MSC2020-Mathematics Subject Classification System

Associate Editors of Mathematical Reviews and zbMATH

This document is a printed form of MSC2020, an MSC revision produced jointly by the editorial staffs of Mathematical Reviews (MR) and Zentralblatt für Mathematik (zbMATH) in consultation with the mathematical community. The goals of this revision of the Mathematics Subject Classification (MSC) were set out in the announcement of it and call for comments by the Executive Editor of MR and the Chief Editor of zbMATH in July 2016. This document results from the MSC revision process that has been going on since then. MSC2020 will be fully deployed from January 2020.

The editors of MR and zbMATH deploying this revision therefore ask for feedback on remaining errors to help in this work, which should be given through e-mail to feedback@msc2020.org. They are grateful for the many suggestions that were received previously, which have greatly influenced what we have.

How to use the Mathematics Subject Classification [MSC]

The main purpose of the classification of items in the mathematical literature using the Mathematics Subject Classification scheme is to help users find the items of present or potential interest to them as readily as possible—in products derived from the Mathematical Reviews Database (MRDB) such as MathSciNet, in Zentralblatt MATH (zbMATH), or anywhere else where this classification scheme is used. An item in the mathematical literature should be classified so as to attract the attention of all those possibly interested in it. The item may be something that falls squarely within one clear area of the MSC, or it may involve several areas. Ideally, the MSC codes attached to an item should represent the subjects to which the item contains a contribution. The classification should serve both those closely concerned with specific subject areas, and those familiar enough with subjects to apply their results and methods elsewhere, inside or outside of mathematics. It will be extremely useful for both users 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 item in the MRDB or zbMATH receives precisely one primary classification, which is simply the MSC code that describes its principal contribution. When an item contains several principal contributions to different areas, the primary classification should cover the most important among them. A paper or book may be assigned one or several secondary classification numbers to cover any remaining principal contributions, ancillary results, motivation or origin of the matters discussed, intended or potential field of application, or other significant aspects worthy of notice. The principal contribution is meant to be the one including the most important part of the work actually done in the item. 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, would have a primary classification in 05C (Graph Theory) with one or more secondary classifications in 68 (Computer Science); 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. There are two types of cross-references given at the end of many of the MSC2020 entries in the MSC. The first type is in braces: "{For A, see X}"; if this appears in section Y, it means that contributions described by A should usually be assigned the classification code X, not Y. The other type of cross-reference merely points out related classifications; it is in brackets: "[See also ...]", "[See mainly ...]", etc., and the classification codes listed in the brackets may, but need not, be included in the classification codes of a paper, or they may be used in place of the classification where the cross-reference is given. The classifier must judge which classification is the most appropriate for the paper at hand.

00-XX General and overarching topics; collections

00-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to mathematics in general

00-02 Research exposition (monographs, survey articles) pertaining to mathematics in general

00Axx General and miscellaneous specific topics

00A05 Mathematics in general

00A06 Mathematics for nonmathematicians (engineering, social sciences, etc.)

00A07 Problem books {For open problems, see 00A27}

00A08 Recreational mathematics

00A09 Popularization of mathematics

00A15 Bibliographies for mathematics in general [See also 01A70 and the classification number –00 in the other sections]

00A17 External book reviews

00A20 Dictionaries and other general reference works [See also the classification number –00 in the other sections]

00A22 Formularies

00A27 Lists of open problems

00A30 Philosophy of mathematics [See also 03A05]

00A35 Methodology of mathematics {For mathematics education, see 97-XX}

00A64 Mathematics and literature

00A65 Mathematics and music

00A66 Mathematics and visual arts

00A67 Mathematics and architecture

00A69 General applied mathematics {For physics, see 00A79 and Sections 70 through 86}

00A71 General theory of mathematical modeling

00A72 General theory of simulation

00A79 Physics (Use more specific entries from Sections 70 through 86 when possible)

00A99 None of the above, but in this section

00Bxx Conference proceedings and collections of articles

00B05 Collections of abstracts of lectures

00B10 Collections of articles of general interest

00B15 Collections of articles of miscellaneous specific interest

00B20 Proceedings of conferences of general interest

00B25 Proceedings of conferences of miscellaneous specific interest

00B30 Festschriften

00B50 Collections of translated articles of general interest

00B55 Collections of translated articles of miscellaneous specific interest

00B60 Collections of reprinted articles [See also 01A75]

00B99 None of the above, but in this section

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

01-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to history and biography

01-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to history and biography

01-02 Research exposition (monographs, survey articles) pertaining to history and biography

01-06 Proceedings, conferences, collections, etc. pertaining to history and biography

01-11 Research data for problems pertaining to history and biography

01Axx History of mathematics and mathematicians

01A05 General histories, source books

01A07 Ethnomathematics, general

01A10 History of mathematics in Paleolithic and Neolithic times

01A11 History of mathematics of the indigenous cultures of Africa, Asia, and Oceania

01A12 History of mathematics of the indigenous cultures of the Americas

01A15 History of mathematics of the indigenous cultures of Europe (pre-Greek, etc.)

01A16 History of mathematics in Ancient Egypt

01A17 History of mathematics in Ancient Babylon

01A20 History of mathematics in Ancient Greece and Rome

01A25 History of mathematics in China

01A27 History of mathematics in Japan

01A29 History of mathematics in Southeast Asia

01A30 History of mathematics in the Golden Age of Islam

01A32 History of mathematics in India

01A35 History of mathematics in late antiquity and medieval Europe

01A40 History of mathematics in the 15th and 16th centuries, Renaissance

01A45 History of mathematics in the 17th century

01A50 History of mathematics in the 18th century

01A55 History of mathematics in the 19th century

01A60 History of mathematics in the 20th century

01A61 History of mathematics in the 21st century

01A65 Development of contemporary mathematics

01A67 Future perspectives in mathematics

01A70 Biographies, obituaries, personalia, bibliographies

01A72 Schools of mathematics

01A73 History of mathematics at specific universities

01A74 History of mathematics at institutions and academies (non-university)

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

01A80 Sociology (and profession) of mathematics

01A85 Historiography

01A90 Bibliographic studies

01A99 None of the above, but in this section

03-XX Mathematical logic and foundations

03-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to mathematical logic and foundations

03-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to mathematical logic and foundations

03-02 Research exposition (monographs, survey articles) pertaining to mathematical logic and foundations

03-03 History of mathematical logic and foundations [Consider also classification numbers pertaining to Section 01]

03-04 Software, source code, etc. for problems pertaining to mathematical logic and foundations

03-06 Proceedings, conferences, collections, etc. pertaining to mathematical logic and foundations

03-08 Computational methods for problems pertaining to mathematical logic and foundations

03-11 Research data for problems pertaining to mathematical logic and foundations

03Axx Philosophical aspects of logic and foundations

03A05 Philosophical and critical aspects of logic and foundations {For philosophy of mathematics, see also 00A30}

03A10 Logic in the philosophy of science

03A99 None of the above, but in this section

03Bxx General logic

03B05 Classical propositional logic

03B10 Classical first-order logic

03B16 Higher-order logic

03B20 Subsystems of classical logic (including intuitionistic logic)

03B22 Abstract deductive systems

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

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

03B35 Mechanization of proofs and logical operations [See also 68V15]

03B38 Type theory

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

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

03B44 Temporal logic

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

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

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

03B50 Many-valued logic

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

03B53 Paraconsistent logics

03B55 Intermediate logics

03B60 Other nonclassical logic

03B62 Combined logics

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

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

03B80 Other applications of logic

03B99 None of the above, but in this section

03Cxx Model theory

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

03C07 Basic properties of first-order languages and structures

03C10 Quantifier elimination, model completeness and related topics

03C13 Model theory of finite structures [See also 68Q15, 68Q19]

03C15 Model theory of denumerable and separable structures

03C20 Ultraproducts and related constructions

03C25 Model-theoretic forcing

03C30 Other model constructions

03C35 Categoricity and completeness of theories

03C40 Interpolation, preservation, definability

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

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

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

03C52 Properties of classes of models

03C55 Set-theoretic model theory

03C57 Computable structure theory, computable model theory [See also 03D45]

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

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

03C64 Model theory of ordered structures; o-minimality

03C65 Models of other mathematical theories

03C66 Continuous model theory, model theory of metric structures

03C68 Other classical first-order model theory

03C70 Logic on admissible sets

03C75 Other infinitary logic

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

03C85 Second- and higher-order model theory

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

03C95 Abstract model theory

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

03C99 None of the above, but in this section

03Dxx Computability and recursion theory

03D03 Thue and Post systems, etc.

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

03D10 Turing machines and related notions [See also 68Q04]

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

03D20 Recursive functions and relations, subrecursive hierarchies

03D25 Recursively (computably) enumerable sets and degrees

03D28 Other Turing degree structures

03D30 Other degrees and reducibilities in computability and recursion theory

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

03D35 Undecidability and degrees of sets of sentences

03D40 Word problems, etc. in computability and recursion theory [See also 06B25, 08A50, 20F10, 68R15]

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

03D50 Recursive equivalence types of sets and structures, isols

03D55 Hierarchies of computability and definability

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

03D65 Higher-type and set recursion theory

03D70 Inductive definability

03D75 Abstract and axiomatic computability and recursion theory

03D78 Computation over the reals, computable analysis {For constructive aspects, see 03F60}

03D80 Applications of computability and recursion theory

03D99 None of the above, but in this section

03Exx Set theory

03E02 Partition relations

03E04 Ordered sets and their cofinalities; pcf theory

03E05 Other combinatorial set theory

03E10 Ordinal and cardinal numbers

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

03E17 Cardinal characteristics of the continuum

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

03E25 Axiom of choice and related propositions

03E30 Axiomatics of classical set theory and its fragments

03E35 Consistency and independence results

03E40 Other aspects of forcing and Boolean-valued models

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

03E47 Other notions of set-theoretic definability

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

03E55 Large cardinals

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

03E60 Determinacy principles

03E65 Other set-theoretic hypotheses and axioms

03E70 Nonclassical and second-order set theories

03E72 Theory of fuzzy sets, etc.

03E75 Applications of set theory

03E99 None of the above, but in this section

03Fxx Proof theory and constructive mathematics

03F03 Proof theory, general (including proof-theoretic semantics)

03F05 Cut-elimination and normal-form theorems

03F07 Structure of proofs

03F10 Functionals in proof theory

03F15 Recursive ordinals and ordinal notations

03F20 Complexity of proofs

03F25 Relative consistency and interpretations

03F30 First-order arithmetic and fragments

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

03F40 Gödel numberings and issues of incompleteness

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

03F50 Metamathematics of constructive systems

03F52 Proof-theoretic aspects of linear logic and other substructural logics [See also 03B47]

03F55 Intuitionistic mathematics

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

03F65 Other constructive mathematics [See also 03D45]

03F99 None of the above, but in this section

03Gxx Algebraic logic

03G05 Logical aspects of Boolean algebras [See also 06Exx]

03G10 Logical aspects of lattices and related structures [See also 06Bxx]

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

03G15 Cylindric and polyadic algebras; relation algebras

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

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

03G27 Abstract algebraic logic

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

03G99 None of the above, but in this section

03Hxx Nonstandard models [See also 03C62]

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

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

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

03H99 None of the above, but in this section

05-XX Combinatorics {For finite fields, see 11Txx}

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

05-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to combinatorics

05-02 Research exposition (monographs, survey articles) pertaining to combinatorics

05-03 History of combinatorics [Consider also classification numbers pertaining to Section 01]

05-04 Software, source code, etc. for problems pertaining to combinatorics

05-06 Proceedings, conferences, collections, etc. pertaining to combinatorics

05-08 Computational methods for problems pertaining to combinatorics

05-11 Research data for problems pertaining to combinatorics

05Axx Enumerative combinatorics {For enumeration in graph theory, see 05C30}

05A05 Permutations, words, matrices

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

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

05A16 Asymptotic enumeration

05A17 Combinatorial aspects of partitions of integers [See also 11P81, 11P82, 11P83]

05A18 Partitions of sets

05A19 Combinatorial identities, bijective combinatorics

05A20 Combinatorial inequalities

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

05A40 Umbral calculus

05A99 None of the above, but in this section

05Bxx Designs and configurations {For applications of design theory, see 94C30}

05B05 Combinatorial aspects of block designs [See also 51E05, 62K10]

05B07 Triple systems

05B10 Combinatorial aspects of difference sets (number-theoretic, group-theoretic, etc.) [See also 11B13]

05B15 Orthogonal arrays, Latin squares, Room squares

05B20 Combinatorial aspects of matrices (incidence, Hadamard, etc.)

05B25 Combinatorial aspects of finite geometries [See also 51D20, 51Exx]

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

05B35 Combinatorial aspects of matroids and geometric lattices [See also 52B40, 90C27]

05B40 Combinatorial aspects of packing and covering [See also 11H31, 52C15, 52C17]

05B45 Combinatorial aspects of tessellation and tiling problems [See also 52C20, 52C22]

05B50 Polyominoes

05B99 None of the above, but in this section

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

05C05 Trees

05C07 Vertex degrees [See also 05E30]

05C09 Graphical indices (Wiener index, Zagreb index, Randić index, etc.)

05C10 Planar graphs; geometric and topological aspects of graph theory [See also 57K10, 57M15]

05C12 Distance in graphs

05C15 Coloring of graphs and hypergraphs

05C17 Perfect graphs

05C20 Directed graphs (digraphs), tournaments

05C21 Flows in graphs

05C22 Signed and weighted graphs

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

05C30 Enumeration in graph theory

05C31 Graph polynomials

05C35 Extremal problems in graph theory [See also 90C35]

05C38 Paths and cycles [See also 90B10]

05C40 Connectivity

05C42 Density (toughness, etc.)

05C45 Eulerian and Hamiltonian graphs

05C48 Expander graphs

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

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

05C55 Generalized Ramsey theory [See also 05D10]

05C57 Games on graphs (graph-theoretic aspects) [See also 91A43, 91A46]

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

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

05C63 Infinite graphs

05C65 Hypergraphs

05C69 Vertex subsets with special properties (dominating sets, independent sets, cliques, etc.)

05C70 Edge subsets with special properties (factorization, matching, partitioning, covering and packing, etc.)

05C72 Fractional graph theory, fuzzy graph theory

05C75 Structural characterization of families of graphs

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

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

05C80 Random graphs (graph-theoretic aspects) [See also 60B20]

05C81 Random walks on graphs

05C82 Small world graphs, complex networks (graph-theoretic aspects) [See also 90Bxx, 91D30]

05C83 Graph minors

05C85 Graph algorithms (graph-theoretic aspects) [See also 68R10, 68W05]

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

05C92 Chemical graph theory [See also 92E10]

05C99 None of the above, but in this section

05Dxx Extremal combinatorics

05D05 Extremal set theory

05D10 Ramsey theory [See also 05C55]

05D15 Transversal (matching) theory

05D40 Probabilistic methods in extremal combinatorics, including polynomial methods (combinatorial Nullstellensatz, etc.)

05D99 None of the above, but in this section

05Exx Algebraic combinatorics

05E05 Symmetric functions and generalizations

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

05E14 Combinatorial aspects of algebraic geometry [See also 14Nxx]

05E16 Combinatorial aspects of groups and algebras [See also 22E45, 33C80]

05E18 Group actions on combinatorial structures

05E30 Association schemes, strongly regular graphs

05E40 Combinatorial aspects of commutative algebra

05E45 Combinatorial aspects of simplicial complexes

05E99 None of the above, but in this section

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

06-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to ordered structures

06-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to ordered structures

06-02 Research exposition (monographs, survey articles) pertaining to ordered structures

06-03 History of ordered structures [Consider also classification numbers pertaining to Section 01]

06-04 Software, source code, etc. for problems pertaining to ordered structures

06-06 Proceedings, conferences, collections, etc. pertaining to ordered structures

06-08 Computational methods for problems pertaining to ordered structures

06-11 Research data for problems pertaining to ordered structures

06Axx Ordered sets

06A05 Total orders

06A06 Partial orders, general

06A07 Combinatorics of partially ordered sets

06A11 Algebraic aspects of posets

06A12 Semilattices [See also 20M10] {For topological semilattices, see 22A26}

06A15 Galois correspondences, closure operators (in relation to ordered sets)

06A75 Generalizations of ordered sets

06A99 None of the above, but in this section

06Bxx Lattices [See also 03G10]

06B05 Structure theory of lattices

06B10 Lattice ideals, congruence relations

06B15 Representation theory of lattices

06B20 Varieties of lattices

06B23 Complete lattices, completions

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

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

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

06B75 Generalizations of lattices

06B99 None of the above, but in this section

06Cxx Modular lattices, complemented lattices

06C05 Modular lattices, Desarguesian lattices

06C10 Semimodular lattices, geometric lattices

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

06C20 Complemented modular lattices, continuous geometries

06C99 None of the above, but in this section

06Dxx Distributive lattices

06D05 Structure and representation theory of distributive lattices

06D10 Complete distributivity

06D15 Pseudocomplemented lattices

06D20 Heyting algebras (lattice-theoretic aspects) [See also 03G25]

06D22 Frames, locales {For topological questions, see 54-XX}

06D25 Post algebras (lattice-theoretic aspects) [See also 03G20]

06D30 De Morgan algebras, Łukasiewicz algebras (lattice-theoretic aspects) [See also 03G20]

06D35 MV-algebras

06D50 Lattices and duality

06D72 Fuzzy lattices (soft algebras) and related topics

06D75 Other generalizations of distributive lattices

06D99 None of the above, but in this section

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

06E05 Structure theory of Boolean algebras

06E10 Chain conditions, complete algebras

06E15 Stone spaces (Boolean spaces) and related structures

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

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

06E30 Boolean functions [See also 94D10]

06E75 Generalizations of Boolean algebras

06E99 None of the above, but in this section

06Fxx Ordered structures

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

06F07 Quantales

06F10 Noether lattices

06F15 Ordered groups [See also 20F60]

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

06F25 Ordered rings, algebras, modules {For ordered fields, see 12J15} [See also 13J25, 16W80]

06F30 Ordered topological structures (aspects of ordered structures) [See also 06B30, 22A26, 54F05, 54H12]

06F35 BCK-algebras, BCI-algebras (aspects of ordered structures) [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.) pertaining to general algebraic systems

08-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to general algebraic systems

08-02 Research exposition (monographs, survey articles) pertaining to general algebraic systems

08-03 History of general algebraic systems [Consider also classification numbers pertaining to Section 01]

08-04 Software, source code, etc. for problems pertaining to general algebraic systems

08-06 Proceedings, conferences, collections, etc. pertaining to general algebraic systems

08-08 Computational methods for problems pertaining to general algebraic systems

08-11 Research data for problems pertaining to general algebraic systems

08Axx Algebraic structures [See also 03C05]

08A02 Relational systems, laws of composition

08A05 Structure theory of algebraic structures

08A30 Subalgebras, congruence relations

08A35 Automorphisms and endomorphisms of algebraic structures

08A40 Operations and polynomials in algebraic structures, primal algebras

08A45 Equational compactness

08A50 Word problems (aspects of algebraic structures) [See also 03D40, 06B25, 20F10, 68R15]

08A55 Partial algebras

08A60 Unary algebras

08A62 Finitary algebras

08A65 Infinitary algebras

08A68 Heterogeneous algebras

08A70 Applications of universal algebra in computer science

08A72 Fuzzy algebraic structures

08A99 None of the above, but in this section

08Bxx Varieties [See also 03C05]

08B05 Equational logic, Mal'tsev conditions

08B10 Congruence modularity, congruence distributivity

08B15 Lattices of varieties

08B20 Free algebras

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

08B26 Subdirect products and subdirect irreducibility

08B30 Injectives, projectives

08B99 None of the above, but in this section

08Cxx Other classes of algebras

08C05 Categories of algebras [See also 18C05]

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

08C15 Quasivarieties

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

08C99 None of the above, but in this section

11-XX Number theory

11-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to number theory

11-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to number theory

11-02 Research exposition (monographs, survey articles) pertaining to number theory

11-03 History of number theory [Consider also classification numbers pertaining to Section 01]

11-04 Software, source code, etc. for problems pertaining to number theory

11-06 Proceedings, conferences, collections, etc. pertaining to number theory

11-11 Research data for problems pertaining to number theory

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 number representations

11A99 None of the above, but in this section

11Bxx Sequences and sets

11B05 Density, gaps, topology

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

11B25 Arithmetic progressions [See also 11N13]

11B30 Arithmetic combinatorics; higher degree uniformity

11B34 Representation functions

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

11B39 Fibonacci and Lucas numbers and polynomials and generalizations

11B50 Sequences (mod m)

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

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 in number theory [See also 13F20]

11C20 Matrices, determinants in number theory [See also 15B36]

11C99 None of the above, but in this section

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

11D04 Linear Diophantine equations

11D07 The Frobenius problem

11D09 Quadratic and bilinear Diophantine equations

11D25 Cubic and quartic Diophantine equations

11D41 Higher degree equations; Fermat's equation

11D45 Counting solutions of Diophantine equations

11D57 Multiplicative and norm form equations

11D59 Thue-Mahler equations

11D61 Exponential Diophantine equations

11D68 Rational numbers as sums of fractions

11D72 Diophantine equations in many variables [See also 11P55]

11D75 Diophantine inequalities [See also 11J25]

11D79 Congruences in many variables

11D85 Representation problems [See also 11P55]

11D88 p-adic and power series fields

11D99 None of the above, but in this section

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

11E04 Quadratic forms over general fields

11E08 Quadratic forms over local rings and fields

11E10 Forms over real fields

11E12 Quadratic forms over global rings and fields

11E16 General binary quadratic forms

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

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

11E39 Bilinear and Hermitian forms

11E41 Class numbers of quadratic and Hermitian forms

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

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

11E70 K-theory of quadratic and Hermitian forms

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

11E76 Forms of degree higher than two

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

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

11E95 p-adic theory

11E99 None of the above, but in this section

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

11F03 Modular and automorphic functions

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

11F11 Holomorphic modular forms of integral weight

11F12 Automorphic forms, one variable

11F20 Dedekind eta function, Dedekind sums

11F22 Relationship to Lie algebras and finite simple groups

11F23 Relations with algebraic geometry and topology

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

11F27 Theta series; Weil representation; theta correspondences

11F30 Fourier coefficients of automorphic forms

11F32 Modular correspondences, etc.

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

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

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

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

11F50 Jacobi forms

11F52 Modular forms associated to Drinfel'd modules

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

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

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

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

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

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

11F72 Spectral theory; trace formulas (e.g., that of Selberg)

11F75 Cohomology of arithmetic groups

11F77 Automorphic forms and their relations with perfectoid spaces [See also 14G45]

11F80 Galois representations

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

11F99 None of the above, but in this section

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

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

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

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

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

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

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

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

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

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

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

11G32 Arithmetic aspects of dessins d'enfants, Belyĭ theory

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

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

11G42 Arithmetic mirror symmetry [See also 14J33]

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

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

11G55 Polylogarithms and relations with K-theory

11G99 None of the above, but in this section

11Hxx Geometry of numbers {For applications in coding theory, see 94B75}

11H06 Lattices and convex bodies (number-theoretic aspects) [See also 11P21, 52C05, 52C07]

11H16 Nonconvex bodies

11H31 Lattice packing and covering (number-theoretic aspects) [See also 05B40, 52C15, 52C17]

11H46 Products of linear forms

11H50 Minima of forms

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

11H56 Automorphism groups of lattices

11H60 Mean value and transfer theorems

11H71 Relations with coding theory

11H99 None of the above, but in this section

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

11J04 Homogeneous approximation to one number

11J06 Markov and Lagrange spectra and generalizations

11J13 Simultaneous homogeneous approximation, linear forms

11J17 Approximation by numbers from a fixed field

11J20 Inhomogeneous linear forms

11J25 Diophantine inequalities [See also 11D75]

11J54 Small fractional parts of polynomials and generalizations

11J61 Approximation in non-Archimedean valuations

11J68 Approximation to algebraic numbers

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

11J71 Distribution modulo one [See also 11K06]

11J72 Irrationality; linear independence over a field

11J81 Transcendence (general theory)

11J82 Measures of irrationality and of transcendence

11J83 Metric theory

11J85 Algebraic independence; Gel'fond's method

11J86 Linear forms in logarithms; Baker's method

11J87 Schmidt Subspace Theorem and applications

11J89 Transcendence theory of elliptic and abelian functions

11J91 Transcendence theory of other special functions

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

11J95 Results involving abelian varieties

11J97 Number-theoretic analogues of methods in Nevanlinna theory (work of Vojta et al.)

11J99 None of the above, but in this section

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

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

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

11K31 Special sequences

11K36 Well-distributed sequences and other variations

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

11K41 Continuous, p-adic and abstract analogues

11K45 Pseudo-random numbers; Monte Carlo methods [See also 65C05, 65C10]

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 in probabilistic number theory [See also 11Jxx]

11K65 Arithmetic functions in probabilistic number theory [See also 11Nxx]

11K70 Harmonic analysis and almost periodicity in probabilistic number theory

11K99 None of the above, but in this section

11Lxx Exponential sums and character sums {For finite fields, see 11Txx}

11L03 Trigonometric and exponential sums, general

11L05 Gauss and Kloosterman sums; generalizations

11L07 Estimates on exponential sums

11L10 Jacobsthal and Brewer sums; other complete character sums

11L15 Weyl sums

11L20 Sums over primes

11L26 Sums over arbitrary intervals

11L40 Estimates on character sums

11L99 None of the above, but in this section

11Mxx Zeta and L-functions: analytic theory

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

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

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

11M32 Multiple Dirichlet series and zeta functions and multizeta values

11M35 Hurwitz and Lerch zeta functions

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

11M38 Zeta and L-functions in characteristic p

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

11M45 Tauberian theorems [See also 40E05]

11M50 Relations with random matrices

11M55 Relations with noncommutative geometry

11M99 None of the above, but in this section

11Nxx Multiplicative number theory

11N05 Distribution of primes

11N13 Primes in congruence classes

11N25 Distribution of integers with specified multiplicative constraints

11N30 Turán theory [See also 30Bxx]

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

11N35 Sieves

11N36 Applications of sieve methods

11N37 Asymptotic results on arithmetic functions

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

11N56 Rate of growth of arithmetic functions

11N60 Distribution functions associated with additive and positive multiplicative functions

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

11N69 Distribution of integers in special residue classes

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

11N80 Generalized primes and integers

11N99 None of the above, but in this section

11Pxx Additive number theory; partitions

11P05 Waring's problem and variants

11P21 Lattice points in specified regions

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

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

11P70 Inverse problems of additive number theory, including sumsets

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

11P82 Analytic theory of partitions

11P83 Partitions; congruences and congruential restrictions

11P84 Partition identities; identities of Rogers-Ramanujan type

11P99 None of the above, but in this section

11Rxx Algebraic number theory: global fields {For complex multiplication, see 11G15}

11R04 Algebraic numbers; rings of algebraic integers

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

11R09 Polynomials (irreducibility, etc.)

