53A10, 57R40, 57R42]
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
53Z05	Applications to physics
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, 04A30] {For ultrafilters, see 54D80}
54A35	Consistency and independence results [See also 03E35]
54A40	Fuzzy topology [See also 04A72]
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	Ordered topological spaces, 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, 04A15, 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, 34C35, 58Fxx]
54H25	Fixed-point and coincidence theorems [See also 47H10, 55M20]
54H99	None of the above, but in this section
54J05	Nonstandard topology [See also 03H05]

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]
55N33	Intersection homology and 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
55P45	H-spaces and duals
55P47	Infinite loop spaces
55P50	Category and cocategory, etc.
55P55	Shape theory [See also 54C56, 55Q07]
55P60	Localization and completion
55P62	Rational homotopy theory
55P65	Homotopy functors
55P91	Equivariant homotopy theory [See also 19L47]
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
55Q30	Homotopy groups of triads, n-ads
55Q35	Operations in homotopy groups
55Q40	Homotopy groups of spheres
55Q45	Stable homotopy of spheres
55Q50	J-morphism [See also 19L20]
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 space bundles
55R35	Classifying spaces of groups and H-spaces

55R40	Homology of classifying spaces, characteristic classes [See also 57Txx, 57R20]
55R45	Homology and homotopy of $B\mathrm{O}$ and $B\mathrm{U}$; 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
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	Semisimplicial complexes
55U15	Chain complexes
55U20	Universal coefficient theorems, Bockstein operator
55U25	Homology of a product, Künneth formula
55U30	Duality
55U35	Abstract homotopy theory
55U40	Topological categories
55U99	None of the above, but in this section
57–XX	MANIFOLDS AND CELL COMPLEXES {For complex manifolds, see 32C10}
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}
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-dimensional 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 ($4 < n < \infty$)
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.)
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, 58F40, 93B05]
57R30	Foliations; geometric theory
57R32	Classifying spaces for foliations; Gel′fand-Fuks cohomology [See also 58H10]
57R35	Differentiable mappings
57R40	Embeddings
57R42	Immersions
57R45	Singularities of differentiable mappings
57R50	Diffeomorphisms
57R52	Isotopy
57R55	Differentiable structures
57R57	Applications of global analysis to structures on manifolds [See also 58–XX]
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, 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 16W30]**
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, 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**
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)
58A35   **Stratified sets [See also 32S60, 58C27]**
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]
58B30   Noncommutative differential geometry and topology [See also 46L30, 46L87, 46L89]
58B99   **None of the above, but in this section**
58Cxx   **Calculus on manifolds; nonlinear operators [See also 47Hxx]**
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**
58C27   **Singularities of differentiable maps [See also 14B05, 14E15, 32Sxx]**
58C28   **Catastrophes [See also 57R70, 58Exx]**
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 47H12, 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)
58D05   Groups of diffeomorphisms and homeomorphisms as manifolds [See also 22E65, 57S05]
58D07   Groups and semigroups of nonlinear operators [See also 17B65, 47D03, 47D06, 47H20]
58D10   **Spaces of embeddings and immersions**
58D15   **Manifolds of mappings [See also 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]
58D25   Equations in function spaces; evolution equations [See also 34Gxx, 35K22, 35R15, 47H15]
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)**
58E15   **Application to extremal problems in several variables; Yang-Mills functionals [See also 81T13], etc.**
58E17   **Pareto optimality, etc., applications to economics**
58E20   **Harmonic maps**
58E25   **Applications to control theory (optimal and nonoptimal)**
58E30   **Variational principles**
58E35   **Variational inequalities (global problems)**
58E40   **Group actions**
58E50   **Applications**
58E99   **None of the above, but in this section**
58Fxx   **Ordinary differential equations on manifolds; dynamical systems [See also 28D10, 34Cxx, 54H20]**
58F03   **One-dimensional dynamics, general symbolic dynamics [See also 26A18]**
58F05   **Hamiltonian and Lagrangian systems; symplectic geometry [See also 70Hxx, 81S10]**
58F06   **Geometric quantization (applications of representation theory) [See also 22E45, 81S10]**
58F07   **Completely integrable systems (including systems with an infinite number of degrees of freedom)**
58F08   **Point-mapping properties, iterations, completeness; dynamics of cellular automata [See also 26A18, 30D05]**
58F09   **Morse-Smale systems**
58F10   **Stability theory**
58F11   **Ergodic theory; invariant measures [See also 28Dxx]**
58F12   **Structure of attractors (and repellors)**
58F13   **Strange attractors; chaos and other pathologies [See also 70K50]**
58F14   **Bifurcation theory and singularities**
58F15   **Hyperbolic structures (expanding maps, Anosov systems, etc.)**
58F17   **Geodesic and horocycle flows**
58F18   **Relations with foliations**
58F19   **Eigenvalue and spectral problems**
58F20   **Periodic points and zeta functions**
58F21   **Limit cycles, singular points, etc.**
58F22   **Periodic solutions**
58F23   **Holomorphic dynamics [See also 30D05]**
58F25   **Flows**
58F27   **Quasiperiodic flows**
58F30   **Perturbations**
58F32   **Functional-differential equations on manifolds**
58F35   **Invariance properties**
58F36   **Normal forms**
58F37   **Correspondences and other transformation methods (e.g. Lie-Bäcklund)**
58F39   **Dynamical systems treatment of PDE (should be assigned another number from 58F) [See also 35B32, 35K57]**
58F40   **Applications**
58F99   **None of the above, but in this section**
58Gxx   **Partial differential equations on manifolds; differential operators [See also 35–XX]**
58G03   **Elliptic equations on manifolds, general theory**
58G05   **Differential complexes [See also 35Nxx]; elliptic complexes**
58G07   **Relations with hyperfunctions**
58G10   Index theory and related fixed-point theorems [See also 19K56, 46L80]
58G11   **Heat and other parabolic equation methods**
58G12   Exotic index theories [See also 19K56, 46L05, 46L10, 46L80, 46M20]
58G15   **Pseudodifferential and Fourier integral operators on manifolds [See also 35Sxx]**
58G16   **Hyperbolic equations**
58G17   **Propagation of singularities; initial value problems**
58G18   **Perturbations; asymptotics**
58G20   **Boundary value problems on manifolds**
58G25   **Spectral problems; spectral geometry; scattering theory [See also 35Pxx]**
58G26   **Determinants and determinant bundles**
58G28   **Bifurcations [See also 35B32]**
58G30   **Relations with special manifold structures (Riemannian, Finsler, etc.)**
58G32   **Diffusion processes and stochastic analysis on manifolds**

58G35	Invariance and symmetry properties [See also 35A30]
58G37	Correspondences and other transformation methods (e.g. Lie-Bäcklund) [See also 35A22]
58G40	Applications
58G99	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, Gel′fand-Fuks, etc.) [See also 57R32]
58H15	Deformations of structures [See also 32Gxx, 58G05]
58H99	None of the above, but in this section
58Z05	Applications to physics
60–XX	PROBABILITY THEORY AND STOCHASTIC PROCESSES {For additional applications, see 11Kxx, 62–XX, 90–XX, 92–XX, 93–XX, 94–XX. For numerical results, see 65U05}
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.
60Axx	Foundations of probability theory
60A05	Axioms; other general questions [See also 03B48]
60A10	Probabilistic measure theory {For ergodic theory, see 28Dxx and 60Fxx}
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, Fourier transforms, factorization
60B99	None of the above, but in this section
60C05	Combinatorial probability
60D05	Geometric probability, stochastic geometry, random sets [See also 52A22, 53C65]
60Exx	Distribution theory [See also 62Exx, 62Hxx]
60E05	Distributions: general theory
60E07	Infinitely divisible distributions; stable distributions
60E10	Characteristic functions; other transforms
60E15	Inequalities (Chebyshev, Kolmogorov, etc.)
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
60G25	Prediction theory [See also 62M20]
60G30	Continuity and singularity of induced measures
60G35	Applications (signal detection, filtering, etc.) [See also 62M20, 93E10, 93E11, 94Axx]
60G40	Stopping times; optimal stopping problems; gambling theory [See also 62L15, 90D60]
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
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 58G32]
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.)
60H99	None of the above, but in this section
60Jxx	Markov processes
60J05	Markov processes with discrete parameter
60J10	Markov chains with discrete parameter
60J15	Random walks
60J20	Applications of discrete Markov processes (social mobility, learning theory, industrial processes, etc.) [See also 90B30, 92H10, 92H35, 92J40]
60J25	Markov processes with continuous parameter
60J27	Markov chains with continuous parameter
60J30	Processes with independent increments
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 58G32]
60J65	Brownian motion [See also 58G32]
60J70	Applications of 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]
60K40	Other physical applications of random processes
60K99	None of the above, but in this section
62–XX	STATISTICS {For numerical methods, see 65U05}
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	Foundations
62A05	Invariance and group considerations
62A10	The likelihood approach
62A15	The Bayesian approach
62A20	The classical approach
62A25	The structural approach
62A30	The fiducial approach
62A99	None of the above, but in this section
62Bxx	Sufficiency and information
62B05	Sufficient statistics and fields
62B10	Statistical information theory [See also 94A17]
62B15	Theory of statistical experiments
62B20	Measure-theoretic results, etc.
62B99	None of the above, but in this section
62Cxx	Decision theory [See also 90A05, 90B50; for game theory, see 90D35]
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
62C99	None of the above, but in this section

62D05   Sampling theory, sample surveys
62Exx   Distribution theory [See also 60Exx]
62E10   Characterization and structure theory
62E15   Exact distribution theory
62E17   Approximations to distributions (nonasymptotic)
62E20   Asymptotic distribution theory
62E25   Monte Carlo studies
62E30   Formal computational methods (polykays, etc.)
62E99   None of the above, but in this section
62Fxx   Parametric inference
62F03   Hypothesis testing
62F04   Small-sample properties of tests
62F05   Asymptotic properties of tests
62F07   Ranking and selection
62F10   Point estimation
62F11   Small-sample properties of estimators
62F12   Asymptotic properties of estimators
62F15   Bayesian inference
62F25   Tolerance and confidence regions
62F30   Inference under constraints
62F35   Robustness and adaptive procedures
62F99   None of the above, but in this section
62Gxx   Nonparametric inference
62G05   Estimation
62G07   Curve estimation (nonparametric regression, density estimation, etc.)
62G09   Resampling methods
62G10   Hypothesis testing
62G15   Tolerance and confidence regions
62G20   Asymptotic properties
62G30   Order statistics; empirical distribution functions
62G35   Robustness
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
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]
62H40   Projection pursuit
62H99   None of the above, but in this section
62Jxx   Linear inference, regression
62J02   General nonlinear regression
62J05   Linear regression
62J07   Ridge regression; James-Stein estimators
62J10   Analysis of variance and covariance
62J12   Generalized linear models
62J15   Paired and multiple comparisons
62J20   Diagnostics
62J99   None of the above, but in this section
62Kxx   Experimental design [See also 05Bxx]
62K05   Optimal designs
62K10   Block designs
62K15   Factorial designs
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, 90D60]
62L20   Stochastic approximation
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 90A20]
62M15   Spectral analysis
62M20   Prediction [See also 60G25]; filtering [See also 60G35, 93E10, 93E11]
62M30   Spatial processes
62M40   Random fields
62M99   None of the above, but in this section
62Nxx   Engineering statistics
62N05   Reliability and life testing [See also 90B25]
62N10   Quality control
62N99   None of the above, but in this section