11R11 Quadratic extensions

11R16 Cubic and quartic extensions

11R18 Cyclotomic extensions

11R20 Other abelian and metabelian extensions

11R21 Other number fields

11R23 Iwasawa theory

11R27 Units and factorization

11R29 Class numbers, class groups, discriminants

11R32 Galois theory

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

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

11R37 Class field theory

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

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

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

11R45 Density theorems

11R47 Other analytic theory [See also 11Nxx]

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

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

11R56 Adèle rings and groups

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

11R59 Zeta functions and L-functions of function fields

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

11R65 Class groups and Picard groups of orders

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

11R80 Totally real fields [See also 12J15]

11R99 None of the above, but in this section

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

11S05 Polynomials

11S15 Ramification and extension theory

11S20 Galois theory

11S23 Integral representations

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

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

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

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

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

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

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

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

11S85 Other nonanalytic theory

11S90 Prehomogeneous vector spaces

11S99 None of the above, but in this section

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

11T06 Polynomials over finite fields

11T22 Cyclotomy

11T23 Exponential sums

11T24 Other character sums and Gauss sums

11T30 Structure theory for finite fields and commutative rings (number-theoretic aspects)

11T55 Arithmetic theory of polynomial rings over finite fields

11T60 Finite upper half-planes

11T71 Algebraic coding theory; cryptography (number-theoretic aspects)

11T99 None of the above, but in this section

11Uxx Connections of number theory and logic

11U05 Decidability (number-theoretic aspects) [See also 03B25]

11U07 Ultraproducts (number-theoretic aspects) [See also 03C20]

11U09 Model theory (number-theoretic aspects) [See also 03Cxx]

11U10 Nonstandard arithmetic (number-theoretic aspects) [See also 03H15]

11U99 None of the above, but in this section

11Yxx Computational number theory {For software etc., see 11-04}

11Y05 Factorization

11Y11 Primality

11Y16 Number-theoretic 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 number-theoretic constants

11Y65 Continued fraction calculations (number-theoretic aspects)

11Y70 Values of arithmetic functions; tables

11Y99 None of the above, but in this section

11Zxx Miscellaneous applications of number theory

11Z05 Miscellaneous applications of number theory

11Z99 None of the above, but in this section

12-XX Field theory and polynomials

12-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to field theory

12-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to field theory

12-02 Research exposition (monographs, survey articles) pertaining to field theory

12-03 History of field theory [Consider also classification numbers pertaining to Section 01]

12-04 Software, source code, etc. for problems pertaining to field theory

12-06 Proceedings, conferences, collections, etc. pertaining to field theory

12-08 Computational methods for problems pertaining to field theory

12-11 Research data for problems pertaining to field theory

12Dxx Real and complex fields

12D05 Polynomials in real and complex fields: factorization

12D10 Polynomials in real and complex fields: 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 in general fields (irreducibility, etc.)

12E10 Special polynomials in general fields

12E12 Equations in general fields

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

12E20 Finite fields (field-theoretic aspects)

12E25 Hilbertian fields; Hilbert's irreducibility theorem

12E30 Field arithmetic

12E99 None of the above, but in this section

12Fxx Field extensions

12F05 Algebraic field extensions

12F10 Separable extensions, Galois theory

12F12 Inverse Galois theory

12F15 Inseparable field extensions

12F20 Transcendental field extensions

12F99 None of the above, but in this section

12Gxx Homological methods (field theory)

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

12G10 Cohomological dimension of fields

12G99 None of the above, but in this section

12Hxx Differential and difference algebra

12H05 Differential algebra [See also 13Nxx]

12H10 Difference algebra [See also 39Axx]

12H20 Abstract differential equations [See also 34Mxx]

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

12H99 None of the above, but in this section

12Jxx Topological fields

12J05 Normed fields

12J10 Valued fields

12J12 Formally p-adic fields

12J15 Ordered fields

12J17 Topological semifields

12J20 General valuation theory for fields [See also 13A18]

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

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

12J99 None of the above, but in this section

12Kxx Generalizations of fields

12K05 Near-fields [See also 16Y30]

12K10 Semifields [See also 16Y60]

12K99 None of the above, but in this section

12Lxx Connections between field theory and logic

12L05 Decidability and field theory [See also 03B25]

12L10 Ultraproducts and field theory [See also 03C20]

12L12 Model theory of fields [See also 03C60]

12L15 Nonstandard arithmetic and field theory [See also 03H15]

12L99 None of the above, but in this section

13-XX Commutative algebra

13-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to commutative algebra

13-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to commutative algebra

13-02 Research exposition (monographs, survey articles) pertaining to commutative algebra

13-03 History of commutative algebra [Consider also classification numbers pertaining to Section 01]

13-04 Software, source code, etc. for problems pertaining to commutative algebra

13-06 Proceedings, conferences, collections, etc. pertaining to commutative algebra

13-11 Research data for problems pertaining to commutative algebra

13Axx General commutative ring theory

13A02 Graded rings [See also 16W50]

13A05 Divisibility and factorizations in commutative rings [See also 13F15]

13A15 Ideals and multiplicative ideal theory in commutative rings

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

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

13A35 Characteristic p methods (Frobenius endomorphism) and reduction to characteristic p; tight closure [See also 13B22]

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

13A70 General commutative ring theory and combinatorics (zero-divisor graphs, annihilating-ideal graphs, etc.) [See also 05C25, 05E40]

13A99 None of the above, but in this section

13Bxx Commutative ring extensions and related topics

13B02 Extension theory of commutative rings

13B05 Galois theory and commutative ring extensions

13B10 Morphisms of commutative rings

13B21 Integral dependence in commutative rings; going up, going down

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

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

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

13B35 Completion of commutative rings [See also 13J10]

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

13B99 None of the above, but in this section

13Cxx Theory of modules and ideals in commutative rings

13C05 Structure, classification theorems for modules and ideals in commutative rings

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

13C11 Injective and flat modules and ideals in commutative rings

13C12 Torsion modules and ideals in commutative rings

13C13 Other special types of modules and ideals in commutative rings

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

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

13C20 Class groups [See also 11R29]

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

13C60 Module categories and commutative rings

13C70 Theory of modules and ideals in commutative rings described by combinatorial properties [See also 05C25, 05E40]

13C99 None of the above, but in this section

13Dxx Homological methods in commutative ring theory {For noncommutative rings, see 16Exx; for general categories, see 18Gxx}

13D02 Syzygies, resolutions, complexes and commutative rings

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

13D05 Homological dimension and commutative rings

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

13D09 Derived categories and commutative rings

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

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

13D22 Homological conjectures (intersection theorems) in commutative ring theory

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

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

13D45 Local cohomology and commutative rings [See also 14B15]

13D99 None of the above, but in this section

13Exx Chain conditions, finiteness conditions in commutative ring theory

13E05 Commutative Noetherian rings and modules

13E10 Commutative Artinian rings and modules, finite-dimensional algebras

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

13E99 None of the above, but in this section

13Fxx Arithmetic rings and other special commutative rings

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

13F07 Euclidean rings and generalizations

13F10 Principal ideal rings

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

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

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

13F30 Valuation rings [See also 13A18]

13F35 Witt vectors and related rings

13F40 Excellent rings

13F45 Seminormal rings

13F50 Rings with straightening laws, Hodge algebras

13F55 Commutative rings defined by monomial ideals; Stanley-Reisner face rings; simplicial complexes [See also 55U10]

13F60 Cluster algebras

13F65 Commutative rings defined by binomial ideals, toric rings, etc. [See also 14M25]

13F70 Other commutative rings defined by combinatorial properties

13F99 None of the above, but in this section

13Gxx Integral domains

13G05 Integral domains

13G99 None of the above, but in this section

13Hxx Local rings and semilocal rings

13H05 Regular local rings

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

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

13H99 None of the above, but in this section

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

13J05 Power series rings [See also 13F25]

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

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

13J15 Henselian rings [See also 13B40]

13J20 Global topological rings

13J25 Ordered rings [See also 06F25]

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

13J99 None of the above, but in this section

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

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

13L99 None of the above, but in this section

13Mxx Finite commutative rings {For number-theoretic aspects, see 11Txx}

13M05 Structure of finite commutative rings

13M10 Polynomials and finite commutative rings

13M99 None of the above, but in this section

13Nxx Differential algebra [See also 12H05, 14F10]

13N05 Modules of differentials

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

13N15 Derivations and commutative rings

13N99 None of the above, but in this section

13Pxx Computational aspects and applications of commutative rings [See also 14Qxx, 68W30] {For software etc., see 13-04}

13P05 Polynomials, factorization in commutative rings [See also 12-08]

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

13P15 Solving polynomial systems; resultants

13P20 Computational homological algebra [See also 13Dxx]

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

13P99 None of the above, but in this section

14-XX Algebraic geometry

14-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to algebraic geometry

14-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to algebraic geometry

14-02 Research exposition (monographs, survey articles) pertaining to algebraic geometry

14-03 History of algebraic geometry [Consider also classification numbers pertaining to Section 01]

14-04 Software, source code, etc. for problems pertaining to algebraic geometry

14-06 Proceedings, conferences, collections, etc. pertaining to algebraic geometry

14-11 Research data for problems pertaining to algebraic geometry

14Axx Foundations of algebraic geometry

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

14A10 Varieties and morphisms

14A15 Schemes and morphisms

14A20 Generalizations (algebraic spaces, stacks)

14A21 Logarithmic algebraic geometry, log schemes

14A22 Noncommutative algebraic geometry [See also 16S38]

14A23 Geometry over the field with one element

14A25 Elementary questions in algebraic geometry

14A30 Fundamental constructions in algebraic geometry involving higher and derived categories (homotopical algebraic geometry, derived algebraic geometry, etc.) {For categorical aspects, see 18Fxx, 18Gxx}

14A99 None of the above, but in this section

14Bxx Local theory in algebraic geometry

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

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

14B10 Infinitesimal methods in algebraic geometry [See also 13D10]

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

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

14B20 Formal neighborhoods in algebraic geometry

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

14B99 None of the above, but in this section

14Cxx Cycles and subschemes

14C05 Parametrization (Chow and Hilbert schemes)

14C15 (Equivariant) Chow groups and rings; motives

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

14C20 Divisors, linear systems, invertible sheaves

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

14C22 Picard groups

14C25 Algebraic cycles

14C30 Transcendental methods, Hodge theory (algebro-geometric aspects) [See also 14D07, 32G20, 32J25, 32S35], Hodge conjecture

14C34 Torelli problem [See also 32G20]

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

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

14C99 None of the above, but in this section

14Dxx Families, fibrations in algebraic geometry

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

14D06 Fibrations, degenerations in algebraic geometry

14D07 Variation of Hodge structures (algebro-geometric aspects) [See also 32G20]

14D10 Arithmetic ground fields (finite, local, global) and families or fibrations

14D15 Formal methods and deformations in algebraic geometry [See also 13D10, 14B07, 32Gxx]

14D20 Algebraic moduli problems, moduli of vector bundles {For analytic moduli problems, see 32G13}

14D21 Applications of vector bundles and moduli spaces in mathematical physics (twistor theory, instantons, quantum field theory) [See also 32L25, 81Txx]

14D22 Fine and coarse moduli spaces

14D23 Stacks and moduli problems

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

14D99 None of the above, but in this section

14Exx Birational geometry

14E05 Rational and birational maps

14E07 Birational automorphisms, Cremona group and generalizations

14E08 Rationality questions in algebraic geometry [See also 14M20]

14E15 Global theory and resolution of singularities (algebro-geometric aspects) [See also 14B05, 32S20, 32S45]

14E16 McKay correspondence

14E18 Arcs and motivic integration

14E20 Coverings in algebraic geometry [See also 14H30]

14E22 Ramification problems in algebraic geometry [See also 11S15]

14E25 Embeddings in algebraic geometry

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

14E99 None of the above, but in this section

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

14F06 Sheaves in algebraic geometry [See also 14F08, 14H60, 14J60, 18F20, 32Lxx, 46M20]

14F08 Derived categories of sheaves, dg categories, and related constructions in algebraic geometry [See also 14A30, 14F06, 18Gxx]

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

14F17 Vanishing theorems in algebraic geometry [See also 32L20]

14F18 Multiplier ideals

14F20 Étale and other Grothendieck topologies and (co)homologies

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

14F25 Classical real and complex (co)homology in algebraic geometry

14F30 p-adic cohomology, crystalline cohomology

14F35 Homotopy theory and fundamental groups in algebraic geometry [See also 14H30]

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

14F42 Motivic cohomology; motivic homotopy theory [See also 19E15]

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

14F45 Topological properties in algebraic geometry

14F99 None of the above, but in this section

14Gxx Arithmetic problems in algebraic geometry; Diophantine geometry [See also 11Dxx, 11Gxx]

14G05 Rational points

14G10 Zeta functions and related questions in algebraic geometry (e.g., Birch-Swinnerton-Dyer conjecture) [See also 11G40]

14G12 Hasse principle, weak and strong approximation, Brauer-Manin obstruction [See also 14F22]

14G15 Finite ground fields in algebraic geometry

14G17 Positive characteristic ground fields in algebraic geometry

14G20 Local ground fields in algebraic geometry

14G22 Rigid analytic geometry

14G25 Global ground fields in algebraic geometry

14G27 Other nonalgebraically closed ground fields in algebraic geometry

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

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

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

14G45 Perfectoid spaces and mixed characteristic

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

14G99 None of the above, but in this section

14Hxx Curves in algebraic geometry

14H05 Algebraic functions and function fields in algebraic geometry [See also 11R58]

14H10 Families, moduli of curves (algebraic)

14H15 Families, moduli of curves (analytic) [See also 30F10, 32G15]

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

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

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

14H37 Automorphisms of curves

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

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

14H45 Special algebraic curves and curves of low genus

14H50 Plane and space curves

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

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

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

14H57 Dessins d'enfants theory {For arithmetic aspects, see 11G32}

14H60 Vector bundles on curves and their moduli [See also 14D20, 14F06, 14J60]

14H70 Relationships between algebraic curves and integrable systems

14H81 Relationships between algebraic curves and physics

14H99 None of the above, but in this section

14Jxx Surfaces and higher-dimensional varieties {For analytic theory, see 32Jxx}

14J10 Families, moduli, classification: algebraic theory

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

14J17 Singularities of surfaces or higher-dimensional varieties [See also 14B05, 14E15, 32S05, 32S25]

14J20 Arithmetic ground fields for surfaces or higher-dimensional varieties [See also 11Dxx, 11G25, 11G35, 14Gxx]

14J25 Special surfaces {For Hilbert modular surfaces, see 14G35}

14J26 Rational and ruled surfaces

14J27 Elliptic surfaces, elliptic or Calabi-Yau fibrations

14J28 $K3$ surfaces and Enriques surfaces

14J29 Surfaces of general type

14J30 3-folds

14J32 Calabi-Yau manifolds (algebro-geometric aspects) [See also 32Q25]

14J33 Mirror symmetry (algebro-geometric aspects) [See also 11G42, 53D37]

14J35 4-folds

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

14J42 Holomorphic symplectic varieties, hyper-Kähler varieties

14J45 Fano varieties

14J50 Automorphisms of surfaces and higher-dimensional varieties

14J60 Vector bundles on surfaces and higher-dimensional varieties, and their moduli [See also 14D20, 14F06, 14H60, 32Lxx]

14J70 Hypersurfaces and algebraic geometry

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

14J81 Relationships with physics

14J99 None of the above, but in this section

14Kxx Abelian varieties and schemes

14K02 Isogeny

14K05 Algebraic theory of abelian varieties

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

14K12 Subvarieties of abelian varieties

14K15 Arithmetic ground fields for abelian varieties [See also 11Dxx, 11Fxx, 11G10, 14Gxx]

14K20 Analytic theory of abelian varieties; abelian integrals and differentials

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

14K25 Theta functions and abelian varieties [See also 14H42]

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

14K99 None of the above, but in this section

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

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

14L10 Group varieties

14L15 Group schemes

14L17 Affine algebraic groups, hyperalgebra constructions [See also 17B45, 18C40]

14L24 Geometric invariant theory [See also 13A50]

14L30 Group actions on varieties or schemes (quotients) [See also 13A50, 14L24, 14M17]

14L35 Classical groups (algebro-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 13F15, 13F45, 13H10]

14M06 Linkage [See also 13C40]

14M07 Low codimension problems in algebraic geometry

14M10 Complete intersections [See also 13C40]

14M12 Determinantal varieties [See also 13C40]

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

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

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

14M22 Rationally connected varieties

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

14M27 Compactifications; symmetric and spherical varieties

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

14M35 Character varieties

14M99 None of the above, but in this section

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

14N05 Projective techniques in algebraic geometry [See also 51N35]

14N07 Secant varieties, tensor rank, varieties of sums of powers

14N10 Enumerative problems (combinatorial problems) in algebraic geometry

14N15 Classical problems, Schubert calculus

14N20 Configurations and arrangements of linear subspaces

14N25 Varieties of low degree

14N30 Adjunction problems

14N35 Gromov-Witten invariants, quantum cohomology, Gopakumar-Vafa invariants, Donaldson-Thomas invariants (algebro-geometric aspects) [See also 53D45]

14N99 None of the above, but in this section

14Pxx Real algebraic and real-analytic geometry

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

14P10 Semialgebraic sets and related spaces

14P15 Real-analytic and semi-analytic 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 {For software etc., see 14-04} [See also 12-08, 13Pxx, 68W30]

14Q05 Computational aspects of algebraic curves [See also 14Hxx]

14Q10 Computational aspects of algebraic surfaces [See also 14Jxx]

14Q15 Computational aspects of higher-dimensional varieties [See also 14Jxx, 14Mxx]

14Q20 Effectivity, complexity and computational aspects of algebraic geometry

14Q25 Computational algebraic geometry over arithmetic ground fields [See also 14Gxx, 14H25, 14Kxx]

14Q30 Computational real algebraic geometry [See also 14Pxx]

14Q65 Geometric aspects of numerical algebraic geometry [See also 65H14]

14Q99 None of the above, but in this section

14Rxx Affine geometry

14R05 Classification of affine varieties

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

14R15 Jacobian problem [See also 13F20]

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

14R25 Affine fibrations [See also 14D06]

14R99 None of the above, but in this section

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

14T10 Foundations of tropical geometry and relations with algebra {For algebraic aspects, see 15A80}

14T15 Combinatorial aspects of tropical varieties

14T20 Geometric aspects of tropical varieties

14T25 Arithmetic aspects of tropical varieties

14T90 Applications of tropical geometry

14T99 None of the above, but in this section

15-XX Linear and multilinear algebra; matrix theory

15-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to linear algebra

15-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to linear algebra

15-02 Research exposition (monographs, survey articles) pertaining to linear algebra

15-03 History of linear algebra [Consider also classification numbers pertaining to Section 01]

15-04 Software, source code, etc. for problems pertaining to linear algebra

15-06 Proceedings, conferences, collections, etc. pertaining to linear algebra

15-11 Research data for problems pertaining to linear algebra

15Axx Basic linear algebra

15A03 Vector spaces, linear dependence, rank, lineability

15A04 Linear transformations, semilinear transformations

15A06 Linear equations (linear algebraic aspects)

15A09 Theory of matrix inversion and generalized inverses

15A10 Applications of generalized inverses

15A12 Conditioning of matrices [See also 65F35]

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

15A16 Matrix exponential and similar functions of matrices

15A18 Eigenvalues, singular values, and eigenvectors

15A20 Diagonalization, Jordan forms

15A21 Canonical forms, reductions, classification

15A22 Matrix pencils [See also 47A56]

15A23 Factorization of matrices

15A24 Matrix equations and identities

15A27 Commutativity of matrices

15A29 Inverse problems in linear algebra

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

15A39 Linear inequalities of matrices

15A42 Inequalities involving eigenvalues and eigenvectors

15A45 Miscellaneous inequalities involving matrices

15A54 Matrices over function rings in one or more variables

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

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

15A66 Clifford algebras, spinors

15A67 Applications of Clifford algebras to physics, etc.

15A69 Multilinear algebra, tensor calculus

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

15A75 Exterior algebra, Grassmann algebras

15A78 Other algebras built from modules

15A80 Max-plus and related algebras

15A83 Matrix completion problems

15A86 Linear preserver problems

15A99 None of the above, but in this section

15Bxx Special matrices

15B05 Toeplitz, Cauchy, and related matrices

15B10 Orthogonal matrices

15B15 Fuzzy matrices

15B30 Matrix Lie algebras

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

15B34 Boolean and Hadamard matrices

15B35 Sign pattern matrices

15B36 Matrices of integers [See also 11C20]

15B48 Positive matrices and their generalizations; cones of matrices

15B51 Stochastic matrices

15B52 Random matrices (algebraic aspects) {For probabilistic aspects, see 60B20}

15B57 Hermitian, skew-Hermitian, and related matrices

15B99 None of the above, but in this section

16-XX Associative rings and algebras {For the commutative case, see 13-XX}

16-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to associative rings and algebras

16-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to associative rings and algebras

16-02 Research exposition (monographs, survey articles) pertaining to associative rings and algebras

16-03 History of associative rings and algebras [Consider also classification numbers pertaining to Section 01]

16-04 Software, source code, etc. for problems pertaining to associative rings and algebras

16-06 Proceedings, conferences, collections, etc. pertaining to associative rings and algebras

16-11 Research data for problems pertaining to associative rings and algebras

16Bxx General and miscellaneous

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

16B70 Applications of logic in associative algebras [See also 03Cxx]

16B99 None of the above, but in this section

16Dxx Modules, bimodules and ideals in associative algebras

16D10 General module theory in associative algebras

16D20 Bimodules in associative algebras

16D25 Ideals in associative algebras

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

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

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

16D60 Simple and semisimple modules, primitive rings and ideals in associative algebras

16D70 Structure and classification for modules, bimodules and ideals (except as in 16Gxx), direct sum decomposition and cancellation in associative algebras)

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

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

16D99 None of the above, but in this section

16Exx Homological methods in associative algebras {For commutative rings, see 13Dxx; for general categories, see 18Gxx}

16E05 Syzygies, resolutions, complexes in associative algebras

16E10 Homological dimension in associative algebras

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

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

16E35 Derived categories and associative algebras

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

16E45 Differential graded algebras and applications (associative algebraic aspects)

16E50 von Neumann regular rings and generalizations (associative algebraic aspects)

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

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

16E99 None of the above, but in this section

16Gxx Representation theory of associative rings and algebras

16G10 Representations of associative Artinian rings

16G20 Representations of quivers and partially ordered sets

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

16G50 Cohen-Macaulay modules in associative algebras

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

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

16G99 None of the above, but in this section

16Hxx Associative algebras and orders {For arithmetic aspects, see 11R52, 11R54, 11S45; for representation theory, see 16G30}

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

16H10 Orders in separable algebras

16H15 Commutative orders

16H20 Lattices over orders

16H99 None of the above, but in this section

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

16K20 Finite-dimensional division rings {For crossed products, see 16S35}

16K40 Infinite-dimensional and general division rings

16K50 Brauer groups (algebraic aspects) [See also 12G05, 14F22]

16K99 None of the above, but in this section

16Lxx Local rings and generalizations

16L30 Noncommutative local and semilocal rings, perfect rings

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

16L99 None of the above, but in this section

16Nxx Radicals and radical properties of associative rings

16N20 Jacobson radical, quasimultiplication

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

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

16N80 General radicals and associative 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 for associative rings and algebras

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

16P20 Artinian rings and modules (associative rings and algebras)

16P40 Noetherian rings and modules (associative rings and algebras)

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

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

16P70 Chain conditions on other classes of submodules, ideals, subrings, etc.; coherence (associative rings and algebras)

16P90 Growth rate, Gelfand-Kirillov dimension

16P99 None of the above, but in this section

16Rxx Rings with polynomial identity

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

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

16R30 Trace rings and invariant theory (associative rings and algebras)

16R40 Identities other than those of matrices over commutative rings

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

16R60 Functional identities (associative rings and algebras)

16R99 None of the above, but in this section

16Sxx Associative rings and algebras arising under various constructions

16S10 Associative 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 (associative algebraic aspects) [See also 13N10, 32C38]

16S34 Group rings [See also 20C05, 20C07], Laurent polynomial rings (associative algebraic aspects)

16S35 Twisted and skew group rings, crossed products

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

16S37 Quadratic and Koszul algebras

16S38 Rings arising from noncommutative algebraic geometry [See also 14A22]

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

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

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

16S70 Extensions of associative rings by ideals

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

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

16S88 Leavitt path algebras

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

16S99 None of the above, but in this section

16Txx Hopf algebras, quantum groups and related topics

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

16T10 Bialgebras

16T15 Coalgebras and comodules; corings

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

16T25 Yang-Baxter equations

16T30 Connections of Hopf algebras with combinatorics

16T99 None of the above, but in this section

16Uxx Conditions on elements

16U10 Integral domains (associative rings and algebras)

16U20 Ore rings, multiplicative sets, Ore localization

16U30 Divisibility, noncommutative UFDs

16U40 Idempotent elements (associative rings and algebras)

16U60 Units, groups of units (associative rings and algebras)

16U70 Center, normalizer (invariant elements) (associative rings and algebras)

16U80 Generalizations of commutativity (associative rings and algebras)

16U90 Generalized inverses (associative rings and algebras)

16U99 None of the above, but in this section

16Wxx Associative rings and algebras with additional structure

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

16W20 Automorphisms and endomorphisms

16W22 Actions of groups and semigroups; invariant theory (associative rings and algebras)

16W25 Derivations, actions of Lie algebras

16W50 Graded rings and modules (associative rings and algebras)

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

16W60 Valuations, completions, formal power series and related constructions (associative rings and algebras) [See also 13Jxx]

16W70 Filtered associative rings; filtrational and graded techniques

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

16W99 None of the above, but in this section

16Yxx Generalizations {For nonassociative rings, see 17-XX}

16Y20 Hyperrings

16Y30 Near-rings [See also 12K05]

16Y60 Semirings [See also 12K10]

16Y80 Γ and fuzzy structures

16Y99 None of the above, but in this section

16Zxx Computational aspects of associative rings {For software etc., see 16-04}

16Z05 Computational aspects of associative rings (general theory) [See also 68W30]

16Z10 Gröbner-Shirshov bases

16Z99 None of the above, but in this section

17-XX Nonassociative rings and algebras

17-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to nonassociative rings and algebras

17-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to nonassociative rings and algebras

17-02 Research exposition (monographs, survey articles) pertaining to nonassociative rings and algebras

17-03 History of nonassociative rings and algebras [Consider also classification numbers pertaining to Section 01]

17-04 Software, source code, etc. for problems pertaining to nonassociative rings and algebras

17-06 Proceedings, conferences, collections, etc. pertaining to nonassociative rings and algebras

17-08 Computational methods for problems pertaining to nonassociative rings and algebras

17-11 Research data for problems pertaining to nonassociative rings and algebras

17Axx General nonassociative rings

17A01 General theory of nonassociative rings and algebras

17A05 Power-associative rings

17A15 Noncommutative Jordan algebras

17A20 Flexible algebras

17A30 Nonassociative algebras satisfying other identities

17A32 Leibniz algebras

17A35 Nonassociative division algebras

17A36 Automorphisms, derivations, other operators (nonassociative rings and algebras)

17A40 Ternary compositions

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

17A45 Quadratic algebras (but not quadratic Jordan algebras)

17A50 Free nonassociative algebras

17A60 Structure theory for nonassociative algebras

17A61 Gröbner-Shirshov bases in nonassociative algebras

17A65 Radical theory (nonassociative rings and algebras)

17A70 Superalgebras

17A75 Composition algebras

17A80 Valued algebras

17A99 None of the above, but in this section

17Bxx Lie algebras and Lie superalgebras {For Lie groups, see 22Exx}

17B01 Identities, free Lie (super)algebras

17B05 Structure theory for Lie algebras and superalgebras

17B08 Coadjoint orbits; nilpotent varieties

17B10 Representations of Lie algebras and Lie superalgebras, algebraic theory (weights)

17B15 Representations of Lie algebras and Lie superalgebras, analytic theory

17B20 Simple, semisimple, reductive (super)algebras

17B22 Root systems

17B25 Exceptional (super)algebras

17B30 Solvable, nilpotent (super)algebras

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

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

17B38 Yang-Baxter equations and Rota-Baxter operators

17B40 Automorphisms, derivations, other operators for Lie algebras and super algebras

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

17B50 Modular Lie (super)algebras

17B55 Homological methods in Lie (super)algebras

17B56 Cohomology of Lie (super)algebras

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

17B61 Hom-Lie and related algebras

17B62 Lie bialgebras; Lie coalgebras

17B63 Poisson algebras

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

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

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

17B68 Virasoro and related algebras

17B69 Vertex operators; vertex operator algebras and related structures

17B70 Graded Lie (super)algebras

17B75 Color Lie (super)algebras

17B80 Applications of Lie algebras and superalgebras to integrable systems

17B81 Applications of Lie (super)algebras to physics, etc.

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 for Jordan algebras

17C17 Radicals in Jordan algebras

17C20 Simple, semisimple Jordan algebras

17C27 Idempotents, Peirce decompositions

17C30 Associated groups, automorphisms of Jordan algebras

17C36 Associated manifolds of Jordan algebras

17C37 Associated geometries of Jordan algebras

17C40 Exceptional Jordan structures

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

17C55 Finite-dimensional structures of Jordan algebras

17C60 Division algebras and Jordan algebras

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

17C70 Super structures

17C90 Applications of Jordan algebras to physics, etc.

17C99 None of the above, but in this section

17Dxx Other nonassociative rings and algebras

17D05 Alternative rings

17D10 Mal'tsev rings and algebras

17D15 Right alternative rings

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

17D25 Lie-admissible algebras

17D30 (non-Lie) Hom algebras and topics

17D92 Genetic algebras

17D99 None of the above, but in this section

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

18-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to category theory

18-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to category theory

18-02 Research exposition (monographs, survey articles) pertaining to category theory

18-03 History of category theory [Consider also classification numbers pertaining to Section 01]

18-04 Software, source code, etc. for problems pertaining to category theory

18-06 Proceedings, conferences, collections, etc. pertaining to category theory

18-08 Computational methods for problems pertaining to category theory

18-11 Research data for problems pertaining to category theory

18Axx General theory of categories and functors

18A05 Definitions and generalizations in theory of categories

18A10 Graphs, diagram schemes, precategories

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

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

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

18A23 Natural morphisms, dinatural morphisms

18A25 Functor categories, comma categories

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

18A32 Factorization systems, substructures, quotient structures, congruences, amalgams

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

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

18A50 Graded categories (general) {For dg categories, see 18G35}

18A99 None of the above, but in this section

18Bxx Special categories

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

18B10 Categories of spans/cospans, relations, or partial maps

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

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

18B25 Topoi [See also 03G30, 18F10]

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

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

18B50 Extensive, distributive, and adhesive categories

18B99 None of the above, but in this section

18Cxx Categories and theories

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

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

18C15 Monads (= standard construction, triple or triad), algebras for monads, homology and derived functors for monads [See also 18Gxx] {For functional programming, see also 68N18}

18C20 Eilenberg-Moore and Kleisli constructions for monads

18C30 Sketches and generalizations

18C35 Accessible and locally presentable categories

18C40 Structured objects in a category (group objects, etc.)

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

18C99 None of the above, but in this section

18Dxx Categorical structures

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

18D20 Enriched categories (over closed or monoidal categories)

18D25 Actions of a monoidal category, tensorial strength {For functional programming, see also 68N18}

18D30 Fibered categories

18D40 Internal categories and groupoids {For double categories, see 18N10; for topological groupoids, see 22A22; for Lie groupoids, see 58H05}

18D60 Profunctors (= correspondences, distributors, modules)

18D65 Proarrow equipments, Yoneda structures, KZ doctrines (lax idempotent monads)

18D70 Formal category theory

18D99 None of the above, but in this section

18Exx Categorical algebra

18E05 Preadditive, additive categories

18E08 Regular categories, Barr-exact categories

18E10 Abelian categories, Grothendieck categories

18E13 Protomodular categories, semi-abelian categories, Mal'tsev categories [See also 08B05 and 18B10]

18E20 Categorical embedding theorems [See also 18B15]

18E35 Localization of categories, calculus of fractions {For homotopical aspects, see also 18N45, 55P60}

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

18E45 Definable subcategories and connections with model theory [See also 13C60]

18E50 Categorical Galois theory

18E99 None of the above, but in this section

18Fxx Categories in geometry and topology

18F05 Local categories and functors

18F10 Grothendieck topologies and Grothendieck topoi [See also 14F20, 18B25]

18F15 Abstract manifolds and fiber bundles (category-theoretic aspects) [See also 55Rxx, 57Pxx]

18F20 Presheaves and sheaves, stacks, descent conditions (category-theoretic aspects) [See also 14F06, 14F08, 32C35, 32L10, 54B40, 55N30]

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

18F30 Grothendieck groups (category-theoretic aspects) [See also 13D15, 16E20, 19Axx]

18F40 Synthetic differential geometry, tangent categories, differential categories

18F50 Goodwillie calculus and functor calculus

18F60 Categories of topological spaces and continuous mappings [See also 54-XX]

18F70 Frames and locales, pointfree topology, Stone duality [See also 06D22, 18B35]

18F75 Quantales [See also 06F07, 18B35]

18F99 None of the above, but in this section

18Gxx Homological algebra in category theory, derived categories and functors [See also 13Dxx, 16Exx, 20Jxx, 55Nxx, 55Uxx, 57Txx]

18G05 Projectives and injectives (category-theoretic aspects) [See also 13C10, 13C11, 16D40, 16D50]

18G10 Resolutions; derived functors (category-theoretic aspects) [See also 13D02, 16E05, 18Gxx]

18G15 Ext and Tor, generalizations, Künneth formula (category-theoretic aspects) [See also 55U25]

18G20 Homological dimension (category-theoretic aspects) [See also 13D05, 16E10]

18G25 Relative homological algebra, projective classes (category-theoretic aspects)

18G31 Simplicial modules and Dold-Kan correspondence

18G35 Chain complexes (category-theoretic aspects), dg categories [See also 14F08, 18G80, 55U15]

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

18G45 2-groups, crossed modules, crossed complexes

18G50 Nonabelian homological algebra (category-theoretic aspects)

18G65 Stable module categories [See also 20C20]

18G70 A_∞-categories, relations with homological mirror symmetry [See also 14F08, 14J33, 53D37]

18G80 Derived categories, triangulated categories

18G85 Graph complexes and graph homology {For relations with deformation quantization, see 53D55}

18G90 Other (co)homology theories (category-theoretic aspects) [See also 19D55, 46L80, 58J20, 58J22]

18G99 None of the above, but in this section

18Mxx Monoidal categories and operads

18M05 Monoidal categories, symmetric monoidal categories [See also 19D23]

18M10 Traced monoidal categories, compact closed categories, star-autonomous categories

18M15 Braided monoidal categories and ribbon categories {For applications to knot theory, see also 57Kxx; for applications to quantum groups, see also 16T20, 17B37, 81R50}

18M20 Fusion categories, modular tensor categories, modular functors {For applications to topological quantum field theories, see also 57R56; for applications to conformal field theories, see also 81T40}

18M25 Tannakian categories {For applications to motives, see also 14C15, 19E15}

18M30 String diagrams and graphical calculi

18M35 Categories of networks and processes, compositionality

18M40 Dagger categories, categorical quantum mechanics [See also 81P68]

18M45 Categorical aspects of linear logic [See also 03B47]

18M50 Bimonoidal, skew-monoidal, duoidal categories

18M60 Operads (general)

18M65 Non-symmetric operads, multicategories, generalized multicategories

18M70 Algebraic operads, cooperads, and Koszul duality

18M75 Topological and simplicial operads [See also 18N60]

18M80 Species, Hopf monoids, operads in combinatorics

18M85 Polycategories/dioperads, properads, PROPs, cyclic operads, modular operads

18M90 Globular operads

18M99 None of the above, but in this section

18Nxx Higher categories and homotopical algebra

18N10 2-categories, bicategories, double categories

18N15 2-dimensional monad theory [See also 18C15]

18N20 Tricategories, weak n-categories, coherence, semi-strictification

18N25 Categorification

18N30 Strict omega-categories, computads, polygraphs

18N40 Homotopical algebra, Quillen model categories, derivators [See also 55U35]

18N45 Categories of fibrations, relations to K-theory, relations to type theory

18N50 Simplicial sets, simplicial objects [See also 55U10]

18N55 Localizations (e.g., simplicial localization, Bousfield localization) [See also 18E35, 55P60]

18N60 $(\infty, 1)$-categories (quasi-categories, Segal spaces, etc.); ∞-topoi, stable ∞-categories [See also 55U35, 55U40]

18N65 (∞, n)-categories and (∞, ∞)-categories

18N70 ∞-operads and higher algebra [See also 18M75]

18N99 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.) pertaining to K-theory

19-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to K-theory

19-02 Research exposition (monographs, survey articles) pertaining to K-theory

19-03 History of K-theory [Consider also classification numbers pertaining to Section 01]

19-04 Software, source code, etc. for problems pertaining to K-theory

19-06 Proceedings, conferences, collections, etc. pertaining to K-theory

19-08 Computational methods for problems pertaining to K-theory

19-11 Research data for problems pertaining to K-theory

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

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

19A15 Efficient generation of modules

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 18M05]

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 18G90]

19D99 None of the above, but in this section

19Exx K-theory in geometry

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

19E15 Algebraic cycles and motivic cohomology (K-theoretic aspects) [See also 14C25, 14C35, 14F42]

19E20 Relations of K-theory 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 (K-theoretic aspects) [See also 11G45]

19F15 Symbols and arithmetic (K-theoretic aspects) [See also 11R37]

19F27 Étale cohomology, higher regulators, zeta and L-functions (K-theoretic aspects) [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 (K-theoretic aspects) [See also 57R67]

19J35 Obstructions to group actions (K-theoretic aspects)

19J99 None of the above, but in this section

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

19K14 K_0 as an ordered group, traces

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

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

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

19K99 None of the above, but in this section

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

19L10 Riemann-Roch theorems, Chern characters

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

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

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

19L50 Twisted K-theory; differential K-theory

19L64 Geometric applications of topological K-theory

19L99 None of the above, but in this section

19Mxx Miscellaneous applications of K-theory

19M05 Miscellaneous applications of K-theory

19M99 None of the above, but in this section

20-XX Group theory and generalizations

20-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to group theory

20-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to group theory

20-02 Research exposition (monographs, survey articles) pertaining to group theory

20-03 History of group theory [Consider also classification numbers pertaining to Section 01]

20-04 Software, source code, etc. for problems pertaining to group theory

20-06 Proceedings, conferences, collections, etc. pertaining to group theory

20-08 Computational methods for problems pertaining to group theory

20-11 Research data for problems pertaining to group theory

20Axx Foundations

20A05 Axiomatics and elementary properties of groups

20A10 Metamathematical considerations in group theory {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 permutation groups

20B07 General theory for infinite permutation groups

20B10 Characterization theorems for permutation groups

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

20B99 None of the above, but in this section

20Cxx Representation theory of groups {For representation rings and Burnside rings, see also 19A22}

20C05 Group rings of finite groups and their modules (group-theoretic aspects) [See also 16S34]

20C07 Group rings of infinite groups and their modules (group-theoretic aspects) [See also 16S34]

20C08 Hecke algebras and their representations

20C10 Integral representations of finite groups

20C11 p-adic representations of finite groups

20C12 Integral representations of infinite groups

20C15 Ordinary representations and characters

20C20 Modular representations and characters

20C25 Projective representations and 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 and other areas of science

20C99 None of the above, but in this section

20Dxx Abstract finite groups

20D05 Finite simple groups and their classification

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

20D08 Simple groups: sporadic groups

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

20D15 Finite 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 of abstract finite groups

20D40 Products of subgroups of abstract finite groups

20D45 Automorphisms of abstract finite groups

20D60 Arithmetic and combinatorial problems involving abstract finite groups

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 of groups, free products with amalgamation, Higman-Neumann-Neumann extensions, and generalizations

20E07 Subgroup theorems; subgroup growth

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

20E10 Quasivarieties and varieties of groups

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

20E18 Limits, profinite groups

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

20E25 Local properties of groups

20E26 Residual properties and generalizations; residually finite groups

20E28 Maximal subgroups

20E32 Simple groups [See also 20D05]

20E34 General structure theorems for groups

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

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

20E45 Conjugacy classes for groups

20E99 None of the above, but in this section

20Fxx Special aspects of infinite or finite groups

20F05 Generators, relations, and presentations of groups

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

20F10 Word problems, other decision problems, connections with logic and automata (group-theoretic aspects) [See also 03B25, 03D05, 03D40, 06B25, 08A50, 20M05, 68Q70]

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

20F12 Commutator calculus

20F14 Derived series, central series, and generalizations for groups

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

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

20F18 Nilpotent groups [See also 20D15]

20F19 Generalizations of solvable and nilpotent groups

20F22 Other classes of groups defined by subgroup chains

20F24 FC-groups and their generalizations

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

20F29 Representations of groups as automorphism groups of algebraic systems

20F34 Fundamental groups and their automorphisms (group-theoretic aspects) [See also 57M05, 57Sxx]

20F36 Braid groups; Artin groups

20F38 Other groups related to topology or analysis

20F40 Associated Lie structures for groups

20F45 Engel conditions

20F50 Periodic groups; locally finite groups

20F55 Reflection and Coxeter groups (group-theoretic aspects) [See also 22E40, 51F15]

20F60 Ordered groups (group-theoretic aspects) [See mainly 06F15]

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

20F67 Hyperbolic groups and nonpositively curved groups

20F69 Asymptotic properties of groups

20F70 Algebraic geometry over groups; equations over groups

20F99 None of the above, but in this section

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

20G05 Representation theory for linear algebraic groups

20G07 Structure theory for linear algebraic groups

20G10 Cohomology theory for linear algebraic groups

20G15 Linear algebraic groups over arbitrary fields

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

20G25 Linear algebraic groups over local fields and their integers

20G30 Linear algebraic groups over global fields and their integers

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

20G40 Linear algebraic groups over finite fields

20G41 Exceptional groups

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

20G43 Schur and q-Schur algebras

20G44 Kac-Moody groups

20G45 Applications of linear algebraic groups to the sciences

20G99 None of the above, but in this section

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

20H05 Unimodular groups, congruence subgroups (group-theoretic aspects) [See also 11F06, 19B37, 22E40, 51F20]

20H10 Fuchsian groups and their generalizations (group-theoretic aspects) [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 of group theory with homological algebra and category theory

20J05 Homological methods in group theory

20J06 Cohomology of groups

20J15 Category of groups

20J99 None of the above, but in this section

20Kxx Abelian groups

20K01 Finite abelian groups {For sumsets, see 11B13, 11P70}

20K10 Torsion groups, primary groups and generalized primary groups

20K15 Torsion-free groups, finite rank

20K20 Torsion-free groups, infinite rank

20K21 Mixed groups

20K25 Direct sums, direct products, etc. for abelian groups

20K27 Subgroups of abelian groups

20K30 Automorphisms, homomorphisms, endomorphisms, etc. for abelian groups

20K35 Extensions of abelian groups

20K40 Homological and categorical methods for abelian groups

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

20K99 None of the above, but in this section

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

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

20L99 None of the above, but in this section

20Mxx Semigroups

20M05 Free semigroups, generators and relations, word problems [See also 03D40, 08A50, 20F10]

20M07 Varieties and pseudovarieties of semigroups

20M10 General structure theory for semigroups

20M11 Radical theory for semigroups

20M12 Ideal theory for semigroups

20M13 Arithmetic theory of semigroups

20M14 Commutative semigroups

20M15 Mappings of semigroups

20M17 Regular semigroups

20M18 Inverse semigroups

20M19 Orthodox semigroups

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

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

20M30 Representation of semigroups; actions of semigroups on sets

20M32 Algebraic monoids

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

20M50 Connections of semigroups with homological algebra and category theory

20M75 Generalizations of semigroups

20M99 None of the above, but in this section

20Nxx Other generalizations of groups

20N02 Sets with a single binary operation (groupoids) {For groupoids in connection with category theory, see 20L05; for topological groupoids, see 22A22, 58H05}

20N05 Loops, quasigroups [See also 05Bxx]

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

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

20N20 Hypergroups

20N25 Fuzzy groups [See also 03E72]

20N99 None of the above, but in this section

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

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

20P99 None of the above, but in this section

22-XX Topological groups, Lie groups {For transformation groups, see 54H15, 57Sxx, 58-XX; for abstract harmonic analysis, see 43-XX}

22-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to topological groups

22-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to topological groups

22-02 Research exposition (monographs, survey articles) pertaining to topological groups

22-03 History of topological groups [Consider also classification numbers pertaining to Section 01]

22-04 Software, source code, etc. for problems pertaining to topological groups

22-06 Proceedings, conferences, collections, etc. pertaining to topological groups

22-08 Computational methods for problems pertaining to topological groups

22-11 Research data for problems pertaining to topological groups

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

22A05 Structure of general topological groups

22A10 Analysis on general topological groups

22A15 Structure of topological semigroups

22A20 Analysis on topological semigroups

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

22A25 Representations of general topological groups and semigroups

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

22A30 Other topological algebraic systems and their representations

22A99 None of the above, but in this section

22Bxx Locally compact abelian groups (LCA groups)

22B05 General properties and structure of LCA groups

22B10 Structure of group algebras of LCA groups

22B99 None of the above, but in this section

22Cxx Compact groups

22C05 Compact groups

22C99 None of the above, but in this section

22Dxx Locally compact groups and their algebras

22D05 General properties and structure of locally compact groups

22D10 Unitary representations of locally compact groups

22D12 Other representations of locally compact groups

22D15 Group algebras of locally compact groups

22D20 Representations of group algebras

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

22D30 Induced representations for locally compact groups

22D35 Duality theorems for locally compact groups

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

22D45 Automorphism groups of locally compact groups

22D50 Rigidity in locally compact groups

22D55 Kazhdan's property (T), the Haagerup property, and generalizations

22D99 None of the above, but in this section

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

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

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

22E15 General properties and structure of real Lie groups

22E20 General properties and structure of other Lie groups

22E25 Nilpotent and solvable Lie groups

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

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

22E35 Analysis on p-adic Lie groups

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

22E41 Continuous cohomologyof Lie groups [See also 57R32, 57Txx, 58H10]

22E43 Structure and representation of the Lorentz group

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

22E46 Semisimple Lie groups and their representations

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

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

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

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

22E60 Lie algebras of Lie groups {For the algebraic theory of Lie algebras, see 17Bxx}

22E65 Infinite-dimensional Lie groups and their Lie algebras: general properties [See also 17B65, 58B25, 58D05 58H05]

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

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

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

22E99 None of the above, but in this section

22Fxx Noncompact transformation groups

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

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

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

22F50 Groups as automorphisms of other structures

22F99 None of the above, but in this section

26-XX Real functions [See also 54C30]

26-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to real functions

26-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to real functions

26-02 Research exposition (monographs, survey articles) pertaining to real functions

26-03 History of real functions [Consider also classification numbers pertaining to Section 01]

26-04 Software, source code, etc. for problems pertaining to real functions

26-06 Proceedings, conferences, collections, etc. pertaining to real functions

26-08 Computational methods for problems pertaining to real functions

26-11 Research data for problems pertaining to real functions

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 real functions in one variable {For properties determined by Fourier coefficients, see 42A16; for those determined by approximation properties, see 41A25, 41A27}

26A16 Lipschitz (Hölder) classes

26A18 Iteration of real functions in one variable [See also 37Bxx, 37Cxx, 37Exx, 39B12, 47H10, 54H25]

26A21 Classification of real functions; Baire classification of sets and functions [See also 03E15, 28A05, 54C50, 54H05]

26A24 Differentiation (real 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 real functions in one variable

26A48 Monotonic functions, generalizations

26A51 Convexity of real functions in one variable, 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 of real functions of several variables: length, area, volume [See also 28A75, 51M25]

26B20 Integral formulas of real functions of several variables (Stokes, Gauss, Green, etc.)