62Pxx   Applications [See also 90–XX, 92–XX]
62P05   Applications to actuarial sciences and financial mathematics
62P10   Applications to biology
62P15   Applications to psychology
62P20   Applications to economics [See also 90Axx]
62P25   Applications to social sciences
62P99   None of the above, but in this section
62Q05   Statistical tables
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.
65A05   Tables
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   Numerical simulation {For theoretical aspects, see 68U20}
65C05   Monte Carlo methods
65C10   Random number generation
65C20   Models, numerical methods
65C99   None of the above, but in this section
65Dxx   Numerical approximation {Primarily algorithms; for theory, see 41–XX}
65D05   Interpolation
65D07   Splines
65D10   Smoothing, curve fitting
65D15   Algorithms for functional approximation
65D17   Computer-aided design (modeling of curves and surfaces) [See also 68U05]
65D20   Computation of special functions, construction of tables
65D25   Numerical differentiation
65D30   Numerical integration
65D32   Quadrature and cubature formulas
65D99   None of the above, but in this section
65E05   Numerical methods in complex analysis (potential theory, etc.) {For numerical methods in conformal mapping, see 30C30}
65Fxx   Numerical linear algebra
65F05   Direct methods for linear systems and matrix inversion
65F10   Iterative methods for linear systems [See also 65N22]
65F15   Eigenvalues, eigenvectors
65F20   Overdetermined systems, pseudoinverses
65F25   Orthogonalization
65F30   Other matrix algorithms
65F35   Matrix norms, conditioning, scaling [See also 15A12, 15A60]
65F40   Determinants
65F50   Sparse matrices
65F99   None of the above, but in this section
65Gxx   Error analysis
65G05   Roundoff error
65G10   Interval and finite arithmetic
65G99   None of the above, but in this section
65Hxx   Nonlinear algebraic or transcendental equations
65H05   Single equations
65H10   Systems of equations
65H17   Eigenvalues, eigenvectors and bifurcation problems [See also 58C40, 58E07, 58F14, 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
65J10   Equations with linear operators (do not use 65Fxx)
65J15   Equations with nonlinear operators (do not use 65Hxx)
65J20   Improperly posed problems
65J99   None of the above, but in this section
65Kxx   Mathematical programming, optimization and variational techniques
65K05   Mathematical programming [See also 90Cxx]
65K10   Optimization and variational techniques [See also 49Mxx, 93B40]
65K99   None of the above, but in this section
65Lxx   Ordinary differential equations
65L05   Initial value problems
65L06   Multistep, Runge-Kutta and extrapolation methods
65L07   Numerical investigation of stability of solutions

65L08 Improperly posed problems
65L10 Boundary value problems
65L12 Finite difference methods
65L15 Eigenvalue problems
65L20 Stability of numerical methods
65L50 Mesh generation and refinement
65L60 Finite elements, Rayleigh-Ritz, Galerkin and collocation methods
65L70 Error bounds
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
65M12 Stability and convergence of numerical methods
65M15 Error bounds
65M20 Method of lines
65M25 Method of characteristics
65M30 Improperly posed problems
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
65M99 None of the above, but in this section
65Nxx Partial differential equations, boundary value problems
65N06 Finite difference methods
65N12 Stability and convergence of numerical methods
65N15 Error bounds
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
65N99 None of the above, but in this section
65P05 Partial differential equations, miscellaneous problems
65Q05 Difference and functional equations, recurrence relations
65Rxx Integral equations, integral transforms [See also 45Lxx]
65R10 Integral transforms
65R20 Integral equations
65R30 Improperly posed problems
65R99 None of the above, but in this section
65S05 Graphical methods
65Txx Numerical methods in Fourier analysis
65T10 Trigonometric approximation and interpolation
65T20 Discrete and fast Fourier transforms
65T99 None of the above, but in this section
65U05 Numerical methods in probability and statistics
65Yxx Computer aspects of numerical algorithms
65Y05 Parallel computation
65Y10 Algorithms for specific classes of architectures
65Y15 Packaged methods
65Y20 Complexity and performance of numerical algorithms [See also 68Q25]
65Y25 Computer graphics and computational geometry [See also 51N05, 68U05]
65Y99 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
68M05 General
68M07 Mathematical problems of computer architecture
68M10 Computer networks [See also 90B12]
68M15 Reliability and testing
68M20 Performance evaluation; queueing; scheduling [See also 60K25, 90Bxx]
68M99 None of the above, but in this section
68Nxx Software
68N05 General theory of programming
68N15 Programming languages
68N17 Logic programming
68N20 Compilers and generators [See also 68Q52]