26B25 Convexity of real functions of several variables, generalizations

26B30 Absolutely continuous real functions of several variables, 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 in real analysis

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

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

26C15 Real rational functions [See also 14Pxx]

26C99 None of the above, but in this section

26Dxx Inequalities in real analysis {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 in real functions [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, 49J53, 54C60] {For nonsmooth analysis, see 49J52, 58Cxx, 90Cxx}

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

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

26E40 Constructive real analysis [See also 03F60]

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

26E60 Means [See also 47A64]

26E70 Real analysis on time scales or measure chains {For dynamic equations on time scales or measure chains, see 34N05}

26E99 None of the above, but in this section

28-XX Measure and integration {For analysis on manifolds, see 58-XX}

28-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to measure and integration

28-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to measure and integration

28-02 Research exposition (monographs, survey articles) pertaining to measure and integration

28-03 History of measure and integration [Consider also classification numbers pertaining to Section 01]

28-04 Software, source code, etc. for problems pertaining to measure and integration

28-06 Proceedings, conferences, collections, etc. pertaining to measure and integration

28-08 Computational methods for problems pertaining to measure and integration

28-11 Research data for problems pertaining to measure and integration

28Axx Classical measure theory

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

28A10 Real- or complex-valued set functions

28A12 Contents, measures, outer measures, capacities

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

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

28A25 Integration with respect to measures and other set functions

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

28A35 Measures and integrals in product spaces

28A50 Integration and disintegration of measures

28A51 Lifting theory [See also 46G15]

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

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

28A78 Hausdorff and packing measures

28A80 Fractals [See also 37Fxx]

28A99 None of the above, but in this section

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

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

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

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

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

28B99 None of the above, but in this section

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

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

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

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

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

28C99 None of the above, but in this section

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

28D05 Measure-preserving transformations {For measure-preserving transformations and dynamical systems, see 37A05}

28D10 One-parameter continuous families of measure-preserving transformations {For dynamical systems aspect, see 37A10}

28D15 General groups of measure-preserving transformations {For dynamical systems aspects, see 37A15}

28D20 Entropy and other invariants

28D99 None of the above, but in this section

28Exx Miscellaneous topics in measure theory

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

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

28E15 Other connections with logic and set theory

28E99 None of the above, but in this section

30-XX Functions of a complex variable

30-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to functions of a complex variable

30-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to functions of a complex variable

30-02 Research exposition (monographs, survey articles) pertaining to functions of a complex variable

30-03 History of functions of a complex variable [Consider also classification numbers pertaining to Section 01]

30-04 Software, source code, etc. for problems pertaining to functions of a complex variable

30-06 Proceedings, conferences, collections, etc. pertaining to functions of a complex variable

30-08 Computational methods for problems pertaining to functions of a complex variable [See also 65Exx]

30-11 Research data for problems pertaining to functions of a complex variable

30Axx General properties of functions of one complex variable

30A05 Monogenic and polygenic functions of one complex variable

30A10 Inequalities in the complex plane

30A99 None of the above, but in this section

30Bxx Series expansions of functions of one complex variable

30B10 Power series (including lacunary series) in one complex variable

30B20 Random power series in one complex variable

30B30 Boundary behavior of power series in one complex variable; over-convergence

30B40 Analytic continuation of functions of one complex variable

30B50 Dirichlet series, exponential series and other series in one complex variable [See also 11M41, 42-XX]

30B60 Completeness problems, closure of a system of functions of one complex variable

30B70 Continued fractions; complex-analytic aspects [See also 11A55, 40A15]

30B99 None of the above, but in this section

30Cxx Geometric function theory

30C10 Polynomials and rational functions of one complex variable

30C15 Zeros of polynomials, rational functions, and other analytic functions of one complex variable (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 Schwarz-Christoffel-type mappings [See also 65E10]

30C35 General theory of conformal mappings

30C40 Kernel functions in one complex variable and applications

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

30C50 Coefficient problems for univalent and multivalent functions of one complex variable

30C55 General theory of univalent and multivalent functions of one complex variable

30C62 Quasiconformal mappings in the complex plane

30C65 Quasiconformal mappings in $\mathbb{R}^n$, 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 of one complex variable, and related topics

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

30D10 Representations of entire functions of one complex variable by series and integrals

30D15 Special classes of entire functions of one complex variable and growth estimates

30D20 Entire functions of one complex variable, general theory

30D30 Meromorphic functions of one complex variable, general theory

30D35 Value distribution of meromorphic functions of one complex variable, Nevanlinna theory

30D40 Cluster sets, prime ends, boundary behavior

30D45 Normal functions of one complex variable, normal families

30D60 Quasi-analytic and other classes of functions of one complex variable

30D99 None of the above, but in this section

30Exx Miscellaneous topics of analysis in the complex plane

30E05 Moment problems and interpolation problems in the complex plane

30E10 Approximation in the complex plane

30E15 Asymptotic representations in the complex plane

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

30E25 Boundary value problems in the complex plane [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 for Riemann surfaces

30F30 Differentials on Riemann surfaces

30F35 Fuchsian groups and automorphic functions (aspects of compact Riemann surfaces and uniformization) [See also 11Fxx, 20H10, 22E40, 32Gxx, 32Nxx]

30F40 Kleinian groups (aspects of compact Riemann surfaces and uniformization) [See also 20H10]

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

30F50 Klein surfaces

30F60 Teichmüller theory for Riemann surfaces [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 and 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

30Hxx Spaces and algebras of analytic functions of one complex variable

30H05 Spaces of bounded analytic functions of one complex variable

30H10 Hardy spaces [See also 42B30, 46E30]

30H15 Nevanlinna spaces and Smirnov spaces

30H20 Bergman spaces and Fock spaces [See also 46E30, 46E35]

30H25 Besov spaces and Q_p-spaces

30H30 Bloch spaces

30H35 BMO-spaces

30H40 Zygmund spaces

30H45 de Branges-Rovnyak spaces

30H50 Algebras of analytic functions of one complex variable

30H80 Corona theorems

30H99 None of the above, but in this section

30Jxx Function theory on the disc

30J05 Inner functions of one complex variable

30J10 Blaschke products

30J15 Singular inner functions of one complex variable

30J99 None of the above, but in this section

30Kxx Universal holomorphic functions of one complex variable

30K05 Universal Taylor series in one complex variable

30K10 Universal Dirichlet series in one complex variable

30K15 Universal functions of one complex variable

30K20 Compositional universality

30K99 None of the above, but in this section

30Lxx Analysis on metric spaces

30L05 Geometric embeddings of metric spaces

30L10 Quasiconformal mappings in metric spaces

30L15 Inequalities in metric spaces

30L99 None of the above, but in this section

31-XX Potential theory {For probabilistic potential theory, see 60J45}

31-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to potential theory

31-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to potential theory

31-02 Research exposition (monographs, survey articles) pertaining to potential theory

31-03 History of potential theory [Consider also classification numbers pertaining to Section 01]

31-04 Software, source code, etc. for problems pertaining to potential theory

31-06 Proceedings, conferences, collections, etc. pertaining to potential theory

31-08 Computational methods for problems pertaining to potential theory [See also 65Exx]

31-11 Research data for problems pertaining to potential theory

31Axx Two-dimensional potential theory

31A05 Harmonic, subharmonic, superharmonic functions in two dimensions

31A10 Integral representations, integral operators, integral equations methods in two dimensions

31A15 Potentials and capacity, harmonic measure, extremal length and related notions in two dimensions [See also 30C85]

31A20 Boundary behavior (theorems of Fatou type, etc.) of harmonic functions in two dimensions

31A25 Boundary value and inverse problems for harmonic functions in two dimensions

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

31A35 Connections of harmonic functions with differential equations in two dimensions

31A99 None of the above, but in this section

31Bxx Higher-dimensional potential theory

31B05 Harmonic, subharmonic, superharmonic functions in higher dimensions

31B10 Integral representations, integral operators, integral equations methods in higher dimensions

31B15 Potentials and capacities, extremal length and related notions in higher dimensions

31B20 Boundary value and inverse problems for harmonic functions in higher dimensions

31B25 Boundary behavior of harmonic functions in higher dimensions

31B30 Biharmonic and polyharmonic equations and functions in higher dimensions

31B35 Connections of harmonic functions with differential equations in higher dimensions

31B99 None of the above, but in this section

31Cxx Generalizations of potential theory

31C05 Harmonic, subharmonic, superharmonic functions on other spaces

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

31C12 Potential theory on Riemannian manifolds and other spaces [See also 53C20] {For Hodge theory, see 58A14}

31C15 Potentials and capacities on other spaces

31C20 Discrete potential theory

31C25 Dirichlet forms

31C35 Martin boundary theory [See also 60J50]

31C40 Fine potential theory; fine properties of sets and functions

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

31C99 None of the above, but in this section

31Dxx Axiomatic potential theory

31D05 Axiomatic potential theory

31D99 None of the above, but in this section

31Exx Potential theory on fractals and metric spaces

31E05 Potential theory on fractals and metric spaces

31E99 None of the above, but in this section

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.) pertaining to several complex variables and analytic spaces

32-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to several complex variables and analytic spaces

32-02 Research exposition (monographs, survey articles) pertaining to several complex variables and analytic spaces

32-03 History of several complex variables and analytic spaces [Consider also classification numbers pertaining to Section 01]

32-04 Software, source code, etc. for problems pertaining to several complex variables and analytic spaces

32-06 Proceedings, conferences, collections, etc. pertaining to several complex variables and analytic spaces

32-08 Computational methods for problems pertaining to several complex variables and analytic spaces [See also 65Exx]

32-11 Research data for problems pertaining to several complex variables and analytic spaces

32Axx Holomorphic functions of several complex variables

32A05 Power series, series of functions of several complex variables

32A08 Polynomials and rational functions of several complex variables

32A10 Holomorphic functions of several complex variables

32A12 Multifunctions of several complex variables

32A15 Entire functions of several complex variables

32A17 Special families of functions of several complex variables

32A18 Bloch functions, normal functions of several complex variables

32A19 Normal families of holomorphic functions, mappings of several complex variables, and related topics (taut manifolds etc.)

32A20 Meromorphic functions of several complex variables

32A22 Nevanlinna theory; growth estimates; other inequalities of several complex variables {For geometric theory, see 32H25, 32H30}

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

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

32A27 Residues for several complex variables [See also 32C30]

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

32A35 H^p-spaces, Nevanlinna spaces of functions in several complex variables [See also 32M15, 42B30, 43A85, 46J15]

32A36 Bergman spaces of functions in several complex variables

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

32A38 Algebras of holomorphic functions of several complex variables [See also 46J10, 46J15]

32A40 Boundary behavior of holomorphic functions of several complex variables

32A45 Hyperfunctions [See also 46F15]

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

32A55 Singular integrals of functions in several complex variables

32A60 Zero sets of holomorphic functions of several complex variables

32A65 Banach algebra techniques applied to functions of several complex variables [See also 46Jxx]

32A70 Functional analysis techniques applied to functions of several complex variables [See also 46Exx]

32A99 None of the above, but in this section

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

32B05 Analytic algebras and generalizations, preparation theorems

32B10 Germs of analytic sets, local parametrization

32B15 Analytic subsets of affine space

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

32B25 Triangulation and topological properties of semi-analytic andsubanalytic sets, and related questions

32B99 None of the above, but in this section

32Cxx Analytic spaces

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

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

32C09 Embedding of real-analytic manifolds

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

32C15 Complex spaces

32C18 Topology of analytic spaces

32C20 Normal analytic spaces

32C22 Embedding of analytic spaces

32C25 Analytic subsets and submanifolds

32C30 Integration on analytic sets and spaces, currents [See also 32A25, 32A27]

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

32C36 Local cohomology of analytic spaces

32C37 Duality theorems for analytic spaces

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

32C55 The Levi problem in complex spaces; generalizations

32C81 Applications of analytic spaces to physics and other areas of science

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 in several complex variables

32D20 Removable singularities in several complex variables

32D26 Riemann domains

32D99 None of the above, but in this section

32Exx Holomorphic convexity

32E05 Holomorphically convex complex spaces, reduction theory

32E10 Stein spaces, Stein manifolds

32E20 Polynomial convexity, rational convexity, meromorphic convexity in several complex variables

32E30 Holomorphic, polynomial and rational approximation, and interpolation in several complex variables; Runge pairs

32E35 Global boundary behavior of holomorphic functions of several complex variables

32E40 The Levi problem

32E99 None of the above, but in this section

32Fxx Geometric convexity in several complex variables

32F10 q-convexity, q-concavity

32F17 Other notions of convexity in relation to several complex variables

32F18 Finite-type conditions for the boundary of a domain

32F27 Topological consequences of geometric convexity

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

32F45 Invariant metrics and pseudodistances in several complex variables

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 Complex-analytic moduli problems {For algebraic moduli problems, see 14D20, 14D22, 14H10, 14J10} [See also 14H15, 14J15]

32G15 Moduli of Riemann surfaces, Teichmüller theory (complex-analytic aspects in several variables) [See also 14H15, 30Fxx]

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

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

32G81 Applications of deformations of analytic structures to the sciences

32G99 None of the above, but in this section

32Hxx Holomorphic mappings and correspondences

32H02 Holomorphic mappings, (holomorphic) embeddings and related questions in several complex variables

32H04 Meromorphic mappings in several complex variables

32H12 Boundary uniqueness of mappings in several complex variables

32H25 Picard-type theorems and generalizations for several complex variables {For function-theoretic properties, see 32A22}

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

32H35 Proper holomorphic mappings, finiteness theorems

32H40 Boundary regularity of mappings in several complex variables

32H50 Iteration of holomorphic maps, fixed points of holomorphic maps and related problems for several complex variables

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 complex surfaces

32J17 Compact complex 3-folds

32J18 Compact complex n-folds

32J25 Transcendental methods of algebraic geometry (complex-analytic aspects) [See also 14C30]

32J27 Compact Kähler manifolds: generalizations, classification

32J81 Applications of compact analytic spaces to the sciences

32J99 None of the above, but in this section

32Kxx Generalizations of analytic spaces

32K05 Banach analytic manifolds and spaces [See also 46G20, 58Bxx]

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

32K12 Holomorphic maps with infinite-dimensional arguments or values [See also 46G20]

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

32K99 None of the above, but in this section

32Lxx Holomorphic fiber spaces [See also 55Rxx]

32L05 Holomorphic bundles and generalizations

32L10 Sheaves and cohomology of sections of holomorphic vector bundles, general results [See also 14F06, 14H60, 14J60, 18F20, 55N30]

32L15 Bundle convexity [See also 32F10]

32L20 Vanishing theorems

32L25 Twistor theory, double fibrations (complex-analytic aspects) [See also 53C28]

32L81 Applications of holomorphic fiber spaces to the sciences

32L99 None of the above, but in this section

32Mxx Complex spaces with a group of automorphisms

32M05 Complex Lie groups, group actions on complex spaces [See also 22E10]

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

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

32M15 Hermitian symmetric spaces, bounded symmetric domains, Jordan algebras (complex-analytic aspects) [See also 22E10, 22E40, 53C35, 57T15]

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

32M18 Automorphism groups of other complex spaces

32M25 Complex vector fields, holomorphic foliations, $\mathbb{C}$-actions

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 in several complex variables

32N15 Automorphic functions in symmetric domains

32N99 None of the above, but in this section

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

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

32P99 None of the above, but in this section

32Qxx Complex manifolds

32Q02 Special domains (Reinhardt, Hartogs, circular, tube, etc.) in $\mathbb{C}^n$ and complex manifolds

32Q05 Negative curvature complex manifolds

32Q10 Positive curvature complex manifolds

32Q15 Kähler manifolds

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

32Q25 Calabi-Yau theory (complex-analytic aspects) [See also 14J32]

32Q26 Notions of stability for complex manifolds

32Q28 Stein manifolds

32Q30 Uniformization of complex manifolds

32Q35 Complex manifolds as subdomains of Euclidean space

32Q40 Embedding theorems for complex manifolds

32Q45 Hyperbolic and Kobayashi hyperbolic manifolds

32Q55 Topological aspects of complex manifolds

32Q56 Oka principle and Oka manifolds

32Q57 Classification theorems for complex manifolds

32Q60 Almost complex manifolds

32Q65 Pseudoholomorphic curves

32Q99 None of the above, but in this section

32Sxx Complex singularities [See also 58Kxx]

32S05 Local complex singularities [See also 14J17]

32S10 Invariants of analytic local rings

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

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

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

32S25 Complex surface and hypersurface singularities [See also 14J17]

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

32S35 Mixed Hodge theory of singular varieties (complex-analytic aspects) [See also 14C30, 14D07]

32S40 Monodromy; relations with differential equations and D-modules (complex-analytic aspects)

32S45 Modifications; resolution of singularities (complex-analytic aspects) [See also 14E15]

32S50 Topological aspects of complex singularities: Lefschetz theorems, topological classification, invariants

32S55 Milnor fibration; relations with knot theory [See also 57K10, 57K45]

32S60 Stratifications; constructible sheaves; intersection cohomology (complex-analytic aspects) [See also 58Kxx]

32S65 Singularities of holomorphic vector fields and foliations

32S70 Other operations on complex singularities

32S99 None of the above, but in this section

32Txx Pseudoconvex domains

32T05 Domains of holomorphy

32T15 Strongly pseudoconvex domains

32T20 Worm domains

32T25 Finite-type domains

32T27 Geometric and analytic invariants on weakly pseudoconvex boundaries

32T35 Exhaustion functions

32T40 Peak functions

32T99 None of the above, but in this section

32Uxx Pluripotential theory

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

32U10 Plurisubharmonic exhaustion functions

32U15 General pluripotential theory

32U20 Capacity theory and generalizations

32U25 Lelong numbers

32U30 Removable sets in pluripotential theory

32U35 Plurisubharmonic extremal functions, pluricomplex Green functions

32U40 Currents

32U99 None of the above, but in this section

32Vxx CR manifolds

32V05 CR structures, CR operators, and generalizations

32V10 CR functions

32V15 CR manifolds as boundaries of domains

32V20 Analysis on CR manifolds

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

32V30 Embeddings of CR manifolds

32V35 Finite-type conditions on CR manifolds

32V40 Real submanifolds in complex manifolds

32V99 None of the above, but in this section

32Wxx Differential operators in several variables

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

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

32W20 Complex Monge-Ampère operators

32W25 Pseudodifferential operators in several complex variables

32W30 Heat kernels in several complex variables

32W50 Other partial differential equations of complex analysis in several variables

32W99 None of the above, but in this section

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

33-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to special functions

33-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to special functions

33-02 Research exposition (monographs, survey articles) pertaining to special functions

33-03 History of special functions [Consider also classification numbers pertaining to Section 01]

33-04 Software, source code, etc. for problems pertaining to special functions

33-06 Proceedings, conferences, collections, etc. pertaining to special functions

33-11 Research data for problems pertaining to special functions

33Bxx Elementary classical functions

33B10 Exponential and trigonometric functions

33B15 Gamma, beta and polygamma functions

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

33B30 Higher logarithm functions

33B99 None of the above, but in this section

33Cxx Hypergeometric functions

33C05 Classical hypergeometric functions, ${}_2F_1$

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

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

33C20 Generalized hypergeometric series, ${}_pF_q$

33C45 Orthogonal polynomials and functions of hypergeometric type (Jacobi, Laguerre, Hermite, Askey scheme, etc.) {For general orthogonal polynomials and functions, see also 42C05}

33C47 Other special orthogonal polynomials and functions

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

33C52 Orthogonal polynomials and functions associated with root systems

33C55 Spherical harmonics

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

33C65 Appell, Horn and Lauricella functions

33C67 Hypergeometric functions associated with root systems

33C70 Other hypergeometric functions and integrals in several variables

33C75 Elliptic integrals as hypergeometric functions

33C80 Connections of hypergeometric functions with groups and algebras, and related topics

33C90 Applications of hypergeometric functions

33C99 None of the above, but in this section

33Dxx Basic hypergeometric functions

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

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

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

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

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

33D60 Basic hypergeometric integrals and functions defined by them

33D65 Bibasic functions and multiple bases

33D67 Basic hypergeometric functions associated with root systems

33D70 Other basic hypergeometric functions and integrals in several variables

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

33D90 Applications of basic hypergeometric functions

33D99 None of the above, but in this section

33Exx Other special functions

33E05 Elliptic functions and integrals

33E10 Lamé, Mathieu, and spheroidal wave functions

33E12 Mittag-Leffler functions and generalizations

33E15 Other wave functions

33E17 Painlevé-type functions

33E20 Other functions defined by series and integrals

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

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

33E99 None of the above, but in this section

33Fxx Computational aspects of special functions {For software etc., see 33-04}

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

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

33F99 None of the above, but in this section

34-XX Ordinary differential equations

34-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to ordinary differential equations

34-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to ordinary differential equations

34-02 Research exposition (monographs, survey articles) pertaining to ordinary differential equations

34-03 History of ordinary differential equations [Consider also classification numbers pertaining to Section 01]

34-04 Software, source code, etc. for problems pertaining to ordinary differential equations

34-06 Proceedings, conferences, collections, etc. pertaining to ordinary differential equations

34-11 Research data for problems pertaining to ordinary differential equations

34Axx General theory for ordinary differential equations

34A05 Explicit solutions, first integrals of ordinary differential equations

34A06 Generalized ordinary differential equations (measure-differential equations, set-valued differential equations, etc.)

34A07 Fuzzy ordinary differential equations

34A08 Fractional ordinary differential equations and fractional differential inclusions

34A09 Implicit ordinary differential equations, differential-algebraic equations

34A12 Initial value problems, existence, uniqueness, continuous dependence and continuation of solutions to ordinary differential equations

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

34A26 Geometric methods in ordinary differential equations

34A30 Linear ordinary differential equations and systems, general

34A33 Ordinary lattice differential equations

34A34 Nonlinear ordinary differential equations and systems, general theory

34A35 Ordinary differential equations of infinite order

34A36 Discontinuous ordinary differential equations

34A37 Ordinary differential equations with impulses

34A38 Hybrid systems of ordinary differential equations

34A40 Differential inequalities involving functions of a single real variable [See also 26D20]

34A45 Theoretical approximation of solutions to ordinary differential equations {For numerical analysis, see 65Lxx}

34A55 Inverse problems involving ordinary differential equations

34A60 Ordinary differential inclusions [See also 49J21, 49K21]

34A99 None of the above, but in this section

34Bxx Boundary value problems for ordinary differential equations {For ordinary differential operators, see 34Lxx}

34B05 Linear boundary value problems for ordinary differential equations

34B07 Linear boundary value problems for ordinary differential equations with nonlinear dependence on the spectral parameter

34B08 Parameter dependent boundary value problems for ordinary differential equations

34B09 Boundary eigenvalue problems for ordinary differential equations

34B10 Nonlocal and multipoint boundary value problems for ordinary differential equations

34B15 Nonlinear boundary value problems for ordinary differential equations

34B16 Singular nonlinear boundary value problems for ordinary differential equations

34B18 Positive solutions to nonlinear boundary value problems for ordinary differential equations

34B20 Weyl theory and its generalizations for ordinary differential equations

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

34B27 Green's functions for ordinary differential equations

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

34B37 Boundary value problems with impulses for ordinary differential equations

34B40 Boundary value problems on infinite intervals for ordinary differential equations

34B45 Boundary value problems on graphs and networks for ordinary differential equations

34B60 Applications of boundary value problems involving ordinary differential equations

34B99 None of the above, but in this section

34Cxx Qualitative theory for ordinary differential equations [See also 37-XX]

34C05 Topological structure of integral curves, singular points, limit cycles of ordinary differential equations

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

34C08 Ordinary differential equations and connections with real algebraic geometry (fewnomials, desingularization, zeros of abelian integrals, etc.)

34C10 Oscillation theory, zeros, disconjugacy and comparison theory for ordinary differential equations

34C11 Growth and boundedness of solutions to ordinary differential equations

34C12 Monotone systems involving ordinary differential equations

34C14 Symmetries, invariants of ordinary differential equations [See also 37C79]

34C15 Nonlinear oscillations and coupled oscillators for ordinary differential equations

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

34C23 Bifurcation theory for ordinary differential equations [See also 37Gxx]

34C25 Periodic solutions to ordinary differential equations

34C26 Relaxation oscillations for ordinary differential equations

34C27 Almost and pseudo-almost periodic solutions to ordinary differential equations

34C28 Complex behavior and chaotic systems of ordinary differential equations [See also 37Dxx]

34C29 Averaging method for ordinary differential equations

34C37 Homoclinic and heteroclinic solutions to ordinary differential equations

34C40 Ordinary differential equations and systems on manifolds

34C41 Equivalence and asymptotic equivalence of ordinary differential equations

34C45 Invariant manifolds for ordinary differential equations

34C46 Multifrequency systems of ordinary differential equations

34C55 Hysteresis for ordinary differential equations

34C60 Qualitative investigation and simulation of ordinary differential equation models

34C99 None of the above, but in this section

34Dxx Stability theory for ordinary differential equations [See also 37C75, 93Dxx]

34D05 Asymptotic properties of solutions to ordinary differential equations

34D06 Synchronization of solutions to ordinary differential equations

34D08 Characteristic and Lyapunov exponents of ordinary differential equations

34D09 Dichotomy, trichotomy of solutions to ordinary differential equations

34D10 Perturbations of ordinary differential equations

34D15 Singular perturbations of ordinary differential equations

34D20 Stability of solutions to ordinary differential equations

34D23 Global stability of solutions to ordinary differential equations

34D30 Structural stability and analogous concepts of solutions to ordinary differential equations [See also 37C20]

34D35 Stability of manifolds of solutions to ordinary differential equations

34D45 Attractors of solutions to ordinary differential equations [See also 37C70, 37D45]

34D99 None of the above, but in this section

34Exx Asymptotic theory for ordinary differential equations

34E05 Asymptotic expansions of solutions to ordinary differential equations

34E10 Perturbations, asymptotics of solutions to ordinary differential equations

34E13 Multiple scale methods for ordinary differential equations

34E15 Singular perturbations, general theory for ordinary differential equations

34E17 Canard solutions to ordinary differential equations

34E18 Methods of nonstandard analysis for ordinary differential equations

34E20 Singular perturbations, turning point theory, WKB methods for ordinary differential equations

34E99 None of the above, but in this section

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

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

34F10 Bifurcation of solutions to ordinary differential equations involving randomness

34F15 Resonance phenomena for ordinary differential equations involving randomness

34F99 None of the above, but in this section

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

34G10 Linear differential equations in abstract spaces [See also 47D06, 47D09]

34G20 Nonlinear differential equations in abstract spaces [See also 47Hxx, 47Jxx]

34G25 Evolution inclusions

34G99 None of the above, but in this section

34Hxx Control problems including ordinary differential equations [See also 49J15, 49K15, 93C15]

34H05 Control problems involving ordinary differential equations [See also 49J15, 49K15, 93C15]

34H10 Chaos control for problems involving ordinary differential equations

34H15 Stabilization of solutions to ordinary differential equations

34H20 Bifurcation control of ordinary differential equations

34H99 None of the above, but in this section

34Kxx Functional-differential equations (including equations with delayed, advanced or state-dependent argument)

34K04 Symmetries, invariants of functional-differential equations [See also 37C79]

34K05 General theory of functional-differential equations

34K06 Linear functional-differential equations

34K07 Theoretical approximation of solutions to functional-differential equations

34K08 Spectral theory of functional-differential operators

34K09 Functional-differential inclusions

34K10 Boundary value problems for functional-differential equations

34K11 Oscillation theory of functional-differential equations

34K12 Growth, boundedness, comparison of solutions to functional-differential equations [See also 37C35]

34K13 Periodic solutions to functional-differential equations [See also 37C27]

34K14 Almost and pseudo-almost periodic solutions to functional-differential equations

34K16 Heteroclinic and homoclinic orbits of functional-differential equations [See also 37C29]

34K17 Transformation and reduction of functional-differential equations and systems, normal forms

34K18 Bifurcation theory of functional-differential equations [See also 37Gxx]

34K19 Invariant manifolds of functional-differential equations

34K20 Stability theory of functional-differential equations [See also 37C75]

34K21 Stationary solutions of functional-differential equations

34K23 Complex (chaotic) behavior of solutions to functional-differential equations [See also 37D45]

34K24 Synchronization of functional-differential equations

34K25 Asymptotic theory of functional-differential equations

34K26 Singular perturbations of functional-differential equations

34K27 Perturbations of functional-differential equations

34K29 Inverse problems for functional-differential equations

34K30 Functional-differential equations in abstract spaces [See also 34Gxx, 35R09, 35R10, 47Jxx]

34K31 Lattice functional-differential equations

34K32 Implicit functional-differential equations

34K33 Averaging for functional-differential equations

34K34 Hybrid systems of functional-differential equations

34K35 Control problems for functional-differential equations [See also 49J21, 49K21, 93C23]

34K36 Fuzzy functional-differential equations

34K37 Functional-differential equations with fractional derivatives

34K38 Functional-differential inequalities

34K39 Discontinuous functional-differential equations

34K40 Neutral functional-differential equations

34K41 Functional-differential equations in the complex domain

34K42 Functional-differential equations on time scales or measure chains

34K43 Functional-differential equations with state-dependent arguments

34K45 Functional-differential equations with impulses

34K50 Stochastic functional-differential equations [See also 34Fxx, 60Hxx]

34K60 Qualitative investigation and simulation of models involving functional-differential equations

34K99 None of the above, but in this section

34Lxx Ordinary differential operators [See also 47E05]

34L05 General spectral theory of ordinary differential operators

34L10 Eigenfunctions, eigenfunction expansions, completeness of eigenfunctions of ordinary differential operators

34L15 Eigenvalues, estimation of eigenvalues, upper and lower bounds of ordinary differential operators

34L16 Numerical approximation of eigenvalues and of other parts of the spectrum of ordinary differential operators

34L20 Asymptotic distribution of eigenvalues, asymptotic theory of eigenfunctions for ordinary differential operators

34L25 Scattering theory, inverse scattering involving ordinary differential operators

34L30 Nonlinear ordinary differential operators

34L40 Particular ordinary differential operators (Dirac, one-dimensional Schrödinger, etc.)