68N25 Monitors and operating systems
68N99 None of the above, but in this section
68Pxx Theory of data
68P05 Data structures
68P10 Searching and sorting
68P15 Database theory
68P20 Information storage and retrieval
68P25 Data encryption [See also 94A60]
68P99 None of the above, but in this section
68Qxx Theory of computing
68Q05 Models of computation (abstract processors, Turing machines, etc.) [See also 03D10]
68Q10 Modes of computation (concurrent, parallel, nondeterministic, etc.) [See also 68Q90]
68Q15 Complexity classes [See also 03D15]
68Q20 Nonnumerical algorithms {For numerical algorithms, see 65–XX; for combinatorics and graph theory, see 68Rxx}
68Q22 Parallel and distributed algorithms {For numerical algorithms, see 65Y05, 65Y10}
68Q25 Analysis of algorithms and problem complexity
68Q30 Algorithmic information theory (Kolmogorov complexity, etc.)
68Q35 VLSI algorithms
68Q40 Symbolic computation, algebraic computation [See also 11Yxx, 12Y05, 13Pxx, 14Qxx, 16–08, 17–08]
68Q42 Rewriting systems
68Q45 Formal languages [See also 03D05, 20M35, 94A45]
68Q50 Grammars [See also 03D05]
68Q52 Parsing [See also 68N20]
68Q55 Semantics [See also 03B70, 06B35]
68Q60 Specification and verification of programs [See also 03B70]
68Q65 Abstract data types; algebraic specification
68Q68 Automata theory, general [See also 03D05]
68Q70 Algebraic theory of automata [See also 18B20, 20M35]
68Q75 Stochastic and nondeterministic automata
68Q80 Tessellation automata, iterative arrays, cellular structures
68Q90 Transition nets
68Q99 None of the above, but in this section
68Rxx Discrete mathematics in relation to computer science
68R05 Combinatorics
68R10 Graph theory [See also 05Cxx, 90B10, 90B35, 90C35]
68R15 Combinatorics on words
68R99 None of the above, but in this section
68S05 Mathematical linguistics [See also 03B65, 92K20]
68Txx Artificial intelligence [See also 92J40]
68T01 General
68T05 Learning and adaptive systems
68T10 Pattern recognition, speech recognition {For cluster analysis, see 62H30}
68T15 Theorem proving [See also 03B35]
68T20 Problem solving
68T25 AI languages
68T27 AI logics
68T30 Knowledge representation
68T35 AI software systems (knowledge-based systems, expert systems, etc.)
68T99 None of the above, but in this section
68Uxx Computing methodologies
68U05 Computer graphics; computational geometry [See also 65Y25]
68U07 Computer-aided design
68U10 Image processing
68U15 Text processing; mathematical typography
68U20 Simulation [See also 65Cxx]
68U30 Other applications
68U99 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 papers
70–06 Proceedings, conferences, collections, etc.
70–08 Computational methods
70A05 Axiomatics, foundations
70Bxx Kinematics [See also 53A17]
70B05 Kinematics of a particle
70B10 Kinematics of a rigid body
70B15 Mechanisms, robots [See also 73K05]
70B99 None of the above, but in this section

70C20	**Statics**
70Dxx	**Dynamics of a particle** [See also 70Hxx]
70D05	**Newtonian dynamics**
70D10	**Lagrangian dynamics**
70D99	**None of the above, but in this section**
70Exx	**Dynamics of a rigid body**
70E05	**Motion of the gyroscope**
70E10	**Motion of projectiles and rockets**
70E15	**Motion of rigid bodies**
70E20	**Perturbation methods for Euler's equations**
70E99	**None of the above, but in this section**
70Fxx	**Dynamics of a system of particles, including celestial mechanics**
70F05	**Two-body problem**
70F07	**Three-body problem**
70F10	**n-body problem**
70F15	**Celestial mechanics**
70F20	**Holonomic systems**
70F25	**Nonholonomic systems**
70F30	**Impulsive motion**
70F35	**Collisions**
70F99	**None of the above, but in this section**
70Gxx	**General representations of dynamical systems** [See also 58Fxx]
70G05	**Riemannian geometry, tensorial methods** [See also 53A45, 53A50, 53B20]
70G10	**Generalized coordinates**
70G15	**Space of events**
70G20	**Impulse-energy space**
70G25	**Configuration space**
70G30	**State space**
70G35	**Phase space**
70G50	**Classical field theories (general)**
70G99	**None of the above, but in this section**
70Hxx	**Hamiltonian and Lagrangian mechanics** [See also 58F05]
70H05	**Hamilton's equations**
70H10	**Liouville's theorem**
70H15	**Canonical transformations**
70H20	**Hamilton-Jacobi equations**
70H25	**Hamilton's principle**
70H30	**Other variational principles**
70H33	**Symmetries**
70H35	**Lagrange's equation of motion**
70H40	**Relativistic dynamics**
70H99	**None of the above, but in this section**
70Jxx	**Linear vibration theory** [See also 73D30]
70J05	**Finite degree of freedom systems**
70J10	**Modal analysis**
70J25	**Stability**
70J30	**Free motions**
70J35	**Forced motions**
70J40	**Parametric resonances**
70J99	**None of the above, but in this section**
70Kxx	**Nonlinear motions** [See also 34Cxx, 58Fxx, 73D35, 73K12]
70K05	**Phase plane analysis**
70K10	**Limit cycles**
70K15	**Lyapunov theorems**
70K20	**Stability**
70K25	**Free motions**
70K28	**Parametric resonances**
70K30	**Nonlinear resonances**
70K40	**Forced motions**
70K50	**Transition to stochasticity (chaotic behavior)** [See also 58F13]
70K99	**None of the above, but in this section**
70L05	**Random vibrations** [See also 73K35, 93Exx]
70M20	**Orbital mechanics**
70P05	**Variable mass, rockets**
70Q05	**Control of mechanical systems** [See also 49–XX, 73K50, 93Cxx, 93Dxx]
73–XX	**MECHANICS OF SOLIDS**
73–00	**General reference works (handbooks, dictionaries, bibliographies, etc.)**
73–01	**Instructional exposition (textbooks, tutorial papers, etc.)**
73–02	**Research exposition (monographs, survey articles)**
73–03	**Historical (must also be assigned at least one classification number from Section 01)**
73–04	**Explicit machine computation and programs (not the theory of computation or programming)**
73–05	**Experimental papers**
73–06	**Proceedings, conferences, collections, etc.**
73A05	**Axiomatics, foundations of solid mechanics**

73Bxx	**Continuum mechanics of solids (constitutive description and properties)**
73B05	**Constitutive equations**
73B10	**Symmetry groups**
73B18	**Nonlocal theories**
73B25	**Polar theories**
73B27	**Nonhomogeneous materials; homogenization**
73B30	**Thermodynamics of solids** {For gases and fluids, see 80–XX}
73B35	**Random materials**
73B40	**Anisotropic materials**
73B50	**Stress concentrations**
73B99	**None of the above, but in this section**
73Cxx	**Elasticity** {For the biharmonic equation, see 31A30, 31B30}
73C02	**Classical linear elasticity**
73C05	**Stress functions**
73C10	**Saint-Venant's principle**
73C15	**Uniqueness theorems**
73C35	**Mixed boundary value problems** [See also 45F05]
73C50	**Nonlinear elasticity**
73C99	**None of the above, but in this section**
73Dxx	**Wave propagation in and vibrations of solids**
73D05	**Impact and explosion problems** [See also 76L05]
73D10	**Integral transforms**
73D15	**Body waves**
73D20	**Surface waves**
73D25	**Wave diffraction and dispersion**
73D30	**Linear vibrations** [See also 70Jxx]
73D35	**Nonlinear vibrations** [See also 70Kxx]
73D40	**Singular surfaces**
73D50	**Inverse problems** [See also 35Lxx, 35R30]
73D70	**Random waves**
73D99	**None of the above, but in this section**
73Exx	**Plasticity**
73E05	**Constitutive specifications (yield criteria, flow rules, hardening, softening)**
73E10	**Method of successive approximations**
73E20	**Limit analysis**
73E50	**Time-dependent problems**
73E60	**Viscoplasticity**
73E70	**Plastic waves**
73E99	**None of the above, but in this section**
73Fxx	**Viscoelasticity**
73F05	**Creep and relaxation functions**
73F10	**Correspondence principle**
73F15	**Time-dependent problems**
73F20	**Aging of materials**
73F25	**Environmental-dependent materials**
73F99	**None of the above, but in this section**
73Gxx	**Finite deformations**
73G05	**Finite elasticity**
73G20	**Finite plasticity**
73G25	**Finite viscoelasticity**
73G99	**None of the above, but in this section**
73Hxx	**Stability (linear and nonlinear)**
73H05	**Buckling**
73H10	**Dynamic stability**
73H99	**None of the above, but in this section**
73Kxx	**Mechanics of structures**
73K03	**Strings**
73K05	**Beams, columns, rods**
73K10	**Plates, discs, membranes**
73K12	**Dynamics of structures**
73K15	**Shells**
73K20	**Composite structures and materials**
73K35	**Random vibrations**
73K40	**Optimization** [See also 90C90]
73K50	**Control of structures**
73K70	**Aero- or hydromechanic structure interactions**
73K99	**None of the above, but in this section**
73M25	**Fracture mechanics**
73N20	**Geophysical solid mechanics** [See also 86A15, 86A17]
73P20	**Biomechanics of solids** [See also 92C10]
73Q05	**Soil and rock mechanics** [See also 86A60]
73R05	**Electromagnetic elasticity**
73S10	**Micromechanics of solids**
73T05	**Contact and surface mechanics**
73Vxx	**Basic methods in solid mechanics** [See also 65–xx]
73V05	**Finite element methods**
73V10	**Boundary element methods**
73V15	**Finite difference methods**
73V20	**Other numerical methods**
73V25	**Variational methods**
73V30	**Stochastic analysis**

73V35	Complex variable techniques
73V99	None of the above, but in this section

76–XX FLUID MECHANICS {For general continuum mechanics, see 73Bxx, or other parts of 73–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 papers
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]
76A99	None of the above, but in this section
76Bxx	Incompressible inviscid fluids, potential theory
76B05	Airfoil theory
76B10	Jets and cavities, cavitation, free-streamline theory, water-entry problems, hydrofoil theory, sloshing
76B15	Water waves, gravity waves; dispersion and diffraction, nonlinear interaction [See also 35Q53]
76B20	Ship waves
76B25	Solitary and cnoidal waves [See also 35Q51]
76B35	Random waves, inviscid fluids
76B40	Added mass computations
76B45	Capillarity
76B99	None of the above, but in this section
76Cxx	Incompressible inviscid fluids, vorticity flows
76C05	Vorticity flows
76C10	Internal waves
76C15	Atmospheric waves
76C20	Rossby waves
76C99	None of the above, but in this section
76Dxx	Incompressible viscous fluids
76D05	Navier-Stokes equations [See also 35Q30]
76D07	Stokes flows
76D08	Lubrication theory
76D10	Boundary-layer theory
76D15	Boundary-layer separation and reattachment
76D20	Higher-order effects in boundary layers
76D25	Wakes and jets
76D30	Singular perturbation problems
76D33	Waves
76D35	Random waves, viscous fluids
76D45	Capillarity [See also 76B45]
76D99	None of the above, but in this section
76Exx	Hydrodynamic stability
76E05	Stability of parallel flows
76E10	Inertial instability
76E15	Convective instability
76E20	Instability of geophysical and astrophysical flows
76E25	Magnetohydrodynamic and electrohydrodynamic instabilities
76E30	Nonlinear effects
76E99	None of the above, but in this section
76Fxx	Turbulence [See also 58F13, 58F27, 60Gxx, 60Jxx]
76F05	Homogeneous isotropic turbulence
76F10	Shear flows
76F20	Turbulence via chaos techniques
76F99	None of the above, but in this section
76G25	General aerodynamics and subsonic flows
76H05	Transonic flows
76J20	Supersonic flows
76K05	Hypersonic flows
76L05	Shock waves and blast waves [See also 35L67, 73D05]
76Mxx	Basic methods in fluid mechanics [See also 65–XX]
76M10	Finite element methods
76M15	Boundary element methods
76M20	Finite difference methods
76M25	Other numerical methods
76M30	Variational methods
76M35	Stochastic analysis
76M99	None of the above, but in this section
76Nxx	Compressible fluids and gas dynamics, general
76N10	Compressible fluids, general [See also 35Q30]
76N15	Gas dynamics, general
76N20	Boundary-layer theory
76N99	None of the above, but in this section