34L99 None of the above, but in this section

34Mxx Ordinary differential equations in the complex domain [See also 30Dxx, 32G34]

34M03 Linear ordinary differential equations and systems in the complex domain

34M04 Nonlinear ordinary differential equations and systems in the complex domain

34M05 Entire and meromorphic solutions to ordinary differential equations in the complex domain

34M10 Oscillation, growth of solutions to ordinary differential equations in the complex domain

34M15 Algebraic aspects (differential-algebraic, hypertranscendence, group-theoretical) of ordinary differential
equations in the complex domain

34M25 Formal solutions and transform techniques for ordinary differential equations in the complex domain

34M30 Asymptotics and summation methods for ordinary differential equations in the complex domain

34M35 Singularities, monodromy and local behavior of solutions to ordinary differential equations in the complex domain, normal forms

34M40 Stokes phenomena and connection problems (linear and nonlinear) for ordinary differential equations in the complex domain

34M45 Ordinary differential equations on complex manifolds

34M46 Spectral theory for ordinary differential operators in the complex domain

34M50 Inverse problems (Riemann-Hilbert, inverse differential Galois, etc.) for ordinary differential equations in the complex domain

34M55 Painlevé and other special ordinary differential equations in the complex domain; classification, hierarchies

34M56 Isomonodromic deformations for ordinary differential equations in the complex domain

34M60 Singular perturbation problems for ordinary differential equations in the complex domain (complex WKB, turning points, steepest descent) [See also 34E20]

34M65 Topological structure of trajectories of ordinary differential equations in the complex domain

34M99 None of the above, but in this section

34Nxx Dynamic equations on time scales or measure chains {For real analysis on time scales, see 26E70}

34N05 Dynamic equations on time scales or measure chains {For real analysis on time scales or measure chains, see 26E70}

34N99 None of the above, but in this section

35-XX Partial differential equations

35-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to partial differential equations

35-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to partial differential equations

35-02 Research exposition (monographs, survey articles) pertaining to partial differential equations

35-03 History of partial differential equations [Consider also classification numbers pertaining to Section 01]

35-04 Software, source code, etc. for problems pertaining to partial differential equations

35-06 Proceedings, conferences, collections, etc. pertaining to partial differential equations

35-11 Research data for problems pertaining to partial differential equations

35Axx General topics in partial differential equations

35A01 Existence problems for PDEs: global existence, local existence, non-existence

35A02 Uniqueness problems for PDEs: global uniqueness, local uniqueness, non-uniqueness

35A08 Fundamental solutions to PDEs

35A09 Classical solutions to PDEs

35A10 Cauchy-Kovalevskaya theorems

35A15 Variational methods applied to PDEs

35A16 Topological and monotonicity methods applied to PDEs

35A17 Parametrices in context of PDEs

35A18 Wave front sets in context of PDEs

35A20 Analyticity in context of PDEs

35A21 Singularity in context of PDEs

35A22 Transform methods (e.g., integral transforms) applied to PDEs

35A23 Inequalities applied to PDEs involving derivatives, differential and integral operators, or integrals

35A24 Methods of ordinary differential equations applied to PDEs

35A25 Other special methods applied to PDEs

35A27 Microlocal methods and methods of sheaf theory and homological algebra applied to PDEs [See also 32C38, 58J15]

35A30 Geometric theory, characteristics, transformations in context of PDEs [See also 58J70, 58J72]

35A35 Theoretical approximation in context of PDEs {For numerical analysis, see 65Mxx, 65Nxx}

35A99 None of the above, but in this section

35Bxx Qualitative properties of solutions to partial differential equations

35B05 Oscillation, zeros of solutions, mean value theorems, etc. in context of PDEs

35B06 Symmetries, invariants, etc. in context of PDEs

35B07 Axially symmetric solutions to PDEs

35B08 Entire solutions to PDEs

35B09 Positive solutions to PDEs

35B10 Periodic solutions to PDEs

35B15 Almost and pseudo-almost periodic solutions to PDEs

35B20 Perturbations in context of PDEs

35B25 Singular perturbations in context of PDEs

35B27 Homogenization in context of PDEs; PDEs in media with periodic structure [See also 74Q05, 74Q10, 76M50, 78M40, 80M40]

35B30 Dependence of solutions to PDEs on initial and/or boundary data and/or on parameters of PDEs [See also 37Cxx]

35B32 Bifurcations in context of PDEs [See also 34C23, 34F10, 34H20, 37F46, 37Gxx, 37H20, 35J20, 37L10, 37M20, 47J15, 58E05, 58E07, 58J55, 74G60, 74H60]

35B33 Critical exponents in context of PDEs

35B34 Resonance in context of PDEs [See also 34F15, 70J40, 70K28, 70K30, 81U24]

35B35 Stability in context of PDEs [See also 34Dxx, 37B25, 37C20, 37C75, 37F15, 37J25, 37K45, 37L15, 49K40, 58K25, 93Dxx]

35B36 Pattern formations in context of PDEs [See also 92C15]

35B38 Critical points of functionals in context of PDEs (e.g., energy functionals) [See also 57R70, 58K05, 58E05]

35B40 Asymptotic behavior of solutions to PDEs

35B41 Attractors [See also 34D45, 37B35, 37C70, 37D45, 37G35, 37L30, 37M22]

35B42 Inertial manifolds [See also 37L25]

35B44 Blow-up in context of PDEs

35B45 A priori estimates in context of PDEs

35B50 Maximum principles in context of PDEs

35B51 Comparison principles in context of PDEs

35B53 Liouville theorems and Phragmén-Lindelöf theorems in context of PDEs

35B60 Continuation and prolongation of solutions to PDEs [See also 58A15, 58A17, 58Hxx]

35B65 Smoothness and regularity of solutions to PDEs

35B99 None of the above, but in this section

35Cxx Representations of solutions to partial differential equations

35C05 Solutions to PDEs in closed form

35C06 Self-similar solutions to PDEs

35C07 Traveling wave solutions

35C08 Soliton solutions [See also 37K40]

35C09 Trigonometric solutions to PDEs

35C10 Series solutions to PDEs

35C11 Polynomial solutions to PDEs

35C15 Integral representations of solutions to PDEs

35C20 Asymptotic expansions of solutions to PDEs

35C99 None of the above, but in this section

35Dxx Generalized solutions to partial differential equations

35D30 Weak solutions to PDEs

35D35 Strong solutions to PDEs

35D40 Viscosity solutions to PDEs

35D99 None of the above, but in this section

35Exx Partial differential equations and systems of partial differential equations with constant coefficients [See also 35N05]

35E05 Fundamental solutions to PDEs and systems of PDEs with constant coefficients

35E10 Convexity properties of solutions to PDEs and systems of PDEs with constant coefficients

35E15 Initial value problems for PDEs and systems of PDEs with constant coefficients

35E20 General theory of PDEs and systems of PDEs with constant coefficients

35E99 None of the above, but in this section

35Fxx General first-order partial differential equations and systems of first-order partial differential equations

35F05 Linear first-order PDEs

35F10 Initial value problems for linear first-order PDEs

35F15 Boundary value problems for linear first-order PDEs

35F16 Initial-boundary value problems for linear first-order PDEs

35F20 Nonlinear first-order PDEs

35F21 Hamilton-Jacobi equations {For calculus of variations and optimal control, see 49Lxx; for mechanics of particles and systems, see 70H20}

35F25 Initial value problems for nonlinear first-order PDEs

35F30 Boundary value problems for nonlinear first-order PDEs

35F31 Initial-boundary value problems for nonlinear first-order PDEs

35F35 Systems of linear first-order PDEs

35F40 Initial value problems for systems of linear first-order PDEs

35F45 Boundary value problems for systems of linear first-order PDEs

35F46 Initial-boundary value problems for systems of linear first-order PDEs

35F50 Systems of nonlinear first-order PDEs

35F55 Initial value problems for systems of nonlinear first-order PDEs

35F60 Boundary value problems for systems of nonlinear first-order PDEs

35F61 Initial-boundary value problems for systems of nonlinear first-order PDEs

35F99 None of the above, but in this section

35Gxx General higher-order partial differential equations and systems of higher-order partial differential equations

35G05 Linear higher-order PDEs

35G10 Initial value problems for linear higher-order PDEs

35G15 Boundary value problems for linear higher-order PDEs

35G16 Initial-boundary value problems for linear higher-order PDEs

35G20 Nonlinear higher-order PDEs

35G25 Initial value problems for nonlinear higher-order PDEs

35G30 Boundary value problems for nonlinear higher-order PDEs

35G31 Initial-boundary value problems for nonlinear higher-order PDEs

35G35 Systems of linear higher-order PDEs

35G40 Initial value problems for systems of linear higher-order PDEs

35G45 Boundary value problems for systems of linear higher-order PDEs

35G46 Initial-boundary value problems for systems of linear higher-order PDEs

35G50 Systems of nonlinear higher-order PDEs

35G55 Initial value problems for systems of nonlinear higher-order PDEs

35G60 Boundary value problems for systems of nonlinear higher-order PDEs

35G61 Initial-boundary value problems for systems of nonlinear higher-order PDEs

35G99 None of the above, but in this section

35Hxx Close-to-elliptic equations

35H10 Hypoelliptic equations

35H20 Subelliptic equations

35H30 Quasielliptic equations

35H99 None of the above, but in this section

35Jxx Elliptic equations and elliptic systems {For global analysis, analysis on manifolds, see 58J10, 58J20}

35J05 Laplace operator, Helmholtz equation (reduced wave equation), Poisson equation [See also 31Axx, 31Bxx]

35J08 Green's functions for elliptic equations

35J10 Schrödinger operator, Schrödinger equation {For ordinary differential equations, see 34L40; for operator theory, see 47D08; for quantum theory, see 81Q05; for statistical mechanics, see 82B44}

35J15 Second-order elliptic equations

35J20 Variational methods for second-order elliptic equations

35J25 Boundary value problems for second-order elliptic equations

35J30 Higher-order elliptic equations [See also 31A30, 31B30]

35J35 Variational methods for higher-order elliptic equations

35J40 Boundary value problems for higher-order elliptic equations

35J46 First-order elliptic systems

35J47 Second-order elliptic systems

35J48 Higher-order elliptic systems

35J50 Variational methods for elliptic systems

35J56 Boundary value problems for first-order elliptic systems

35J57 Boundary value problems for second-order elliptic systems

35J58 Boundary value problems for higher-order elliptic systems

35J60 Nonlinear elliptic equations

35J61 Semilinear elliptic equations

35J62 Quasilinear elliptic equations

35J65 Nonlinear boundary value problems for linear elliptic equations

35J66 Nonlinear boundary value problems for nonlinear elliptic equations

35J67 Boundary values of solutions to elliptic equations and elliptic systems

35J70 Degenerate elliptic equations

35J75 Singular elliptic equations

35J86 Unilateral problems for linear elliptic equations and variational inequalities with linear elliptic operators [See also 35R35, 49J40]

35J87 Unilateral problems for nonlinear elliptic equations and variational inequalities with nonlinear elliptic operators [See also 35R35, 49J40]

35J88 Unilateral problems for elliptic systems and systems of variational inequalities with elliptic operators [See also 35R35, 49J40]

35J91 Semilinear elliptic equations with Laplacian, bi-Laplacian or poly-Laplacian

35J92 Quasilinear elliptic equations with p-Laplacian

35J93 Quasilinear elliptic equations with mean curvature operator

35J94 Elliptic equations with infinity-Laplacian

35J96 Monge-Ampère equations {For complex Monge-Ampère operators, see 32W20; for parabolic Monge-Ampère equations, see 35K96}

35J99 None of the above, but in this section

35Kxx Parabolic equations and parabolic systems {For global analysis, analysis on manifolds, see 58J35}

35K05 Heat equation

35K08 Heat kernel

35K10 Second-order parabolic equations

35K15 Initial value problems for second-order parabolic equations

35K20 Initial-boundary value problems for second-order parabolic equations

35K25 Higher-order parabolic equations

35K30 Initial value problems for higher-order parabolic equations

35K35 Initial-boundary value problems for higher-order parabolic equations

35K40 Second-order parabolic systems

35K41 Higher-order parabolic systems

35K45 Initial value problems for second-order parabolic systems

35K46 Initial value problems for higher-order parabolic systems

35K51 Initial-boundary value problems for second-order parabolic systems

35K52 Initial-boundary value problems for higher-order parabolic systems

35K55 Nonlinear parabolic equations

35K57 Reaction-diffusion equations {For diffusion processes and reaction effects, see 47D07, 58J65, 60J60, 60J70, 74N25, 76R50, 76V05, 80A23, 82B24, 82C24, 92E20}

35K58 Semilinear parabolic equations

35K59 Quasilinear parabolic equations

35K60 Nonlinear initial, boundary and initial-boundary value problems for linear parabolic equations

35K61 Nonlinear initial, boundary and initial-boundary value problems for nonlinear parabolic equations

35K65 Degenerate parabolic equations

35K67 Singular parabolic equations

35K70 Ultraparabolic equations, pseudoparabolic equations, etc.

35K85 Unilateral problems for linear parabolic equations and variational inequalities with linear parabolic operators [See also 35R35, 49J40]

35K86 Unilateral problems for nonlinear parabolic equations and variational inequalities with nonlinear parabolic operators [See also 35R35, 49J40]

35K87 Unilateral problems for parabolic systems and systems of variational inequalities with parabolic operators [See also 35R35, 49J40]

35K90 Abstract parabolic equations

35K91 Semilinear parabolic equations with Laplacian, bi-Laplacian or poly-Laplacian

35K92 Quasilinear parabolic equations with p-Laplacian

35K93 Quasilinear parabolic equations with mean curvature operator

35K96 Parabolic Monge-Ampère equations

35K99 None of the above, but in this section

35Lxx Hyperbolic equations and hyperbolic systems {For global analysis, see 58J45}

35L02 First-order hyperbolic equations

35L03 Initial value problems for first-order hyperbolic equations

35L04 Initial-boundary value problems for first-order hyperbolic equations

35L05 Wave equation

35L10 Second-order hyperbolic equations

35L15 Initial value problems for second-order hyperbolic equations

35L20 Initial-boundary value problems for second-order hyperbolic equations

35L25 Higher-order hyperbolic equations

35L30 Initial value problems for higher-order hyperbolic equations

35L35 Initial-boundary value problems for higher-order hyperbolic equations

35L40 First-order hyperbolic systems

35L45 Initial value problems for first-order hyperbolic systems

35L50 Initial-boundary value problems for first-order hyperbolic systems

35L51 Second-order hyperbolic systems

35L52 Initial value problems for second-order hyperbolic systems

35L53 Initial-boundary value problems for second-order hyperbolic systems

35L55 Higher-order hyperbolic systems

35L56 Initial value problems for higher-order hyperbolic systems

35L57 Initial-boundary value problems for higher-order hyperbolic systems

35L60 First-order nonlinear hyperbolic equations

35L65 Hyperbolic conservation laws

35L67 Shocks and singularities for hyperbolic equations [See also 58Kxx, 74J40, 76L05]

35L70 Second-order nonlinear hyperbolic equations

35L71 Second-order semilinear hyperbolic equations

35L72 Second-order quasilinear hyperbolic equations

35L75 Higher-order nonlinear hyperbolic equations

35L76 Higher-order semilinear hyperbolic equations

35L77 Higher-order quasilinear hyperbolic equations

35L80 Degenerate hyperbolic equations

35L81 Singular hyperbolic equations

35L82 Pseudohyperbolic equations

35L85 Unilateral problems for linear hyperbolic equations and variational inequalities with linear hyperbolic operators [See also 35R35, 49J40]

35L86 Unilateral problems for nonlinear hyperbolic equations and variational inequalities with nonlinear hyperbolic operators [See also 35R35, 49J40]

35L87 Unilateral problems for hyperbolic systems and systems of variational inequalities with hyperbolic operators [See also 35R35, 49J40]

35L90 Abstract hyperbolic equations

35L99 None of the above, but in this section

35Mxx Partial differential equations of mixed type and mixed-type systems of partial differential equations

35M10 PDEs of mixed type

35M11 Initial value problems for PDEs of mixed type

35M12 Boundary value problems for PDEs of mixed type

35M13 Initial-boundary value problems for PDEs of mixed type

35M30 Mixed-type systems of PDEs

35M31 Initial value problems for mixed-type systems of PDEs

35M32 Boundary value problems for mixed-type systems of PDEs

35M33 Initial-boundary value problems for mixed-type systems of PDEs

35M85 Unilateral problems for linear PDEs of mixed type and variational inequalities with partial differential operators of mixed type [See also 35R35, 49J40]

35M86 Unilateral problems for nonlinear PDEs of mixed type and variational inequalities with nonlinear partial differential operators of mixed type [See also 35R35, 49J40]

35M87 Unilateral problems for mixed-type systems of PDEs and systems of variational inequalities with partial differential operators of mixed type [See also 35R35, 49J40]

35M99 None of the above, but in this section

35Nxx Overdetermined problems for partial differential equations and systems of partial differential equations {For global analysis, see 58Hxx, 58J10, 58J15}

35N05 Overdetermined systems of PDEs with constant coefficients

35N10 Overdetermined systems of PDEs with variable coefficients

35N15 $\overline{\partial}$-Neumann problems and formal complexes in context of PDEs [See also 32W05, 32W10, 58J10]

35N20 Overdetermined initial value problems for PDEs and systems of PDEs

35N25 Overdetermined boundary value problems for PDEs and systems of PDEs

35N30 Overdetermined initial-boundary value problems for PDEs and systems of PDEs

35N99 None of the above, but in this section

35Pxx Spectral theory and eigenvalue problems for partial differential equations {For operator theory, see 47Axx, 47Bxx, 47F05}

35P05 General topics in linear spectral theory for PDEs

35P10 Completeness of eigenfunctions and eigenfunction expansions in context of PDEs

35P15 Estimates of eigenvalues in context of PDEs

35P20 Asymptotic distributions of eigenvalues in context of PDEs

35P25 Scattering theory for PDEs [See also 47A40]

35P30 Nonlinear eigenvalue problems and nonlinear spectral theory for PDEs

35P99 None of the above, but in this section

35Qxx Partial differential equations of mathematical physics and other areas of application [See also 35J05, 35J10, 35K05, 35L05]

35Q05 Euler-Poisson-Darboux equations

35Q07 Fuchsian PDEs

35Q15 Riemann-Hilbert problems in context of PDEs [See also 30E25, 31A25, 31B20]

35Q20 Boltzmann equations {For fluid mechanics, see 76P05; for statistical mechanics, see 82B40, 82C40, 82D05}

35Q30 Navier-Stokes equations {For fluid mechanics, see 76D05, 76D07, 76N10}

35Q31 Euler equations {For fluid mechanics, see 76D05, 76D07, 76N10}

35Q35 PDEs in connection with fluid mechanics

35Q40 PDEs in connection with quantum mechanics

35Q41 Time-dependent Schrödinger equations and Dirac equations {For quantum theory, see 81Q05; for relativity and gravitational theory, see 83A05, 83C10}

35Q49 Transport equations {For calculus of variations and optimal control, see 49Q22; for fluid mechanics, see 76F25; for statistical mechanics, see 82C70, 82D75; for operations research, see 90B06; for mathematical programming, see 90C08}

35Q51 Soliton equations {For dynamical systems and ergodic theory, see 37K40}

35Q53 KdV equations (Korteweg-de Vries equations) {For dynamical systems and ergodic theory, see 37K10}

35Q55 NLS equations (nonlinear Schrödinger equations) {For dynamical systems and ergodic theory, see 37K10}

35Q56 Ginzburg-Landau equations {For optics and electromagnetic theory, see 78A25}

35Q60 PDEs in connection with optics and electromagnetic theory

35Q61 Maxwell equations {For optics and electromagnetic theory, see 78A25; for relativity and gravitational theory, see 83C22}

35Q62 PDEs in connection with statistics

35Q68 PDEs in connection with computer science

35Q70 PDEs in connection with mechanics of particles and systems of particles

35Q74 PDEs in connection with mechanics of deformable solids

35Q75 PDEs in connection with relativity and gravitational theory

35Q76 Einstein equations {For several complex variables and analytic spaces, see 32Q40; for differential geometry, see 53C07; for relativity and gravitational theory, see 83C05, 83C25, 83D05}

35Q79 PDEs in connection with classical thermodynamics and heat transfer

35Q81 PDEs in connection with semiconductor devices {For statistical mechanics, see 82D37}

35Q82 PDEs in connection with statistical mechanics

35Q83 Vlasov equations {For statistical mechanics, see 82C70, 82D75}

35Q84 Fokker-Planck equations {For fluid mechanics, see 76X05, 76W05; for statistical mechanics, see 82C31}

35Q85 PDEs in connection with astronomy and astrophysics

35Q86 PDEs in connection with geophysics

35Q89 PDEs in connection with mean field game theory {For calculus of variations and optimal control, see 49N80; for game theory, see 91A16}

35Q90 PDEs in connection with mathematical programming

35Q91 PDEs in connection with game theory, economics, social and behavioral sciences

35Q92 PDEs in connection with biology, chemistry and other natural sciences

35Q93 PDEs in connection with control and optimization

35Q94 PDEs in connection with information and communication

35Q99 None of the above, but in this section

35Rxx Miscellaneous topics in partial differential equations {For equations on manifolds, see 32Wxx, 58Jxx; for manifolds of solutions, see 58Bxx; for stochastic PDEs, see 60H15}

35R01 PDEs on manifolds [See also 32Wxx, 53Cxx, 58Jxx]

35R02 PDEs on graphs and networks (ramified or polygonal spaces)

35R03 PDEs on Heisenberg groups, Lie groups, Carnot groups, etc.

35R05 PDEs with low regular coefficients and/or low regular data

35R06 PDEs with measure

35R07 PDEs on time scales

35R09 Integral partial differential equations [See also 45Kxx]

35R10 Functional partial differential equations

35R11 Fractional partial differential equations

35R12 Impulsive partial differential equations

35R13 Fuzzy partial differential equations

35R15 PDEs on infinite-dimensional (e.g., function) spaces (= PDEs in infinitely many variables) [See also 46Gxx, 58D25]

35R20 Operator partial differential equations (= PDEs on finite-dimensional spaces for abstract space valued functions) [See also 34Gxx, 47A50, 47D03, 47D06, 47D09, 47H20, 47Jxx]

35R25 Ill-posed problems for PDEs

35R30 Inverse problems for PDEs

35R35 Free boundary problems for PDEs

35R37 Moving boundary problems for PDEs

35R45 Partial differential inequalities and systems of partial differential inequalities

35R50 PDEs of infinite order

35R60 PDEs with randomness, stochastic partial differential equations [See also 60H15]

35R70 PDEs with multivalued right-hand sides

35R99 None of the above, but in this section

35Sxx Pseudodifferential operators and other generalizations of partial differential operators {For operator theory, see 47G30, 58J40}

35S05 Pseudodifferential operators as generalizations of partial differential operators [See also 32W25, 47G30, 47L80, 58J40]

35S10 Initial value problems for PDEs with pseudodifferential operators

35S15 Boundary value problems for PDEs with pseudodifferential operators

35S16 Initial-boundary value problems for PDEs with pseudodifferential operators

35S30 Fourier integral operators applied to PDEs [See also 43A32, 58J40]

35S35 Topological aspects for pseudodifferential operators in context of PDEs: intersection cohomology, stratified sets, etc. [See also 32C38, 32S40, 32S60, 58J15]

35S50 Paradifferential operators as generalizations of partial differential operators in context of PDEs

35S99 None of the above, but in this section

37-XX Dynamical systems and ergodic theory [See also 26A18, 28Dxx, 34Cxx, 34Dxx, 35Bxx, 46Lxx, 58Jxx, 70-XX]

37-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to dynamical systems and ergodic theory

37-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to dynamical systems and ergodic theory

37-02 Research exposition (monographs, survey articles) pertaining to dynamical systems and ergodic theory

37-03 History of dynamical systems and ergodic theory [Consider also classification numbers pertaining to Section 01]

37-04 Software, source code, etc. for problems pertaining to dynamical systems and ergodic theory

37-06 Proceedings, conferences, collections, etc. pertaining to dynamical systems and ergodic theory

37-11 Research data for problems pertaining to dynamical systems and ergodic theory

37Axx Ergodic theory [See also 28Dxx]

37A05 Dynamical aspects of measure-preserving transformations

37A10 Dynamical systems involving one-parameter continuous families of measure-preserving transformations

37A15 General groups of measure-preserving transformations and dynamical systems [See mainly 22Fxx]

37A17 Homogeneous flows [See also 22Fxx]

37A20 Algebraic ergodic theory, cocycles, orbit equivalence, ergodic equivalence relations

37A25 Ergodicity, mixing, rates of mixing

37A30 Ergodic theorems, spectral theory, Markov operators {For operator ergodic theory, see mainly 47A35}

37A35 Entropy and other invariants, isomorphism, classification in ergodic theory

37A40 Nonsingular (and infinite-measure preserving) transformations

37A44 Relations between ergodic theory and number theory [See also 11Kxx]

37A46 Relations between ergodic theory and harmonic analysis

37A50 Dynamical systems and their relations with probability theory and stochastic processes [See also 60Fxx, 60G10]

37A55 Dynamical systems and the theory of C^*-algebras [See mainly 46L55]

37A60 Dynamical aspects of statistical mechanics [See also 82Cxx]

37A99 None of the above, but in this section

37Bxx Topological dynamics

37B02 Dynamics in general topological spaces

37B05 Dynamical systems involving transformations and group actions with special properties (minimality, distality, proximality, expansivity, etc.)

37B10 Symbolic dynamics

37B15 Dynamical aspects of cellular automata {For computational aspects, see 68Q80}

37B20 Notions of recurrence and recurrent behavior in dynamical systems

37B25 Stability of topological dynamical systems

37B30 Index theory for dynamical systems, Morse-Conley indices

37B35 Gradient-like and recurrent behavior; isolated (locally maximal) invariant sets; attractors, repellers for topological dynamical systems

37B40 Topological entropy

37B45 Continua theory in dynamics

37B51 Multidimensional shifts of finite type

37B52 Tiling dynamics

37B55 Topological dynamics of nonautonomous systems

37B65 Approximate trajectories, pseudotrajectories, shadowing and related notions for topological dynamical systems

37B99 None of the above, but in this section

37Cxx Smooth dynamical systems: general theory [See also 34Cxx, 34Dxx]

37C05 Dynamical systems involving smooth mappings and diffeomorphisms

37C10 Dynamics induced by flows and semiflows

37C15 Topological and differentiable equivalence, conjugacy, moduli, classification of dynamical systems

37C20 Generic properties, structural stability of dynamical systems

37C25 Fixed points and periodic points of dynamical systems; fixed-point index theory, local dynamics

37C27 Periodic orbits of vector fields and flows

37C29 Homoclinic and heteroclinic orbits for dynamical systems

37C30 Functional analytic techniques in dynamical systems; zeta functions, (Ruelle-Frobenius) transfer operators, etc.

37C35 Orbit growth in dynamical systems

37C40 Smooth ergodic theory, invariant measures for smooth dynamical systems [See also 37Dxx]

37C45 Dimension theory of smooth dynamical systems

37C50 Approximate trajectories (pseudotrajectories, shadowing, etc.) in smooth dynamics

37C55 Periodic and quasi-periodic flows and diffeomorphisms

37C60 Nonautonomous smooth dynamical systems [See also 37B55]

37C65 Monotone flows as dynamical systems

37C70 Attractors and repellers of smooth dynamical systems and their topological structure

37C75 Stability theory for smooth dynamical systems

37C79 Symmetries and invariants of dynamical systems [See also 34C14, 34K04]

37C81 Equivariant dynamical systems

37C83 Dynamical systems with singularities (billiards, etc.)

37C85 Dynamics induced by group actions other than $\mathbb{Z}$ and $\mathbb{R}$, and $\mathbb{C}$ [See mainly 22Fxx, and also 32M25, 57R30, 57Sxx]

37C86 Foliations generated by dynamical systems

37C99 None of the above, but in this section

37Dxx Dynamical systems with hyperbolic behavior

37D05 Dynamical systems with hyperbolic orbits and sets

37D10 Invariant manifold theory for dynamical systems

37D15 Morse-Smale systems

37D20 Uniformly hyperbolic systems (expanding, Anosov, Axiom A, etc.)

37D25 Nonuniformly hyperbolic systems (Lyapunov exponents, Pesin theory, etc.)

37D30 Partially hyperbolic systems and dominated splittings

37D35 Thermodynamic formalism, variational principles, equilibrium states for dynamical systems

37D40 Dynamical systems of geometric origin and hyperbolicity (geodesic and horocycle flows, etc.)

37D45 Strange attractors, chaotic dynamics of systems with hyperbolic behavior

37D99 None of the above, but in this section

37Exx Low-dimensional dynamical systems

37E05 Dynamical systems involving maps of the interval (piecewise continuous, continuous, smooth)

37E10 Dynamical systems involving maps of the circle

37E15 Combinatorial dynamics (types of periodic orbits)

37E20 Universality and renormalization of dynamical systems [See also 37F25]

37E25 Dynamical systems involving maps of trees and graphs

37E30 Dynamical systems involving homeomorphisms and diffeomorphisms of planes and surfaces

37E35 Flows on surfaces

37E40 Dynamical aspects of twist maps

37E45 Rotation numbers and vectors

37E99 None of the above, but in this section

37Fxx Dynamical systems over complex numbers [See also 30D05, 32H50]

37F05 Dynamical systems involving relations and correspondences in one complex variable

37F10 Dynamics of complex polynomials, rational maps, entire and meromorphic functions; Fatou and Julia sets [See also 32A10, 32A20, 32H02, 32H04]

37F12 Critical orbits for holomorphic dynamical systems

37F15 Expanding holomorphic maps; hyperbolicity; structural stability of holomorphic dynamical systems

37F20 Combinatorics and topology in relation with holomorphic dynamical systems

37F25 Renormalization of holomorphic dynamical systems

37F31 Quasiconformal methods in holomorphic dynamics; quasiconformal dynamics

37F32 Fuchsian and Kleinian groups as dynamical systems

37F34 Teichmüller theory; moduli spaces of holomorphic dynamical systems

37F35 Conformal densities and Hausdorff dimension for holomorphic dynamical systems

37F40 Geometric limits in holomorphic dynamics

37F44 Holomorphic families of dynamical systems; holomorphic motions; semigroups of holomorphic maps

37F46 Bifurcations; parameter spaces in holomorphic dynamics; the Mandelbrot and Multibrot sets

37F50 Small divisors, rotation domains and linearization in holomorphic dynamics

37F75 Dynamical aspects of holomorphic foliations and vector fields [See also 32M25, 32S65, 34Mxx]

37F80 Higher-dimensional holomorphic and meromorphic dynamics

37F99 None of the above, but in this section

37Gxx Local and nonlocal bifurcation theory for dynamical systems [See also 34C23, 34K18]

37G05 Normal forms for dynamical systems

37G10 Bifurcations of singular points in dynamical systems

37G15 Bifurcations of limit cycles and periodic orbits in dynamical systems

37G20 Hyperbolic singular points with homoclinic trajectories in dynamical systems

37G25 Bifurcations connected with nontransversal intersection in dynamical systems

37G30 Infinite nonwandering sets arising in bifurcations of dynamical systems

37G35 Dynamical aspects of attractors and their bifurcations

37G40 Dynamical aspects of symmetries, equivariant bifurcation theory

37G99 None of the above, but in this section

37Hxx Random dynamical systems [See also 15B52, 34D08, 34F05, 47B80, 70L05, 82C05, 93Exx]

37H05 General theory of random and stochastic dynamical systems

37H10 Generation, random and stochastic difference and differential equations [See also 34F05, 34K50, 60H10, 60H15]

37H12 Random iteration

37H15 Random dynamical systems aspects of multiplicative ergodic theory, Lyapunov exponents [See also 34D08, 37Axx, 37Cxx, 37Dxx]

37H20 Bifurcation theory for random and stochastic dynamical systems [See also 37Gxx]

37H30 Stability theory for random and stochastic dynamical systems

37H99 None of the above, but in this section

37Jxx Dynamical aspects of finite-dimensional Hamiltonian and Lagrangian systems [See also 53Dxx, 70Fxx, 70Hxx]

37J06 General theory of finite-dimensional Hamiltonian and Lagrangian systems, Hamiltonian and Lagrangian structures, symmetries, invariants

37J11 Symplectic and canonical mappings

37J12 Fixed points and periodic points of finite-dimensional Hamiltonian and Lagrangian systems

37J20 Bifurcation problems for finite-dimensional Hamiltonian and Lagrangian systems

37J25 Stability problems for finite-dimensional Hamiltonian and Lagrangian systems

37J30 Obstructions to integrability for finite-dimensional Hamiltonian and Lagrangian systems (nonintegrability criteria)

37J35 Completely integrable finite-dimensional Hamiltonian systems, integration methods, integrability tests

37J37 Relations of finite-dimensional Hamiltonian and Lagrangian systems with Lie algebras and other algebraic structures

37J38 Relations of finite-dimensional Hamiltonian and Lagrangian systems with algebraic geometry, complex analysis, special functions

37J39 Relations of finite-dimensional Hamiltonian and Lagrangian systems with topology, geometry and differential geometry (symplectic geometry, Poisson geometry, etc.) [See also 53D20]

37J40 Perturbations of finite-dimensional Hamiltonian systems, normal forms, small divisors, KAM theory, Arnol'd diffusion

37J46 Periodic, homoclinic and heteroclinic orbits of finite-dimensional Hamiltonian systems

37J51 Action-minimizing orbits and measures for finite-dimensional Hamiltonian and Lagrangian systems; variational principles; degree-theoretic methods

37J55 Contact systems [See also 53D10]

37J60 Nonholonomic dynamical systems [See also 70F25]

37J65 Nonautonomous Hamiltonian dynamical systems (Painlevé equations, etc.)

37J70 Completely integrable discrete dynamical systems

37J99 None of the above, but in this section

37Kxx Dynamical system aspects of infinite-dimensional Hamiltonian and Lagrangian systems [See also 35Axx, 35Qxx]

37K06 General theory of infinite-dimensional Hamiltonian and Lagrangian systems, Hamiltonian and Lagrangian structures, symmetries, conservation laws

37K10 Completely integrable infinite-dimensional Hamiltonian and Lagrangian systems, integration methods, integrability tests, integrable hierarchies (KdV, KP, Toda, etc.)

37K15 Inverse spectral and scattering methods for infinite-dimensional Hamiltonian and Lagrangian systems

37K20 Relations of infinite-dimensional Hamiltonian and Lagrangian dynamical systems with algebraic geometry, complex analysis, and special functions [See also 14H70]

37K25 Relations of infinite-dimensional Hamiltonian and Lagrangian dynamical systems with topology, geometry and differential geometry

37K30 Relations of infinite-dimensional Hamiltonian and Lagrangian dynamical systems with infinite-dimensional Lie algebras and other algebraic structures

37K35 Lie-Bäcklund and other transformations for infinite-dimensional Hamiltonian and Lagrangian systems

37K40 Soliton theory, asymptotic behavior of solutions of infinite-dimensional Hamiltonian systems

37K45 Stability problems for infinite-dimensional Hamiltonian and Lagrangian systems

37K50 Bifurcation problems for infinite-dimensional Hamiltonian and Lagrangian systems

37K55 Perturbations, KAM for infinite-dimensional Hamiltonian and Lagrangian systems

37K58 Variational principles and methods for infinite-dimensional Hamiltonian and Lagrangian systems

37K60 Lattice dynamics; integrable lattice equations [See also 37L60]

37K65 Hamiltonian systems on groups of diffeomorphisms and on manifolds of mappings and metrics

37K99 None of the above, but in this section

37Lxx Infinite-dimensional dissipative dynamical systems [See also 35Bxx, 35Qxx]

37L05 General theory of infinite-dimensional dissipative dynamical systems, nonlinear semigroups, evolution equations

37L10 Normal forms, center manifold theory, bifurcation theory for infinite-dimensional dissipative dynamical systems

37L15 Stability problems for infinite-dimensional dissipative dynamical systems

37L20 Symmetries of infinite-dimensional dissipative dynamical systems

37L25 Inertial manifolds and other invariant attracting sets of infinite-dimensional dissipative dynamical systems

37L30 Infinite-dimensional dissipative dynamical systems–attractors and their dimensions, Lyapunov exponents

37L40 Invariant measures for infinite-dimensional dissipative dynamical systems

37L45 Hyperbolicity; Lyapunov functions for infinite-dimensional dissipative dynamical systems

37L50 Noncompact semigroups; dispersive equations; perturbations of infinite-dimensional dissipative dynamical systems

37L55 Infinite-dimensional random dynamical systems; stochastic equations [See also 35R60, 60H10, 60H15]

37L60 Lattice dynamics and infinite-dimensional dissipative dynamical systems [See also 37K60]

37L65 Special approximation methods (nonlinear Galerkin, etc.) for infinite-dimensional dissipative dynamical systems

37L99 None of the above, but in this section

37Mxx Approximation methods and numerical treatment of dynamical systems {For numerical analysis, see also 65Pxx; for software etc., see 37-04}

37M05 Simulation of dynamical systems

37M10 Time series analysis of dynamical systems

37M15 Discretization methods and integrators (symplectic, variational, geometric, etc.) for dynamical systems

37M20 Computational methods for bifurcation problems in dynamical systems

37M21 Computational methods for invariant manifolds of dynamical systems

37M22 Computational methods for attractors of dynamical systems

37M25 Computational methods for ergodic theory (approximation of invariant measures, computation of Lyapunov exponents, entropy, etc.)

37M99 None of the above, but in this section

37Nxx Applications of dynamical systems

37N05 Dynamical systems in classical and celestial mechanics [See mainly 70Fxx, 70Hxx, 70Kxx]

37N10 Dynamical systems in fluid mechanics, oceanography and meteorology [See mainly 76-XX, especially 76D05, 76F20, 86A05, 86A10]

37N15 Dynamical systems in solid mechanics [See mainly 74Hxx]

37N20 Dynamical systems in other branches of physics (quantum mechanics, general relativity, laser physics)

37N25 Dynamical systems in biology [See also 92-XX]

37N30 Dynamical systems in numerical analysis [See also 65-XX]

37N35 Dynamical systems in control [See also 93-XX]

37N40 Dynamical systems in optimization and economics [See also 90-XX, 91-XX]

37N99 None of the above, but in this section

37Pxx Arithmetic and non-Archimedean dynamical systems [See also 11S82, 37A44]

37P05 Arithmetic and non-Archimedean dynamical systems involving polynomial and rational maps

37P10 Arithmetic and non-Archimedean dynamical systems involving analytic and meromorphic maps

37P15 Dynamical systems over global ground fields

37P20 Dynamical systems over non-Archimedean local ground fields

37P25 Dynamical systems over finite ground fields

37P30 Height functions; Green functions; invariant measures in arithmetic and non-Archimedean dynamical systems [See also 11G50, 14G40]

37P35 Arithmetic properties of periodic points

37P40 Non-Archimedean Fatou and Julia sets

37P45 Families and moduli spaces in arithmetic and non-Archimedean dynamical systems

37P50 Dynamical systems on Berkovich spaces

37P55 Arithmetic dynamics on general algebraic varieties

37P99 None of the above, but in this section

39-XX Difference and functional equations

39-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to difference and functional equations

39-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to difference and functional equations

39-02 Research exposition (monographs, survey articles) pertaining to difference and functional equations

39-03 History of difference and functional equations [Consider also classification numbers pertaining to Section 01]

39-04 Software, source code, etc. for problems pertaining to difference and functional equations

39-06 Proceedings, conferences, collections, etc. pertaining to difference and functional equations

39-08 Computational methods for problems pertaining to difference and functional equations

39-11 Research data for problems pertaining to difference and functional equations

39Axx Difference equations {For dynamic equations on time scales, see 34N05; for dynamical systems, see 37-XX}

39A05 General theory of difference equations

39A06 Linear difference equations

39A10 Additive difference equations

39A12 Discrete version of topics in analysis

39A13 Difference equations, scaling (q-differences) [See also 33Dxx]

39A14 Partial difference equations

39A20 Multiplicative and other generalized difference equations, e.g., of Lyness type

39A21 Oscillation theory for difference equations

39A22 Growth, boundedness, comparison of solutions to difference equations

39A23 Periodic solutions of difference equations

39A24 Almost periodic solutions of difference equations

39A26 Fuzzy difference equations

39A27 Boundary value problems for difference equations

39A28 Bifurcation theory for difference equations

39A30 Stability theory for difference equations

39A33 Chaotic behavior of solutions of difference equations

39A36 Integrable difference and lattice equations; integrability tests

39A45 Difference equations in the complex domain

39A50 Stochastic difference equations

39A60 Applications of difference equations

39A70 Difference operators [See also 47B39]

39A99 None of the above, but in this section

39Bxx Functional equations and inequalities [See also 30D05]

39B05 General theory of functional equations and inequalities

39B12 Iteration theory, iterative and composite equations [See also 26A18, 30D05, 37-XX]

39B22 Functional equations for real functions [See also 26A51, 26B25]

39B32 Functional equations for complex functions [See also 30D05]

39B42 Matrix and operator functional equations [See also 47Jxx]

39B52 Functional equations for functions with more general domains and/or ranges

39B55 Orthogonal additivity and other conditional functional equations

39B62 Functional inequalities, including subadditivity, convexity, etc. [See also 26A51, 26B25, 26Dxx]

39B72 Systems of functional equations and inequalities

39B82 Stability, separation, extension, and related topics for functional equations [See also 46A22]

39B99 None of the above, but in this section

40-XX Sequences, series, summability

40-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to sequences, series, summability

40-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to sequences, series, summability

40-02 Research exposition (monographs, survey articles) pertaining to sequences, series, summability

40-03 History of sequences, series, summability [Consider also classification numbers pertaining to Section 01]

40-04 Software, source code, etc. for problems pertaining to sequences, series, summability

40-06 Proceedings, conferences, collections, etc. pertaining to sequences, series, summability

40-08 Computational methods for problems pertaining to sequences, series, summability

40-11 Research data for problems pertaining to sequences, series, summability

40Axx Convergence and divergence of infinite limiting processes

40A05 Convergence and divergence of series and sequences

40A10 Convergence and divergence of integrals

40A15 Convergence and divergence of continued fractions [See also 30B70]

40A20 Convergence and divergence of infinite products

40A25 Approximation to limiting values (summation of series, etc.) {For the Euler-Maclaurin summation formula, see 65B15}

40A30 Convergence and divergence of series and sequences of functions

40A35 Ideal and statistical convergence [See also 40G15]

40A99 None of the above, but in this section

40Bxx Multiple sequences and series

40B05 Multiple sequences and series (should also be assigned at least one other classification number in this section)

40B99 None of the above, but in this section

40Cxx General summability methods

40C05 Matrix methods for summability

40C10 Integral methods for summability

40C15 Function-theoretic methods (including power series methods and semicontinuous methods) for summability

40C99 None of the above, but in this section

40Dxx Direct theorems on summability

40D05 General theorems on summability

40D09 Structure of summability fields

40D10 Tauberian constants and oscillation limits in summability theory

40D15 Convergence factors and summability factors

40D20 Summability and bounded fields of methods

40D25 Inclusion and equivalence theorems in summability theory

40D99 None of the above, but in this section

40Exx Inversion theorems

40E05 Tauberian theorems, general

40E10 Growth estimates

40E15 Lacunary inversion theorems

40E20 Tauberian constants

40E99 None of the above, but in this section

40Fxx Absolute and strong summability (should also be assigned at least one other classification number in Section 40)

40F05 Absolute and strong summability (should also be assigned at least one other classification number in Section 40)

40F99 None of the above, but in this section

40Gxx Special methods of summability

40G05 Cesàro, Euler, Nörlund and Hausdorff methods

40G10 Abel, Borel and power series methods

40G15 Summability methods using statistical convergence [See also 40A35]

40G99 None of the above, but in this section

40Hxx Functional analytic methods in summability

40H05 Functional analytic methods in summability

40H99 None of the above, but in this section

40Jxx Summability in abstract structures (should also be assigned at least one other classification number from Section 40) [See also 43A55, 46A35, 46B15]

40J05 Summability in abstract structures (should also be assigned at least one other classification number from Section 40) [See also 43A55, 46A35, 46B15]

40J99 None of the above, but in this section

41-XX Approximations and expansions {For approximation theory in the complex domain, see 30E05, 30E10; for trigonometric approximation and interpolation, see 42A10, 42A15; for numerical approximation, see 65Dxx}

41-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to approximations and expansions

41-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to approximations and expansions

41-02 Research exposition (monographs, survey articles) pertaining to approximations and expansions

41-03 History of approximations and expansions [Consider also classification numbers pertaining to Section 01]

41-04 Software, source code, etc. for problems pertaining to approximations and expansions

41-06 Proceedings, conferences, collections, etc. pertaining to approximations and expansions

41-11 Research data for problems pertaining to approximations and expansions

41Axx Approximations and expansions {For approximation theory in the complex domain, see 30E05, 30E10; for trigonometric approximation and interpolation, see 42A10, 42A15; for numerical approximation, see 65Dxx}

41A05 Interpolation in approximation theory [See also 42A15, 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 in approximation theory

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 in approximation theory

41A44 Best constants in approximation theory

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 from Section 41)

41A65 Abstract approximation theory (approximation in normed linear spaces and other abstract spaces)

41A80 Remainders in approximation formulas

41A81 Weighted approximation

41A99 None of the above, but in this section

42-XX Harmonic analysis on Euclidean spaces

42-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to harmonic analysis on Euclidean spaces

42-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to harmonic analysis on Euclidean spaces

42-02 Research exposition (monographs, survey articles) pertaining to harmonic analysis on Euclidean spaces

42-03 History of harmonic analysis on Euclidean spaces [Consider also classification numbers pertaining to Section 01]

42-04 Software, source code, etc. for problems pertaining to harmonic analysis on Euclidean spaces

42-06 Proceedings, conferences, collections, etc. pertaining to harmonic analysis on Euclidean spaces

42-08 Computational methods for problems pertaining to harmonic analysis on Euclidean spaces

42-11 Research data for problems pertaining to harmonic analysis on Euclidean spaces

42Axx Harmonic analysis in one variable

42A05 Trigonometric polynomials, inequalities, extremal problems

42A10 Trigonometric approximation

42A15 Trigonometric interpolation

42A16 Fourier coefficients, Fourier series of functions with special properties, special Fourier series {For automorphic theory, see mainly 11F30}

42A20 Convergence and absolute convergence of Fourier and trigonometric series

42A24 Summability and absolute summability of Fourier and trigonometric series

42A32 Trigonometric series of special types (positive coefficients, monotonic coefficients, etc.)

42A38 Fourier and Fourier-Stieltjes transforms and other transforms of Fourier type

42A45 Multipliers in one variable harmonic analysis

42A50 Conjugate functions, conjugate series, singular integrals

42A55 Lacunary series of trigonometric and other functions; Riesz products

42A61 Probabilistic methods for one variable harmonic analysis

42A63 Uniqueness of trigonometric expansions, uniqueness of Fourier expansions, Riemann theory, localization

42A65 Completeness of sets of functions in one variable harmonic analysis

42A70 Trigonometric moment problems in one variable harmonic analysis

42A75 Classical almost periodic functions, mean periodic functions [See also 43A60]

42A82 Positive definite functions in one variable harmonic analysis

42A85 Convolution, factorization for one variable harmonic analysis

42A99 None of the above, but in this section

42Bxx Harmonic analysis in several variables {For automorphic theory, see mainly 11F30}

42B05 Fourier series and coefficients in several variables

42B08 Summability in several variables

42B10 Fourier and Fourier-Stieltjes transforms and other transforms of Fourier type

42B15 Multipliers for harmonic analysis in several variables

42B20 Singular and oscillatory integrals (Calderón-Zygmund, etc.)

42B25 Maximal functions, Littlewood-Paley theory

42B30 H^p-spaces

42B35 Function spaces arising in harmonic analysis

42B37 Harmonic analysis and PDEs [See also 35-XX]

42B99 None of the above, but in this section

42Cxx Nontrigonometric harmonic analysis

42C05 Orthogonal functions and polynomials, general theory of nontrigonometric harmonic analysis [See also 33C45, 33C50, 33D45]

42C10 Fourier series in special orthogonal functions (Legendre polynomials, Walsh functions, etc.)

42C15 General harmonic expansions, frames

42C20 Other transformations of harmonic type

42C25 Uniqueness and localization for orthogonal series

42C30 Completeness of sets of functions in nontrigonometric harmonic analysis

42C40 Nontrigonometric harmonic analysis involving wavelets and other special systems

42C99 None of the above, but in this section

43-XX Abstract harmonic analysis {For other analysis on topological and Lie groups, see 22Exx}

43-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to abstract harmonic analysis

43-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to abstract harmonic analysis

43-02 Research exposition (monographs, survey articles) pertaining to abstract harmonic analysis

43-03 History of abstract harmonic analysis [Consider also classification numbers pertaining to Section 01]

43-04 Software, source code, etc. for problems pertaining to abstract harmonic analysis

43-06 Proceedings, conferences, collections, etc. pertaining to abstract harmonic analysis

43-08 Computational methods for problems pertaining to abstract harmonic analysis

43-11 Research data for problems pertaining to abstract harmonic analysis

43Axx Abstract harmonic analysis {For other analysis on topological and Lie groups, see 22Exx}

43A05 Measures on groups and semigroups, etc.

43A07 Means on groups, semigroups, etc.; amenable groups

43A10 Measure algebras on groups, semigroups, etc.

43A15 L^p-spaces and other function spaces on groups, semigroups, etc.

43A17 Analysis on ordered groups, H^p-theory

43A20 L^1-algebras on groups, semigroups, etc.

43A22 Homomorphisms and multipliers of function spaces on groups, semigroups, etc.

43A25 Fourier and Fourier-Stieltjes transforms on locally compact and other abelian groups

43A30 Fourier and Fourier-Stieltjes transforms on non-abelian 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 Harmonic analysis on hypergroups

43A65 Representations of groups, semigroups, etc. (aspects of abstract harmonic analysis) [See also 22A10, 22A20, 22Dxx, 22E45]

43A70 Analysis on specific locally compact and other abelian groups [See also 11R56, 22B05]

43A75 Harmonic analysis on specific compact groups

43A77 Harmonic analysis on general compact groups

43A80 Analysis on other specific Lie groups [See also 22Exx]

43A85 Harmonic analysis on homogeneous spaces

43A90 Harmonic analysis and spherical functions [See also 22E45, 22E46, 33C55]

43A95 Categorical methods for abstract harmonic analysis [See also 46Mxx]

43A99 None of the above, but in this section

44-XX Integral transforms, operational calculus {For fractional derivatives and integrals, see 26A33; for Fourier transforms, see 42A38, 42B10; for integral transforms in distribution spaces, see 46F12; for numerical methods, see 65R10}

44-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to integral transforms

44-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to integral transforms

44-02 Research exposition (monographs, survey articles) pertaining to integral transforms

44-03 History of integral transforms [Consider also classification numbers pertaining to Section 01]

44-04 Software, source code, etc. for problems pertaining to integral transforms

44-06 Proceedings, conferences, collections, etc. pertaining to integral transforms

44-11 Research data for problems pertaining to integral transforms

44Axx Integral transforms, operational calculus {For fractional derivatives and integrals, see 26A33; for Fourier transforms, see 42A38, 42B10; for integral transforms in distribution spaces, see 46F12; for numerical methods, see 65R10}

44A05 General integral transforms [See also 42A38]

44A10 Laplace transform

44A12 Radon transform [See also 92C55]

44A15 Special integral transforms (Legendre, Hilbert, etc.)