76P05	Rarefied gas flows, Boltzmann equation [See also 82B40, 82C40, 82D05]
76Q05	Hydrodynamic sound, acoustics
76Rxx	Diffusion and convection
76R05	Forced convection
76R10	Free convection
76R50	Diffusion [See also 60J60]
76R99	None of the above, but in this section
76S05	Flows in porous media; filtration; seepage
76T05	Two-phase and multiphase flows
76U05	Rotating fluids
76V05	Stratified and reacting fluids
76W05	Magnetohydrodynamics and electrohydrodynamics
76X05	Ionized gas flow in electromagnetic fields; plasmic flow
76Y05	Quantum hydrodynamics and relativistic hydrodynamics [See also 83C55, 85A30]
76Zxx	Biological fluid mechanics [See also 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 programs (not the theory of computation or programming)
78–05	Experimental papers
78–06	Proceedings, conferences, collections, etc.
78–08	Computational methods
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
78A40	Waves and radiation
78A45	Diffraction, scattering [See also 34E20 for WKB methods]
78A50	Antennas, wave-guides
78A55	Technical applications
78A60	Lasers, masers, optical bistability, nonlinear optics [See also 81V80]
78A70	Biological applications [See also 92C30, 92J30]
78A97	Mathematically heuristic optics and electromagnetic theory (must also be assigned at least one other classification number in this section)
78A99	Miscellaneous topics

80–XX CLASSICAL THERMODYNAMICS, HEAT TRANSFER {For thermodynamics of solids, see 73B30}

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 papers
80–06	Proceedings, conferences, collections, etc.
80–08	Computational methods
80A05	Foundations
80A10	Classical thermodynamics
80A15	Thermodynamics of mixtures
80A20	Heat and mass transfer, heat flow
80A22	Stefan problems, phase changes, etc.
80A23	Inverse problems
80A25	Combustion, interior ballistics
80A30	Chemical kinetics [See also 92C45, 92E20]
80A32	Chemically reacting flows [See also 92C45, 92E20]
80A50	Chemistry (general) [See mainly 92Exx]
80A97	Mathematically heuristic classical thermodynamics (must also be assigned at least one other classification number in this section)
80A99	Miscellaneous topics

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
81P15 Quantum measurement theory
81P20 Stochastic mechanics (including stochastic electrodynamics)
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 quantum mechanical equations
81Q10 Selfadjoint operator theory in quantum theory, including spectral analysis
81Q15 Perturbation theories for operators and differential equations
81Q20 Semiclassical techniques including WKB and Maslov methods
81Q30 Feynman integrals and graphs; applications of algebraic topology and algebraic geometry [See also 14D05, 32S40]
81Q40 Bethe-Salpeter and other integral equations
81Q50 Quantum chaos [See also 58F13]
81Q60 Supersymmetric quantum mechanics
81Q99 None of the above, but in this section
81Rxx Groups and algebras in quantum theory
81R05 Representations of finite-dimensional groups and algebras motivated by physics [See also 20C35, 22E70]
81R10 Representations of infinite-dimensional groups and algebras motivated by physics, including Virasoro, Kac-Moody and other current algebras [See also 17B65, 17B67, 22E65, 22E67, 22E70]
81R20 Covariant wave equations
81R25 Spinor and twistor methods [See also 32L25]
81R30 Coherent states [See also 22E45]
81R40 Symmetry breaking
81R50 Quantum groups and related algebraic methods [See also 16W30, 17B37]
81R99 None of the above, but in this section
81Sxx General quantum mechanics and problems of quantization
81S05 Commutation relations
81S10 Geometric quantization, symplectic methods [See also 58F06]
81S20 Stochastic quantization
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
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
81T30 String and superstring theories; other extended objects [See also 83E30]
81T40 Two-dimensional field theories, conformal field theories, etc.
81T50 Anomalies
81T60 Supersymmetric field theories
81T70 Quantization in field theory; cohomological methods [See also 58F06]
81T80 Simulation and numerical modeling
81T99 None of the above, but in this section
81Uxx Scattering theory [See also 47A40]
81U05 2-body potential scattering theory [See also 34E20 for WKB methods]
81U10 n-body potential scattering theory
81U20 S-matrix theory, etc.
81U30 Dispersion theory, dispersion relations
81U40 Inverse scattering problems [See also 58F07, 58F19]
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
81V19 Other fundamental interactions
81V22 Unified theories
81V25 Other elementary particle theory
81V35 Nuclear physics
81V45 Atomic physics

81V55 Molecular physics [See also 92E10]
81V70 Many-body theory
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.)
82B21 Continuum models (systems of particles, etc.)
82B23 Exactly solvable models
82B24 Interface problems
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 60J15, 82C41]
82B43 Percolation [See also 60K35]
82B44 Disordered systems (random Ising models, random Schrödinger operators, etc.)
82B80 Numerical methods (Monte Carlo, series resummation, etc.) [See also 65–XX, 81T80]
82B99 Miscellaneous topics
82Cxx Time-dependent statistical mechanics (dynamic and nonequilibrium)
82C03 Foundations
82C05 Classical dynamic and nonequilibrium statistical mechanics (general)
82C10 Quantum dynamics and nonequilibrium statistical mechanics (general)
82C20 Dynamic lattice systems (kinetic Ising, etc.)
82C21 Dynamic continuum models (systems of particles, etc.)
82C22 Interacting particle systems [See also 60K35]
82C23 Exactly solvable dynamic models [See also 58F07]
82C24 Interface problems
82C26 Dynamic and nonequilibrium phase transitions (general)
82C27 Dynamic critical phenomena
82C28 Dynamic renormalization group methods [See also 81T17]
82C31 Stochastic methods (Fokker-Planck, Langevin, etc.) [See also 60H10]
82C32 Neural nets [See also 68T05, 92B20, 92J40]
82C35 Irreversible thermodynamics, including Onsager-Machlup theory
82C40 Kinetic theory of gases
82C41 Dynamics of random walks, random surfaces, lattice animals, etc. [See also 60J15]
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 physical systems
82D05 Gases
82D10 Plasmas
82D15 Liquids
82D20 Solids
82D25 Crystals {For crystallographic group theory, see 20H15}
82D30 Random media, disordered materials (including liquid crystals and spin glasses)
82D35 Metals
82D40 Magnetic materials
82D45 Ferroelectrics
82D50 Superfluids
82D55 Superconductors
82D60 Polymers
82D75 Nuclear reactor theory
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 papers
- 83–06 Proceedings, conferences, collections, etc.
- 83–08 Computational methods
- 83A05 Special relativity
- 83B05 Observational and experimental questions
- 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 Electromagnetic fields, Einstein-Maxwell equations
- 83C25 Approximation procedures, weak fields
- 83C27 Lattice gravity, Regge calculus and other discrete methods
- 83C30 Asymptotic procedures (radiation, news functions, $\mathscr{H}$-spaces, etc.)
- 83C35 Gravitational waves
- 83C40 Gravitational energy and conservation laws; groups of motions
- 83C45 Quantization of the gravitational field
- 83C47 Quantum field theory aspects [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
- 83C75 Space-time singularities, cosmic censorship, etc.
- 83C99 None of the above, but in this section
- 83D05 Relativistic gravitational theories other than Einstein's, including asymmetric field theories
- 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
- 83F05 Cosmology