44A20 Integral transforms of special functions

44A30 Multiple integral transforms

44A35 Convolution as an integral transform

44A40 Calculus of Mikusiński and other operational calculi

44A45 Classical operational calculus

44A55 Discrete operational calculus

44A60 Moment problems {For trigonometric moment problems, see 42A70}

44A99 None of the above, but in this section

45-XX Integral equations

45-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to integral equations

45-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to integral equations

45-02 Research exposition (monographs, survey articles) pertaining to integral equations

45-03 History of integral equations [Consider also classification numbers pertaining to Section 01]

45-04 Software, source code, etc. for problems pertaining to integral equations

45-06 Proceedings, conferences, collections, etc. pertaining to integral equations

45-11 Research data for problems pertaining to integral equations

45Axx Linear integral equations

45A05 Linear integral equations

45A99 None of the above, but in this section

45Bxx Fredholm integral equations

45B05 Fredholm integral equations

45B99 None of the above, but in this section

45Cxx Eigenvalue problems for integral equations [See also 34Lxx, 35Pxx, 45P05, 47A75]

45C05 Eigenvalue problems for integral equations [See also 34Lxx, 35Pxx, 45P05, 47A75]

45C99 None of the above, but in this section

45Dxx Volterra integral equations [See also 34A12]

45D05 Volterra integral equations [See also 34A12]

45D99 None of the above, but in this section

45Exx Singular integral equations [See also 30E20, 30E25, 44A15, 44A35]

45E05 Integral equations with kernels of Cauchy type [See also 35J15]

45E10 Integral equations of the convolution type (Abel, Picard, Toeplitz and Wiener-Hopf type) [See also 47B35]

45E99 None of the above, but in this section

45Fxx Systems of linear integral equations

45F05 Systems of nonsingular linear integral equations

45F10 Dual, triple, etc., integral and series equations

45F15 Systems of singular linear integral equations

45F99 None of the above, but in this section

45Gxx Nonlinear integral equations [See also 47H30, 47Jxx]

45G05 Singular nonlinear integral equations

45G10 Other nonlinear integral equations

45G15 Systems of nonlinear integral equations

45G99 None of the above, but in this section

45Hxx Integral equations with miscellaneous special kernels [See also 44A15]

45H05 Integral equations with miscellaneous special kernels [See also 44A15]

45H99 None of the above, but in this section

45Jxx Integro-ordinary differential equations [See also 34K05, 34K30, 47G20]

45J05 Integro-ordinary differential equations [See also 34K05, 34K30, 47G20]

45J99 None of the above, but in this section

45Kxx Integro-partial differential equations [See also 34K30, 35R09, 35R10, 47G20]

45K05 Integro-partial differential equations [See also 34K30, 35R09, 35R10, 47G20]

45K99 None of the above, but in this section

45Lxx Theoretical approximation of solutions to integral equations {For numerical analysis, see 65Rxx}

45L05 Theoretical approximation of solutions to integral equations {For numerical analysis, see 65Rxx}

45L99 None of the above, but in this section

45Mxx Qualitative behavior of solutions to integral equations

45M05 Asymptotics of solutions to integral equations

45M10 Stability theory for integral equations

45M15 Periodic solutions of integral equations

45M20 Positive solutions of integral equations

45M99 None of the above, but in this section

45Nxx Abstract integral equations, integral equations in abstract spaces

45N05 Abstract integral equations, integral equations in abstract spaces

45N99 None of the above, but in this section

45Pxx Integral operators [See also 47B38, 47G10]

45P05 Integral operators [See also 47B38, 47G10]

45P99 None of the above, but in this section

45Qxx Inverse problems for integral equations

45Q05 Inverse problems for integral equations

45Q99 None of the above, but in this section

45Rxx Random integral equations [See also 60H20]

45R05 Random integral equations [See also 60H20]

45R99 None of the above, but in this section

46-XX Functional analysis {For manifolds modeled on topological linear spaces, see 57Nxx, 58Bxx}

46-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to functional analysis

46-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to functional analysis

46-02 Research exposition (monographs, survey articles) pertaining to functional analysis

46-03 History of functional analysis [Consider also classification numbers pertaining to Section 01]

46-04 Software, source code, etc. for problems pertaining to functional analysis

46-06 Proceedings, conferences, collections, etc. pertaining to functional analysis

46-08 Computational methods for problems pertaining to functional analysis

46-11 Research data for problems pertaining to functional analysis

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 $\mathbb{R}$, etc.)

46A20 Duality theory for topological vector spaces

46A22 Theorems of Hahn-Banach type; extension and lifting of functionals and operators [See also 46M10]

46A25 Reflexivity and semi-reflexivity [See also 46B10]

46A30 Open mapping and closed graph theorems; completeness (including B-, B_r-completeness)

46A32 Spaces of linear operators; topological tensor products; approximation properties [See also 46B28, 46M05, 47L05, 47L20]

46A35 Summability and bases in topological vector spaces [See also 46B15]

46A40 Ordered topological linear spaces, vector lattices [See also 06F20, 46B40, 46B42]

46A45 Sequence spaces (including Köthe sequence spaces) [See also 46B45]

46A50 Compactness in topological linear spaces; angelic spaces, etc.

46A55 Convex sets in topological linear spaces; Choquet theory [See also 52A07]

46A61 Graded Fréchet spaces and tame operators

46A63 Topological invariants ((DN), (Ω), etc.) for locally convex spaces

46A70 Saks spaces and their duals (strict topologies, mixed topologies, two-norm spaces, co-Saks spaces, etc.)

46A80 Modular spaces

46A99 None of the above, but in this section

46Bxx Normed linear spaces and Banach spaces; Banach lattices {For function spaces, see 46Exx}

46B03 Isomorphic theory (including renorming) of Banach spaces

46B04 Isometric theory of Banach spaces

46B06 Asymptotic theory of Banach spaces [See also 52A23]

46B07 Local theory of Banach spaces

46B08 Ultraproduct techniques in Banach space theory [See also 46M07]

46B09 Probabilistic methods in Banach space theory [See also 60Bxx]

46B10 Duality and reflexivity in normed linear and Banach spaces [See also 46A25]

46B15 Summability and bases; functional analytic aspects of frames in Banach and Hilbert spaces [See also 46A35, 42C15]

46B20 Geometry and structure of normed linear spaces

46B22 Radon-Nikodým, Kreĭn-Milman and related properties [See also 46G10]

46B25 Classical Banach spaces in the general theory

46B26 Nonseparable Banach spaces

46B28 Spaces of operators; tensor products; approximation properties [See also 46A32, 46M05, 47L05, 47L20]

46B40 Ordered normed spaces [See also 46A40, 46B42]

46B42 Banach lattices [See also 46A40, 46B40]

46B45 Banach sequence spaces [See also 46A45]

46B50 Compactness in Banach (or normed) spaces

46B70 Interpolation between normed linear spaces [See also 46M35]

46B80 Nonlinear classification of Banach spaces; nonlinear quotients

46B85 Embeddings of discrete metric spaces into Banach spaces; applications in topology and computer science [See also 05C12, 68Rxx]

46B87 Lineability in functional analysis [See also 15A03]

46B99 None of the above, but in this section

46Cxx Inner product spaces and their generalizations, Hilbert spaces {For function spaces, see 46Exx}

46C05 Hilbert and pre-Hilbert spaces: geometry and topology (including spaces with semidefinite inner product)

46C07 Hilbert subspaces (= operator ranges); complementation (Aronszajn, de Branges, etc.) [See also 46B70, 46M35]

46C15 Characterizations of Hilbert spaces

46C20 Spaces with indefinite inner product (Kreĭn spaces, Pontryagin spaces, etc.) [See also 47B50]

46C50 Generalizations of inner products (semi-inner products, partial inner products, etc.)

46C99 None of the above, but in this section

46Exx Linear function spaces and their duals [See also 30H05, 32A38, 46F05] {For function algebras, see 46J10}

46E05 Lattices of continuous, differentiable or analytic functions

46E10 Topological linear spaces of continuous, differentiable or analytic functions

46E15 Banach spaces of continuous, differentiable or analytic functions

46E20 Hilbert spaces of continuous, differentiable or analytic functions

46E22 Hilbert spaces with reproducing kernels (= (proper) functional Hilbert spaces, including de Branges-Rovnyak and other structured spaces) [See also 47B32]

46E25 Rings and algebras of continuous, differentiable or analytic functions {For Banach function algebras, see 46J10, 46J15}

46E27 Spaces of measures [See also 28A33, 46Gxx]

46E30 Spaces of measurable functions (L^p-spaces, Orlicz spaces, Köthe function spaces, Lorentz spaces, rearrangement invariant spaces, ideal spaces, etc.)

46E35 Sobolev spaces and other spaces of "smooth" functions, embedding theorems, trace theorems

46E36 Sobolev (and similar kinds of) spaces of functions on metric spaces; analysis on metric spaces

46E39 Sobolev (and similar kinds of) spaces of functions of discrete variables

46E40 Spaces of vector- and operator-valued functions

46E50 Spaces of differentiable or holomorphic functions on infinite-dimensional spaces [See also 46G20, 46G25, 47H60]

46E99 None of the above, but in this section

46Fxx Distributions, generalized functions, distribution spaces [See also 46T30]

46F05 Topological linear spaces of test functions, distributions and ultradistributions [See also 46E10, 46E35]

46F10 Operations with distributions and generalized functions

46F12 Integral transforms in distribution spaces [See also 42-XX, 44-XX]

46F15 Hyperfunctions, analytic functionals [See also 32A25, 32A45, 32C35, 58J15]

46F20 Distributions and ultradistributions as boundary values of analytic functions [See also 30D40, 30E25, 32A40]

46F25 Distributions on infinite-dimensional spaces [See also 58C35]

46F30 Generalized functions for nonlinear analysis (Rosinger, Colombeau, nonstandard, etc.)

46F99 None of the above, but in this section

46Gxx Measures, integration, derivative, holomorphy (all involving infinite-dimensional spaces) [See also 28-XX, 46Txx]

46G05 Derivatives of functions in infinite-dimensional spaces [See also 46T20, 58C20, 58C25]

46G10 Vector-valued measures and integration [See also 28Bxx, 46B22]

46G12 Measures and integration on abstract linear spaces [See also 28C20, 46T12]

46G15 Functional analytic lifting theory [See also 28A51]

46G20 Infinite-dimensional holomorphy [See also 32-XX, 46E50, 46T25, 58B12, 58C10]

46G25 (Spaces of) multilinear mappings, polynomials [See also 46E50, 46G20, 47H60]

46G99 None of the above, but in this section

46Hxx Topological algebras, normed rings and algebras, Banach algebras {For group algebras, convolution algebras and measure algebras, see 43A10, 43A20}

46H05 General theory of topological algebras

46H10 Ideals and subalgebras

46H15 Representations of topological algebras

46H20 Structure, classification of topological algebras

46H25 Normed modules and Banach modules, topological modules (if not placed in 13-XX or 16-XX)

46H30 Functional calculus in topological algebras [See also 47A60]

46H35 Topological algebras of operators [See mainly 47Lxx]

46H40 Automatic continuity

46H70 Nonassociative topological algebras [See also 46K70, 46L70]

46H99 None of the above, but in this section

46Jxx Commutative Banach algebras and commutative topological algebras [See also 46E25]

46J05 General theory of commutative topological algebras

46J10 Banach algebras of continuous functions, function algebras [See also 46E25]

46J15 Banach algebras of differentiable or analytic functions, H^p-spaces [See also 30H10, 32A35, 32A37, 32A38, 42B30]

46J20 Ideals, maximal ideals, boundaries

46J25 Representations of commutative topological algebras

46J30 Subalgebras of commutative topological algebras

46J40 Structure and classification of commutative topological algebras

46J45 Radical Banach algebras

46J99 None of the above, but in this section

46Kxx Topological (rings and) algebras with an involution [See also 16W10]

46K05 General theory of topological algebras with involution

46K10 Representations of topological algebras with involution

46K15 Hilbert algebras

46K50 Nonselfadjoint (sub)algebras in algebras with involution

46K70 Nonassociative topological algebras with an involution [See also 46H70, 46L70]

46K99 None of the above, but in this section

46Lxx Selfadjoint operator algebras (C^*-algebras, von Neumann (W^*-) algebras, etc.) [See also 22D25, 47Lxx]

46L05 General theory of C^*-algebras

46L06 Tensor products of C^*-algebras

46L07 Operator spaces and completely bounded maps [See also 47L25]

46L08 C^*-modules

46L09 Free products of C^*-algebras

46L10 General theory of von Neumann algebras

46L30 States of selfadjoint operator algebras

46L35 Classifications of C^*-algebras

46L36 Classification of factors

46L37 Subfactors and their classification

46L40 Automorphisms of selfadjoint operator algebras

46L45 Decomposition theory for C^*-algebras

46L51 Noncommutative measure and integration

46L52 Noncommutative function spaces

46L53 Noncommutative probability and statistics

46L54 Free probability and free operator algebras

46L55 Noncommutative dynamical systems [See also 28Dxx, 37Kxx, 37Lxx, 37A55]

46L57 Derivations, dissipations and positive semigroups in C^*-algebras

46L60 Applications of selfadjoint operator algebras to physics [See also 46N50, 46N55, 47L90, 81T05, 82B10, 82C10]

46L65 Quantizations, deformations for selfadjoint operator algebras

46L67 Quantum groups (operator algebraic aspects)

46L70 Nonassociative selfadjoint operator algebras [See also 46H70, 46K70]

46L80 K-theory and operator algebras (including cyclic theory) [See also 18F25, 19Kxx, 46M20, 55Rxx, 58J22]

46L85 Noncommutative topology [See also 58B32, 58B34, 58J22]

46L87 Noncommutative differential geometry [See also 58B32, 58B34, 58J22]

46L89 Other "noncommutative" mathematics based on C^*-algebra theory [See also 58B32, 58B34, 58J22]

46L99 None of the above, but in this section

46Mxx Methods of category theory in functional analysis [See also 18-XX]

46M05 Tensor products in functional analysis [See also 46A32, 46B28, 47A80]

46M07 Ultraproducts in functional analysis [See also 46B08, 46S20]

46M10 Projective and injective objects in functional analysis [See also 46A22]

46M15 Categories, functors in functional analysis {For K-theory, Ext, etc., see 19K33, 46L80, 46M18, 46M20}

46M18 Homological methods in functional analysis (exact sequences, right inverses, lifting, etc.)

46M20 Methods of algebraic topology in functional analysis (cohomology, sheaf and bundle theory, etc.) [See also 14F06, 18Fxx, 19Kxx, 32Cxx, 32Lxx, 46L80, 46M15, 46M18, 55Rxx]

46M35 Abstract interpolation of topological vector spaces [See also 46B70]

46M40 Inductive and projective limits in functional analysis [See also 46A13]

46M99 None of the above, but in this section

46Nxx Miscellaneous applications of functional analysis [See also 47Nxx]

46N10 Applications of functional analysis in optimization, convex analysis, mathematical programming, economics

46N20 Applications of functional analysis to differential and integral equations

46N30 Applications of functional analysis in probability theory and statistics

46N40 Applications of functional analysis in numerical analysis [See also 65Jxx]

46N50 Applications of functional analysis in quantum physics

46N55 Applications of functional analysis in statistical physics

46N60 Applications of functional analysis in biology and other sciences

46N99 None of the above, but in this section

46Sxx Other (nonclassical) types of functional analysis [See also 47Sxx]

46S05 Quaternionic functional analysis

46S10 Functional analysis over fields other than $\mathbb{R}$ or $\mathbb{C}$ or the quaternions; non-Archimedean functional analysis [See also 12J25, 32P05]

46S20 Nonstandard functional analysis [See also 03H05]

46S30 Constructive functional analysis [See also 03F60]

46S40 Fuzzy functional analysis [See also 03E72]

46S50 Functional analysis in probabilistic metric linear spaces

46S60 Functional analysis on superspaces (supermanifolds) or graded spaces [See also 58A50, 58C50]

46S99 None of the above, but in this section

46Txx Nonlinear functional analysis [See also 47Hxx, 47Jxx, 58Cxx, 58Dxx]

46T05 Infinite-dimensional manifolds [See also 53Axx, 57N20, 58Bxx, 58Dxx]

46T10 Manifolds of mappings

46T12 Measure (Gaussian, cylindrical, etc.) and integrals (Feynman, path, Fresnel, etc.) on manifolds [See also 28Cxx, 46G12, 60-XX]

46T20 Continuous and differentiable maps in nonlinear functional analysis [See also 46G05]

46T25 Holomorphic maps in nonlinear functional analysis [See also 46G20]

46T30 Distributions and generalized functions on nonlinear spaces [See also 46Fxx]

46T99 None of the above, but in this section

47-XX Operator theory

47-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to operator theory

47-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to operator theory

47-02 Research exposition (monographs, survey articles) pertaining to operator theory

47-03 History of operator theory [Consider also classification numbers pertaining to Section 01]

47-04 Software, source code, etc. for problems pertaining to operator theory

47-06 Proceedings, conferences, collections, etc. pertaining to operator theory

47-08 Computational methods for problems pertaining to operator theory

47-11 Research data for problems pertaining to operator theory

47Axx General theory of linear operators

47A05 General (adjoints, conjugates, products, inverses, domains, ranges, etc.)

47A06 Linear relations (multivalued linear operators)

47A07 Forms (bilinear, sesquilinear, multilinear)

47A08 Operator matrices [See also 47A13]

47A10 Spectrum, resolvent

47A11 Local spectral properties of linear operators

47A12 Numerical range, numerical radius

47A13 Several-variable operator theory (spectral, Fredholm, etc.)

47A15 Invariant subspaces of linear operators [See also 47A46]

47A16 Cyclic vectors, hypercyclic and chaotic operators

47A20 Dilations, extensions, compressions of linear operators

47A25 Spectral sets of linear operators

47A30 Norms (inequalities, more than one norm, etc.) of linear operators

47A35 Ergodic theory of linear operators [See also 28Dxx, 37Axx]

47A40 Scattering theory of linear operators [See also 34L25, 35P25, 37K15, 58J50, 81Uxx]

47A45 Canonical models for contractions and nonselfadjoint linear operators

47A46 Chains (nests) of projections or of invariant subspaces, integrals along chains, etc.

47A48 Operator colligations (= nodes), vessels, linear systems, characteristic functions, realizations, etc.

47A50 Equations and inequalities involving linear operators, with vector unknowns

47A52 Linear operators and ill-posed problems, regularization [See also 35R25, 47J06, 65F22, 65J20, 65L08, 65M30, 65R30]

47A53 (Semi-) Fredholm operators; index theories [See also 58B15, 58J20]

47A55 Perturbation theory of linear operators [See also 47H14, 58J37, 70H09, 81Q15]

47A56 Functions whose values are linear operators (operator- and matrix-valued functions, etc., including analytic and meromorphic ones)

47A57 Linear operator methods in interpolation, moment and extension problems [See also 30E05, 42A70, 42A82, 44A60]

47A58 Linear operator approximation theory

47A60 Functional calculus for linear operators

47A62 Equations involving linear operators, with operator unknowns

47A63 Linear operator inequalities

47A64 Operator means involving linear operators, shorted linear operators, etc.

47A65 Structure theory of linear operators

47A66 Quasitriangular and nonquasitriangular, quasidiagonal and nonquasidiagonal linear operators

47A67 Representation theory of linear operators

47A68 Factorization theory (including Wiener-Hopf and spectral factorizations) of linear operators

47A70 (Generalized) eigenfunction expansions of linear operators; rigged Hilbert spaces

47A75 Eigenvalue problems for linear operators [See also 47J10, 49R05]

47A80 Tensor products of linear operators [See also 46M05]

47A99 None of the above, but in this section

47Bxx Special classes of linear operators

47B01 Operators on Banach spaces

47B02 Operators on Hilbert spaces (general)

47B06 Riesz operators; eigenvalue distributions; approximation numbers, s-numbers, Kolmogorov numbers, entropy numbers, etc. of operators

47B07 Linear operators defined by compactness properties

47B10 Linear operators belonging to operator ideals (nuclear, p-summing, in the Schatten-von Neumann classes, etc.) [See also 47L20]

47B12 Sectorial operators

47B13 Cowen-Douglas operators

47B15 Hermitian and normal operators (spectral measures, functional calculus, etc.)

47B20 Subnormal operators, hyponormal operators, etc.

47B25 Linear symmetric and selfadjoint operators (unbounded)

47B28 Nonselfadjoint operators [See also 47A45, 81Q12]

47B32 Linear operators in reproducing-kernel Hilbert spaces (including de Branges, de Branges-Rovnyak, and other structured spaces) [See also 46E22]

47B33 Linear composition operators

47B34 Kernel operators

47B35 Toeplitz operators, Hankel operators, Wiener-Hopf operators {For other integral operators, see also 45P05, 47G10} [See also 32A25, 32M15]

47B36 Jacobi (tridiagonal) operators (matrices) and generalizations

47B37 Linear operators on special spaces (weighted shifts, operators on sequence spaces, etc.)

47B38 Linear operators on function spaces (general)

47B39 Linear difference operators [See also 39A70]

47B40 Spectral operators, decomposable operators, well-bounded operators, etc.

47B44 Linear accretive operators, dissipative operators, etc.

47B47 Commutators, derivations, elementary operators, etc.

47B48 Linear operators on Banach algebras

47B49 Transformers, preservers (linear operators on spaces of linear operators)

47B50 Linear operators on spaces with an indefinite metric [See also 46C20]

47B60 Linear operators on ordered spaces

47B65 Positive linear operators and order-bounded operators

47B80 Random linear operators [See also 47H40, 60H25]

47B90 Operator theory and harmonic analysis [See also 42-XX, 43-XX, 44-XX]

47B91 Operators on complex function spaces

47B92 Operators on real function spaces

47B93 Operators arising in mathematical physics

47B99 None of the above, but in this section

47Cxx Individual linear operators as elements of algebraic systems

47C05 Linear operators in algebras

47C10 Linear operators in *-algebras

47C15 Linear operators in C^*- or von Neumann algebras

47C99 None of the above, but in this section

47Dxx Groups and semigroups of linear operators, their generalizations and applications

47D03 Groups and semigroups of linear operators [See also 20M20] {For nonlinear operators, see 47H20}

47D06 One-parameter semigroups and linear evolution equations [See also 34G10, 34K30]

47D07 Markov semigroups and applications to diffusion processes {For Markov processes, see 60Jxx}

47D08 Schrödinger and Feynman-Kac semigroups

47D09 Operator sine and cosine functions and higher-order Cauchy problems [See also 34G10]

47D60 C-semigroups, regularized semigroups

47D62 Integrated semigroups

47D99 None of the above, but in this section

47Exx Ordinary differential operators [See also 34Bxx, 34Lxx]

47E05 General theory of ordinary differential operators (should also be assigned at least one other classification number in Section 47) [See also 34Bxx, 34Lxx]

47E07 Functional-differential and differential-difference operators [See also 34K08]

47E99 None of the above, but in this section

47Fxx Partial differential operators [See also 35Pxx, 58Jxx]

47F05 General theory of partial differential operators (should also be assigned at least one other classification number in Section 47) [See also 35Pxx, 58Jxx]

47F10 Elliptic operators and their generalizations {For elliptic complexes, see 58J10}

47F99 None of the above, but in this section

47Gxx Integral, integro-differential, and pseudodifferential operators [See also 58Jxx]

47G10 Integral operators [See also 45P05]

47G20 Integro-differential operators [See also 34K30, 35R09, 35R10, 45Jxx, 45Kxx]

47G30 Pseudodifferential operators [See also 35Sxx, 58Jxx]

47G40 Potential operators [See also 31-XX]

47G99 None of the above, but in this section

47Hxx Nonlinear operators and their properties {For global and geometric aspects, see 49J53, 58-XX, especially 58Cxx}

47H04 Set-valued operators [See also 28B20, 54C60, 58C06]

47H05 Monotone operators and generalizations

47H06 Nonlinear accretive operators, dissipative operators, etc.

47H07 Monotone and positive operators on ordered Banach spaces or other ordered topological vector spaces

47H08 Measures of noncompactness and condensing mappings, K-set contractions, etc.

47H09 Contraction-type mappings, nonexpansive mappings, A-proper mappings, etc.