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 papers
- 85–06 Proceedings, conferences, collections, etc.
- 85–08 Computational methods
- 85A04 General
- 85A05 Galactic and stellar dynamics
- 85A15 Galactic and stellar structure
- 85A20 Stellar atmospheres
- 85A25 Radiative transfer
- 85A30 Hydrodynamic and hydromagnetic problems [See also 76Y05]
- 85A35 Statistical astronomy
- 85A40 Cosmology {For relativistic cosmology, see 83F05}
- 85A45 Radio astronomy
- 85A99 Miscellaneous topics

86–XX   GEOPHYSICS [See also 73N20, 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 papers
- 86–06 Proceedings, conferences, collections, etc.
- 86–08 Computational methods
- 86A04 General
- 86A05 Hydrology, hydrography, oceanography [See also 76B15, 76B20, 76B25, 76C15, 76E20, 76Q05, 76Rxx, 76U05]

- 86A10 Meteorology and atmospheric physics [See also 76Bxx, 76C15, 76C20, 76E20, 76N15, 76Q05, 76Rxx, 76U05, 76V05]
- 86A15 Seismology [See also 73Dxx, 73Fxx, 73M25, 73N20, 73Q05]
- 86A17 Global dynamics, earthquake problems
- 86A20 Potentials, prospecting [See also 76S05, 76W05]
- 86A22 Inverse problems [See also 35R30]
- 86A25 Geo-electricity and geomagnetism [See also 78A25]
- 86A30 Geodesy, mapping problems
- 86A32 Geostatistics
- 86A40 Glaciology
- 86A60 Geological problems
- 86A99 Miscellaneous topics

90–XX   ECONOMICS, OPERATIONS RESEARCH, PROGRAMMING, GAMES
- 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
- 90Axx Mathematical economics {For econometrics, see 62P20}
- 90A05 Decision theory [See also 62Cxx, 90B50, 90D35]
- 90A06 Individual preferences
- 90A07 Group preferences
- 90A08 Social choice
- 90A09 Finance, portfolios, investment
- 90A10 Utility theory
- 90A11 Production theory, theory of the firm
- 90A12 Price theory and market structure
- 90A14 Equilibrium: general theory
- 90A15 General economic models, trade models
- 90A16 Dynamic economic models, growth models
- 90A17 Multisectoral models
- 90A19 Statistical models; economic indexes and measures
- 90A20 Economic time series analysis [See also 62M10]
- 90A25 Spatial models
- 90A27 Public goods
- 90A28 Voting theory
- 90A30 Environmental economics (natural resource models, harvesting, pollution, etc.)
- 90A35 Informational economics
- 90A36 Incentives theory
- 90A40 Consumer behavior, demand theory
- 90A43 Expected utility; risk-averse utility
- 90A46 Risk theory
- 90A50 Labor market
- 90A53 Special types of economies
- 90A56 Special types of equilibria
- 90A58 Models of real-world systems; general macro-economic models, etc.
- 90A60 Market models (auctions, bargaining, bidding, selling, etc.)
- 90A70 Macro-economic policy-making, taxation
- 90A80 Resource allocation
- 90A99 None of the above, but in this section
- 90Bxx Operations research and management science
- 90B05 Inventory, storage, reservoirs
- 90B06 Transportation, logistics
- 90B10 Flows in networks, deterministic
- 90B12 Communication networks [See also 68M10, 94A05]
- 90B15 Flows in networks, probabilistic
- 90B20 Highway traffic
- 90B22 Queues and service [See also 60K25, 68M20]
- 90B25 Reliability, availability, maintenance, inspection [See also 60K10, 62N05]
- 90B30 Production models
- 90B35 Scheduling theory [See also 68M20]
- 90B40 Search theory
- 90B50 Management decision-making, including multiple objectives [See also 90A05, 90C31, 90D35]
- 90B60 Marketing, advertising [See also 90A60]
- 90B70 Theory of organizations, industrial and manpower planning [See also 92H35]
- 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**
90C25	**Convex programming**
90C26	**Nonconvex programming, quasiconvex programming**
90C27	**Combinatorial optimization**
90C28	**Geometric programming**
90C29	**Multi-objective and goal programming; vector optimization**
90C30	**Nonlinear programming**
90C31	**Sensitivity, stability, parametric optimization**
90C32	**Fractional programming**
90C33	**Complementarity problems**
90C34	**Semi-infinite programming**
90C35	**Programming involving graphs or networks**
90C39	**Dynamic programming [See also 49L20]**
90C40	**Markov and semi-Markov decision processes**
90C42	**Markov programming and Markov renewal programming**
90C45	**Continuous programming**
90C48	**Programming in abstract spaces**
90C60	**Abstract computational complexity for mathematical programming problems [See also 68Q25]**
90C70	**Fuzzy programming**
90C90	**Applications of mathematical programming**
90C99	**None of the above, but in this section**
90Dxx	**Game theory**
90D05	**2-person games**
90D06	**n-person games, $n > 2$**
90D10	**Noncooperative games**
90D12	**Cooperative games**
90D13	**Games with infinitely many players**
90D15	**Stochastic games [See also 93E05]**
90D20	**Multistage and repeated games**
90D25	**Differential games [See also 49N55]**
90D26	**Pursuit and evasion games**
90D35	**Decision theory for games [See also 62Cxx, 90A05, 90B50]**
90D40	**Game-theoretic models [See also 65Cxx]**
90D42	**Positional games**
90D43	**Games involving graphs**
90D44	**Games involving topology or set theory**
90D46	**Combinatorial games**
90D50	**Discrete-time games**
90D55	**Games of timing**
90D60	**Probabilistic games; gambling**
90D65	**Hierarchical games**
90D70	**Spaces of games**
90D80	**Applications of game theory**
90D99	**None of the above, but in this section**
92–XX	**BIOLOGY AND OTHER NATURAL SCIENCES, BEHAVIORAL 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 [See also 68T05, 82C32, 94Cxx]**
92B99	**None of the above, but in this section**
92Cxx	**Physiological, cellular and medical topics**
92C05	**Biophysics**
92C10	**Biomechanics [See also 73P20]**
92C15	**Developmental biology, pattern formation**
92C20	**Neural biology**
92C30	**Physiology (general)**
92C35	**Physiological flow [See also 76Z05]**
92C40	**Biochemistry, molecular biology**
92C45	**Kinetics in biochemical problems (pharmacokinetics, enzyme kinetics, etc.) [See also 80A30]**

92C50	**Medical applications (general)**
92C55	**Tomography [See also 44A12, 65R10]**
92C60	**Medical epidemiology**
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**
92F05	**Other natural sciences**
92Gxx	**Social and behavioral sciences: methodology {For statistics, see 62–XX}**
92G05	**Measurement theory**
92G15	**One- and multidimensional scaling**
92G20	**Test theory**
92G25	**Questionnaire analysis**
92G30	**Clustering [See also 62H30]**
92G40	**Q-analysis**
92G99	**None of the above, but in this section**
92Hxx	**Mathematical sociology (including anthropology)**
92H10	**Models of societies, social and urban evolution**
92H20	**Mathematical geography and demography**
92H25	**Spatial models [See also 90A25]**
92H30	**Social networks**
92H35	**Manpower systems [See also 90A50, 90B70]**
92H99	**None of the above, but in this section**
92Jxx	**Mathematical psychology**
92J10	**Cognitive psychology**
92J30	**Psychophysics and psychophysiology; perception**
92J40	**Memory and learning [See also 68T05]**
92J45	**Measurement and performance**
92J99	**None of the above, but in this section**
92Kxx	**Other social and behavioral sciences (mathematical treatment)**
92K10	**History, political science**
92K20	**Linguistics [See also 03B65, 68S05]**
92K99	**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 programs (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**
93A20	**Cascaded systems**
93A25	**Input-output systems**
93A30	**Mathematical modeling (models of systems, model-matching, etc.)**
93A99	**None of the above, but in this section**
93Bxx	**Controllability, observability, and system structure**
93B03	**Attainable sets**
93B05	**Controllability**
93B06	**Relations between controllability and optimal solutions**
93B07	**Observability**
93B10	**Canonical structure**
93B11	**System structure simplification**
93B12	**Variable structure systems**
93B15	**Realizability of systems from input-output data**
93B17	**Transformation**
93B18	**Linearizability**
93B20	**Minimal systems representations**
93B25	**Algebraic methods**
93B27	**Geometric methods (including algebro-geometric)**
93B28	**Operator-theoretic methods [See also 47A57, 47N70]**
93B29	**Differential-geometric methods**
93B30	**System identification**
93B35	**Sensitivity (robustness)**

93B36	H^∞-control
93B40	**Computational methods**
93B50	**Synthesis problems**
93B51	**Design techniques (robust design, computer-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, guided systems**
93C05	**Linear**
93C10	**Nonlinear**
93C15	Systems governed by ordinary differential equations
93C20	Systems governed by partial differential equations
93C22	Systems governed by integral equations
93C25	Systems in abstract spaces
93C30	Systems governed by functional relations other than differential or integral equations
93C35	Multivariable, multidimensional systems
93C40	Adaptive control systems
93C41	Problems with incomplete information
93C42	Fuzzy control
93C45	Time-invariant
93C50	Time-dependent
93C55	Discrete-time
93C57	Sampled-data
93C60	**Continuous-time**
93C62	Digital systems
93C70	Time-scale analysis and related topics
93C73	Perturbations in control systems
93C80	Frequency-response methods
93C83	Control problems involving computers (process control, etc.)
93C85	Automated systems (robots, etc.)
93C90	Random disturbances in control systems
93C95	Applications of control theory
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 and robust stabilization
93D22	Interrelations between stability problems and optimization problems
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
93E05	Stochastic games, stochastic differential games [See also 90D15]
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
93E23	Stochastic gradient methods
93E24	Least squares and related methods
93E25	Other computational methods
93E30	Computer simulations of stochastic systems
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, 90B12]**
94A11	**Application of orthogonal functions in communication**
94A12	**Signal theory (characterization, reconstruction, etc.)**
94A13	**Detection theory**
94A14	**Modulation and demodulation**
94A15	**Information theory, general [See also 62B10]**
94A17	**Measures of information, entropy**
94A24	**Coding theorems (Shannon theory)**
94A29	**Source coding**

94A34	Rate-distortion theory
94A40	**Channel models**
94A45	**Prefix, length-variable, comma-free codes [See also 20M35, 68Q45]**
94A50	Theory of questionnaires
94A55	Shift register sequences
94A60	Cryptography [See also 11T71, 68P25]
94A99	**None of the above, but in this section**
94Bxx	Theory of error-correcting 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]**
94B30	**Majority codes**
94B35	Decoding
94B40	**Arithmetic codes [See also 11T71]**
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**
94D05	**Fuzzy sets and logic (in connection with questions of Section 94) [See also 03B52, 03E72, 04A72, 28E10]**