47H10 Fixed-point theorems [See also 37C25, 54H25, 55M20, 58C30]

47H11 Degree theory for nonlinear operators [See also 55M25, 58C30]

47H14 Perturbations of nonlinear operators [See also 47A55, 58J37, 70H09, 70K60, 81Q15]

47H20 Semigroups of nonlinear operators [See also 37L05, 47J35, 54H15, 58D07]

47H25 Nonlinear ergodic theorems [See also 28Dxx, 37Axx, 47A35]

47H30 Particular nonlinear operators (superposition, Hammerstein, Nemytskiĭ, Uryson, etc.) [See also 45Gxx, 45P05]

47H40 Random nonlinear operators [See also 47B80, 60H25]

47H60 Multilinear and polynomial operators [See also 46G25]

47H99 None of the above, but in this section

47Jxx Equations and inequalities involving nonlinear operators [See also 46Txx] {For global and geometric aspects, see 58-XX}

47J05 Equations involving nonlinear operators (general) [See also 47H10, 47J25]

47J06 Nonlinear ill-posed problems [See also 35R25, 47A52, 65F22, 65J20, 65L08, 65M30, 65R30]

47J07 Abstract inverse mapping and implicit function theorems involving nonlinear operators [See also 46T20, 58C15]

47J10 Nonlinear spectral theory, nonlinear eigenvalue problems [See also 49R05]

47J15 Abstract bifurcation theory involving nonlinear operators [See also 34C23, 37Gxx, 58E07, 58E09]

47J20 Variational and other types of inequalities involving nonlinear operators (general) [See also 49J40]

47J22 Variational and other types of inclusions [See also 34A60, 49J21, 49K21]

47J25 Iterative procedures involving nonlinear operators [See also 47J26, 65J15]

47J26 Fixed-point iterations [See also 47J25]

47J30 Variational methods involving nonlinear operators [See also 58Exx]

47J35 Nonlinear evolution equations [See also 34G20, 35K90, 35L90, 35Qxx, 35R20, 37Kxx, 37Lxx, 47H20, 58D25]

47J40 Equations with nonlinear hysteresis operators [See also 34C55, 74N30]

47J99 None of the above, but in this section

47Lxx Linear spaces and algebras of operators [See also 46Lxx]

47L05 Linear spaces of operators [See also 46A32, 46B28]

47L07 Convex sets and cones of operators [See also 46A55]

47L10 Algebras of operators on Banach spaces and other topological linear spaces

47L15 Operator algebras with symbol structure

47L20 Operator ideals [See also 47B10]

47L22 Ideals of polynomials and of multilinear mappings in operator theory

47L25 Operator spaces (= matricially normed spaces) [See also 46L07]

47L30 Abstract operator algebras on Hilbert spaces

47L35 Nest algebras, CSL algebras

47L40 Limit algebras, subalgebras of C^*-algebras

47L45 Dual algebras; weakly closed singly generated operator algebras

47L50 Dual spaces of operator algebras

47L55 Representations of (nonselfadjoint) operator algebras

47L60 Algebras of unbounded operators; partial algebras of operators

47L65 Crossed product algebras (analytic crossed products)

47L70 Nonassociative nonselfadjoint operator algebras

47L75 Other nonselfadjoint operator algebras

47L80 Algebras of specific types of operators (Toeplitz, integral, pseudodifferential, etc.)

47L90 Applications of operator algebras to the sciences

47L99 None of the above, but in this section

47Nxx Miscellaneous applications of operator theory [See also 46Nxx]

47N10 Applications of operator theory in optimization, convex analysis, mathematical programming, economics

47N20 Applications of operator theory to differential and integral equations

47N30 Applications of operator theory in probability theory and statistics

47N40 Applications of operator theory in numerical analysis [See also 65Jxx]

47N50 Applications of operator theory in the physical sciences

47N60 Applications of operator theory in chemistry and life sciences

47N70 Applications of operator theory in systems, signals, circuits, and control theory

47N99 None of the above, but in this section

47Sxx Other (nonclassical) types of operator theory [See also 46Sxx]

47S05 Quaternionic operator theory

47S10 Operator theory over fields other than $\mathbb{R}$, $\mathbb{C}$ or the quaternions; non-Archimedean operator theory

47S20 Nonstandard operator theory [See also 03H05]

47S30 Constructive operator theory [See also 03F60]

47S40 Fuzzy operator theory [See also 03E72]

47S50 Operator theory in probabilistic metric linear spaces [See also 54E70]

47S99 None of the above, but in this section

49-XX Calculus of variations and optimal control; optimization [See also 34H05, 34K35, 65Kxx, 90Cxx, 93-XX]

49-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to calculus of variations and optimal control

49-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to calculus of variations and optimal control

49-02 Research exposition (monographs, survey articles) pertaining to calculus of variations and optimal control

49-03 History of calculus of variations and optimal control [Consider also classification numbers pertaining to Section 01]

49-04 Software, source code, etc. for problems pertaining to calculus of variations and optimal control

49-06 Proceedings, conferences, collections, etc. pertaining to calculus of variations and optimal control

49-11 Research data for problems pertaining to calculus of variations and optimal control

49Jxx Existence theories in calculus of variations and optimal control

49J05 Existence theories for free problems in one independent variable

49J10 Existence theories for free problems in two or more independent variables

49J15 Existence theories for optimal control problems involving ordinary differential equations

49J20 Existence theories for optimal control problems involving partial differential equations

49J21 Existence theories for optimal control problems involving relations other than differential equations

49J27 Existence theories for problems in abstract spaces [See also 90C48, 93C25]

49J30 Existence of optimal solutions belonging to restricted classes (Lipschitz controls, bang-bang controls, etc.)

49J35 Existence of solutions for minimax problems

49J40 Variational inequalities [See also 47J20]

49J45 Methods involving semicontinuity and convergence; relaxation

49J50 Fréchet and Gateaux differentiability in optimization [See also 46G05, 58C20]

49J52 Nonsmooth analysis [See also 46G05, 58C50, 90C56]

49J53 Set-valued and variational analysis [See also 28B20, 47H04, 54C60, 58C06]

49J55 Existence of optimal solutions to problems involving randomness [See also 93E20]

49J99 None of the above, but in this section

49Kxx Optimality conditions

49K05 Optimality conditions for free problems in one independent variable

49K10 Optimality conditions for free problems in two or more independent variables

49K15 Optimality conditions for problems involving ordinary differential equations

49K20 Optimality conditions for problems involving partial differential equations

49K21 Optimality conditions for problems involving relations other than differential equations

49K27 Optimality conditions for problems in abstract spaces [See also 90C48, 93C25]

49K30 Optimality conditions for solutions belonging to restricted classes (Lipschitz controls, bang-bang controls, etc.)

49K35 Optimality conditions for minimax problems

49K40 Sensitivity, stability, well-posedness [See also 90C31]

49K45 Optimality conditions for problems involving randomness [See also 93E20]

49K99 None of the above, but in this section

49Lxx Hamilton-Jacobi theories [See also 70H20, 35F21]

49L12 Hamilton-Jacobi equations in optimal control and differential games

49L20 Dynamic programming in optimal control and differential games

49L25 Viscosity solutions to Hamilton-Jacobi equations in optimal control and differential games

49L99 None of the above, but in this section

49Mxx Numerical methods in optimal control [See also 65Kxx, 90-08, 90Cxx]

49M05 Numerical methods based on necessary conditions

49M15 Newton-type methods [See also 90C53]

49M20 Numerical methods of relaxation type

49M25 Discrete approximations in optimal control

49M27 Decomposition methods

49M29 Numerical methods involving duality

49M37 Numerical methods based on nonlinear programming [See also 65Kxx, 90C30]

49M41 PDE constrained optimization (numerical aspects)

49M99 None of the above, but in this section

49Nxx Miscellaneous topics in calculus of variations and optimal control

49N05 Linear optimal control problems [See also 93C05]

49N10 Linear-quadratic optimal control problems

49N15 Duality theory (optimization) [See also 90C46]

49N20 Periodic optimal control problems

49N25 Impulsive optimal control problems

49N30 Problems with incomplete information (optimization) [See also 93C41]

49N35 Optimal feedback synthesis [See also 93B52]

49N45 Inverse problems in optimal control

49N60 Regularity of solutions in optimal control

49N70 Differential games and control [See also 91A23]

49N75 Pursuit and evasion games [See also 91A24]

49N80 Mean field games and control [See also 91A16]

49N90 Applications of optimal control and differential games [See also 90C90, 91A80, 93C95]

49N99 None of the above, but in this section

49Qxx Manifolds and measure-geometric topics [See also 58Exx]

49Q05 Minimal surfaces and optimization [See also 53A10, 58E12]

49Q10 Optimization of shapes other than minimal surfaces [See also 90C90]

49Q12 Sensitivity analysis for optimization problems on manifolds

49Q15 Geometric measure and integration theory, integral and normal currents in optimization [See also 28A75, 32C30, 58A25, 58C35]

49Q20 Variational problems in a geometric measure-theoretic setting

49Q22 Optimal transportation [See also 90B06]

49Q99 None of the above, but in this section

49Rxx Variational methods for eigenvalues of operators (should also be assigned at least one other classification number in Section 49) [See also 47A75]

49R05 Variational methods for eigenvalues of operators (should also be assigned at least one other classification number in Section 49) [See also 47A75]

49R99 None of the above, but in this section

49Sxx Variational principles of physics (should also be assigned at least one other classification number in Section 49)

49S05 Variational principles of physics (should also be assigned at least one other classification number in Section 49)

49S99 None of the above, but in this section

51-XX Geometry {For algebraic geometry, see 14-XX; for differential geometry, see 53-XX}

51-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to geometry

51-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to geometry

51-02 Research exposition (monographs, survey articles) pertaining to geometry

51-03 History of geometry [Consider also classification numbers pertaining to Section 01]

51-04 Software, source code, etc. for problems pertaining to geometry

51-06 Proceedings, conferences, collections, etc. pertaining to geometry

51-08 Computational methods for problems pertaining to geometry

51-11 Research data for problems pertaining to geometry

51Axx Linear incidence geometry

51A05 General theory of linear incidence geometry and projective geometries

51A10 Homomorphism, automorphism and dualities in linear incidence geometry

51A15 Linear incidence geometric structures with parallelism

51A20 Configuration theorems in linear incidence geometry

51A25 Algebraization in linear incidence geometry [See also 12Kxx, 20N05]

51A30 Desarguesian and Pappian geometries

51A35 Non-Desarguesian affine and projective planes

51A40 Translation planes and spreads in linear incidence geometry

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 of nonlinear incidence geometry

51B10 Möbius geometries

51B15 Laguerre geometries

51B20 Minkowski geometries in nonlinear incidence geometry

51B25 Lie geometries in nonlinear incidence geometry

51B99 None of the above, but in this section

51Cxx Ring geometry (Hjelmslev, Barbilian, etc.)

51C05 Ring geometry (Hjelmslev, Barbilian, etc.)

51C99 None of the above, but in this section

51Dxx Geometric closure systems

51D05 Abstract (Maeda) geometries

51D10 Abstract geometries with exchange axiom

51D15 Abstract geometries with parallelism

51D20 Combinatorial geometries and geometric closure systems [See also 05B25, 05B35]

51D25 Lattices of subspaces and geometric closure systems [See also 05B35]

51D30 Continuous geometries, geometric closure systems 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 in finite geometry [See also 05B05]

51E10 Steiner systems in finite geometry [See also 05B05]

51E12 Generalized quadrangles and generalized polygons in finite geometry

51E14 Finite partial geometries (general), nets, partial spreads

51E15 Finite affine and projective planes (geometric aspects)

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 in finite geometry

51E24 Buildings and the geometry of diagrams

51E25 Other finite nonlinear geometries

51E26 Other finite linear geometries

51E30 Other finite incidence structures (geometric aspects) [See also 05B30]

51E99 None of the above, but in this section

51Fxx Metric geometry

51F05 Absolute planes in metric geometry

51F10 Absolute spaces in metric geometry

51F15 Reflection groups, reflection geometries [See also 20H10, 20H15] {For Coxeter groups, see 20F55}

51F20 Congruence and orthogonality in metric geometry [See also 20H05]

51F25 Orthogonal and unitary groups in metric geometry [See also 20H05]

51F30 Lipschitz and coarse geometry of metric spaces [See also 53C23]

51F99 None of the above, but in this section

51Gxx Ordered geometries (ordered incidence structures, etc.)

51G05 Ordered geometries (ordered incidence structures, etc.)

51G99 None of the above, but in this section

51Hxx Topological geometry

51H05 General theory of topological geometry

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, especially 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 of incidence groups

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 of distance geometry

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 in geometric order structures

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 in real or complex geometry

51M16 Inequalities and extremum problems in real or complex geometry {For convex problems, see 52A40}

51M20 Polyhedra and polytopes; regular figures, division of spaces [See also 51F15]

51M25 Length, area and volume in real or complex geometry [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 14L35, 20Gxx]

51N35 Questions of classical algebraic geometry [See also 14Nxx]

51N99 None of the above, but in this section

51Pxx Classical or axiomatic geometry and physics (should also be assigned at least one other classification number from Sections 70–86)

51P05 Classical or axiomatic geometry and physics (should also be assigned at least one other classification number from Sections 70–86)

51P99 None of the above, but in this section

52-XX Convex and discrete geometry

52-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to convex and discrete geometry

52-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to convex and discrete geometry

52-02 Research exposition (monographs, survey articles) pertaining to convex and discrete geometry

52-03 History of convex and discrete geometry [Consider also classification numbers pertaining to Section 01]

52-04 Software, source code, etc. for problems pertaining to convex and discrete geometry

52-06 Proceedings, conferences, collections, etc. pertaining to convex and discrete geometry

52-08 Computational methods for problems pertaining to convex and discrete geometry

52-11 Research data for problems pertaining to convex and discrete geometry

52Axx General convexity

52A01 Axiomatic and generalized convexity

52A05 Convex sets without dimension restrictions (aspects of convex geometry)

52A07 Convex sets in topological vector spaces (aspects of convex geometry) [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 Convexity and finite-dimensional Banach spaces (including special norms, zonoids, etc.) (aspects of convex geometry) [See also 46Bxx]

52A22 Random convex sets and integral geometry (aspects of convex geometry) [See also 53C65, 60D05]

52A23 Asymptotic theory of convex bodies [See also 46B06]

52A27 Approximation by convex sets

52A30 Variants of convex sets (star-shaped, (m, n)-convex, etc.)

52A35 Helly-type theorems and geometric transversal theory

52A37 Other problems of combinatorial convexity

52A38 Length, area, volume and convex sets (aspects of convex geometry) [See also 26B15, 28A75, 49Q20]

52A39 Mixed volumes and related topics in convex geometry

52A40 Inequalities and extremum problems involving convexity in convex geometry

52A41 Convex functions and convex programs in convex geometry [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 of polytopes and polyhedra (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 in convex geometry (including relations with commutative algebra and algebraic geometry) [See also 06A11, 13F20, 13F55, 13Hxx, 52C05, 52C07]

52B22 Shellability for polytopes and polyhedra

52B35 Gale and other diagrams

52B40 Matroids in convex geometry (realizations in the context of convex polytopes, convexity in combinatorial structures, etc.) [See also 05B35, 52Cxx]

52B45 Dissections and valuations (Hilbert's third problem, etc.)

52B55 Computational aspects related to convexity {For computational methods, see 52-08; for computational geometry and algorithms, see 68Q25, 68U05; for numerical algorithms, see 65Yxx} [See also 68Uxx]

52B60 Isoperimetric problems for polytopes

52B70 Polyhedral manifolds

52B99 None of the above, but in this section

52Cxx Discrete geometry

52C05 Lattices and convex bodies in 2 dimensions (aspects of discrete geometry) [See also 11H06, 11H31, 11P21]

52C07 Lattices and convex bodies in n dimensions (aspects of discrete geometry) [See also 11H06, 11H31, 11P21]

52C10 Erdős problems and related topics of discrete geometry [See also 11Hxx]

52C15 Packing and covering in 2 dimensions (aspects of discrete geometry) [See also 05B40, 11H31]

52C17 Packing and covering in n dimensions (aspects of discrete geometry) [See also 05B40, 11H31]

52C20 Tilings in 2 dimensions (aspects of discrete geometry) [See also 05B45, 51M20]

52C22 Tilings in n dimensions (aspects of discrete geometry) [See also 05B45, 51M20]

52C23 Quasicrystals and aperiodic tilings in discrete geometry

52C25 Rigidity and flexibility of structures (aspects of discrete geometry) [See also 70B15]

52C26 Circle packings and discrete conformal geometry

52C30 Planar arrangements of lines and pseudolines (aspects of discrete geometry)

52C35 Arrangements of points, flats, hyperplanes (aspects of discrete geometry) [See also 14N20, 32S22]

52C40 Oriented matroids in discrete geometry

52C45 Combinatorial complexity of geometric structures [See also 68U05]

52C99 None of the above, but in this section

53-XX Differential geometry {For differential topology, see 57Rxx; for foundational questions of differentiable manifolds, see 58Axx}

53-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to differential geometry

53-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to differential geometry

53-02 Research exposition (monographs, survey articles) pertaining to differential geometry

53-03 History of differential geometry [Consider also classification numbers pertaining to Section 01]

53-04 Software, source code, etc. for problems pertaining to differential geometry

53-06 Proceedings, conferences, collections, etc. pertaining to differential geometry

53-08 Computational methods for problems pertaining to differential geometry

53-11 Research data for problems pertaining to differential geometry

53Axx Classical differential geometry

53A04 Curves in Euclidean and related spaces

53A05 Surfaces in Euclidean and related spaces

53A07 Higher-dimensional and -codimensional surfaces in Euclidean and related n-spaces

53A10 Minimal surfaces in differential geometry, surfaces with prescribed mean curvature [See also 49Q05, 49Q10, 53C42]

53A15 Affine differential geometry

53A17 Differential geometric aspects in kinematics

53A20 Projective differential geometry

53A25 Differential line geometry

53A31 Differential geometry of submanifolds of Möbius space

53A35 Non-Euclidean differential geometry

53A40 Other special differential geometries

53A45 Differential geometric aspects in vector and tensor analysis

53A55 Differential invariants (local theory), geometric objects

53A60 Differential geometry of webs [See also 14C21, 20N05]

53A70 Discrete differential geometry

53A99 None of the above, but in this section

53Bxx Local differential geometry

53B05 Linear and affine connections

53B10 Projective connections

53B12 Differential geometric aspects of statistical manifolds and information geometry

53B15 Other connections

53B20 Local Riemannian geometry

53B21 Methods of local Riemannian geometry

53B25 Local submanifolds [See also 53C40]

53B30 Local differential geometry of Lorentz metrics, indefinite metrics

53B35 Local differential geometry of Hermitian and Kählerian structures [See also 32Qxx]

53B40 Local differential geometry of Finsler spaces and generalizations (areal metrics)

53B50 Applications of local differential geometry to the sciences

53B99 None of the above, but in this section

53Cxx Global differential geometry [See also 51H25, 58-XX] {For related bundle theory, see 55Rxx, 57Rxx}

53C05 Connections, general theory

53C07 Special connections and metrics on vector bundles (Hermite-Einstein, Yang-Mills) [See also 32Q20]

53C08 Differential geometric aspects of gerbes and differential characters

53C10 G-structures

53C12 Foliations (differential geometric aspects) [See also 57R30, 57R32]

53C15 General geometric structures on manifolds (almost complex, almost product structures, etc.)

53C17 Sub-Riemannian geometry

53C18 Conformal structures on manifolds

53C20 Global Riemannian geometry, including pinching [See also 31C12, 58B20]

53C21 Methods of global Riemannian geometry, including PDE methods; curvature restrictions [See also 58J60]

53C22 Geodesics in global differential geometry [See also 58E10]

53C23 Global geometric and topological methods (à la Gromov); differential geometric analysis on metric spaces

53C24 Rigidity results

53C25 Special Riemannian manifolds (Einstein, Sasakian, etc.)

53C26 Hyper-Kähler and quaternionic Kähler geometry, "special" geometry

53C27 Spin and Spin^c geometry

53C28 Twistor methods in differential geometry [See also 32L25]

53C29 Issues of holonomy in differential geometry

53C30 Differential geometry of homogeneous manifolds [See also 14M15, 14M17, 32M10, 57T15]

53C35 Differential geometry of symmetric spaces [See also 32M15, 57T15]

53C38 Calibrations and calibrated geometries

53C40 Global submanifolds [See also 53B25]

53C42 Differential geometry of immersions (minimal, prescribed curvature, tight, etc.) [See also 49Q05, 49Q10, 53A10, 57R40, 57R42]

53C43 Differential geometric aspects of harmonic maps [See also 58E20]

53C45 Global surface theory (convex surfaces à la A. D. Aleksandrov)

53C50 Global differential geometry of Lorentz manifolds, manifolds with indefinite metrics

53C55 Global differential geometry of Hermitian and Kählerian manifolds [See also 32Qxx]

53C56 Other complex differential geometry [See also 32Qxx]

53C60 Global differential geometry of 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 of global differential geometry to the sciences

53C99 None of the above, but in this section

53Dxx Symplectic geometry, contact geometry [See also 37Jxx, 70Gxx, 70Hxx]

53D05 Symplectic manifolds, general

53D10 Contact manifolds, general

53D12 Lagrangian submanifolds; Maslov index

53D15 Almost contact and almost symplectic manifolds

53D17 Poisson manifolds; Poisson groupoids and algebroids

53D18 Generalized geometries (à la Hitchin)

53D20 Momentum maps; symplectic reduction

53D22 Canonical transformations in symplectic and contact geometry

53D25 Geodesic flows in symplectic geometry and contact geometry

53D30 Symplectic structures of moduli spaces

53D35 Global theory of symplectic and contact manifolds [See also 57Rxx]

53D37 Symplectic aspects of mirror symmetry, homological mirror symmetry, and Fukaya category [See also 14J33]

53D40 Symplectic aspects of Floer homology and cohomology

53D42 Symplectic field theory; contact homology

53D45 Gromov-Witten invariants, quantum cohomology, Frobenius manifolds [See also 14N35]

53D50 Geometric quantization

53D55 Deformation quantization, star products

53D99 None of the above, but in this section

53Exx Geometric evolution equations

53E10 Flows related to mean curvature

53E20 Ricci flows

53E30 Flows related to complex manifolds (e.g., Kähler-Ricci flows, Chern-Ricci flows)

53E40 Higher-order geometric flows

53E50 Flows related to symplectic and contact structures

53E99 None of the above, but in this section

53Zxx Applications of differential geometry to sciences and engineering

53Z05 Applications of differential geometry to physics

53Z10 Applications of differential geometry to biology

53Z15 Applications of differential geometry to chemistry

53Z30 Applications of differential geometry to engineering

53Z50 Applications of differential geometry to data and computer science

53Z99 None of the above, but in this section

54-XX General topology {For the topology of manifolds of all dimensions, see 57Nxx}

54-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to general topology

54-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to general topology

54-02 Research exposition (monographs, survey articles) pertaining to general topology

54-03 History of general topology [Consider also classification numbers pertaining to Section 01]

54-04 Software, source code, etc. for problems pertaining to general topology

54-06 Proceedings, conferences, collections, etc. pertaining to general topology

54-08 Computational methods for problems pertaining to general topology

54-11 Research data for problems pertaining to general topology

54Axx Generalities in topology

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, nets, etc.)

54A25 Cardinality properties (cardinal functions and inequalities, discrete subsets) [See also 03Exx] {For ultrafilters, see 54D80}

54A35 Consistency and independence results in general topology [See also 03E35]

54A40 Fuzzy topology [See also 03E72]

54A99 None of the above, but in this section

54Bxx Basic constructions in general topology

54B05 Subspaces in general topology

54B10 Product spaces in general topology

54B15 Quotient spaces, decompositions in general topology

54B17 Adjunction spaces and similar constructions in general topology

54B20 Hyperspaces in general topology

54B30 Categorical methods in general topology [See also 18F60]

54B35 Spectra in general topology

54B40 Presheaves and sheaves in general topology [See also 18F20]

54B99 None of the above, but in this section

54Cxx Maps and general types of topological 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 in general topology [See also 26-XX]

54C35 Function spaces in general topology [See also 46Exx, 58D15]

54C40 Algebraic properties of function spaces in general topology [See also 46J10]

54C45 C- and C^*-embedding

54C50 Topology of 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 in general topology [See also 55P55, 57N25]

54C60 Set-valued maps in general topology [See also 26E25, 28B20, 47H04, 58C06]

54C65 Selections in general topology [See also 28B20]

54C70 Entropy in general topology

54C99 None of the above, but in this section

54Dxx Fairly general properties of topological spaces

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 in general topology

54D45 Local compactness, σ-compactness

54D50 k-spaces

54D55 Sequential spaces

54D60 Realcompactness and realcompactification

54D65 Separability of topological spaces

54D70 Base properties of topological spaces

54D80 Special constructions of topological spaces (spaces of ultrafilters, etc.)

54D99 None of the above, but in this section

54Exx Topological 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 of topological spaces

54F05 Linearly ordered topological spaces, generalized ordered spaces, and partially ordered spaces [See also 06B30, 06F30]

54F15 Continua and generalizations

54F16 Hyperspaces of continua

54F17 Inverse limits of set-valued functions

54F35 Higher-dimensional local connectedness [See also 55Mxx, 55Nxx]

54F45 Dimension theory in general topology [See also 55M10]

54F50 Topological 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 topological spaces

54G05 Extremally disconnected spaces, F-spaces, etc.

54G10 P-spaces

54G12 Scattered spaces

54G15 Pathological topological spaces

54G20 Counterexamples in general topology

54G99 None of the above, but in this section

54Hxx Connections of general topology with other structures, applications

54H05 Descriptive set theory (topological aspects of Borel, analytic, projective, etc. sets) [See also 03E15, 26A21, 28A05]

54H10 Topological representations of algebraic systems [See also 22-XX]

54H11 Topological groups (topological aspects) [See also 22A05]

54H12 Topological lattices, etc. (topological aspects) [See also 06B30, 06F30]

54H13 Topological fields, rings, etc. (topological aspects) [See also 12Jxx] {For algebraic aspects, see 13Jxx, 16W80}

54H15 Transformation groups and semigroups (topological aspects) [See also 20M20, 22-XX, 57Sxx]

54H25 Fixed-point and coincidence theorems (topological aspects) [See also 47H10, 55M20]

54H30 Applications of general topology to computer science (e.g., digital topology, image processing) [See also 68U03]

54H99 None of the above, but in this section

54Jxx Nonstandard topology [See also 03H05]

54J05 Nonstandard topology [See also 03H05]

54J99 None of the above, but in this section

55-XX Algebraic topology

55-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to algebraic topology

55-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to algebraic topology

55-02 Research exposition (monographs, survey articles) pertaining to algebraic topology

55-03 History of algebraic topology [Consider also classification numbers pertaining to Section 01]

55-04 Software, source code, etc. for problems pertaining to algebraic topology

55-06 Proceedings, conferences, collections, etc. pertaining to algebraic topology

55-08 Computational methods for problems pertaining to algebraic topology

55-11 Research data for problems pertaining to algebraic topology

55Mxx Classical topics in algebraic topology {For the topology of Euclidean spaces and manifolds, see 57Nxx}

55M05 Duality in algebraic topology

55M10 Dimension theory in algebraic topology [See also 54F45]

55M15 Absolute neighborhood retracts [See also 54C55]

55M20 Fixed points and coincidences in algebraic topology [See also 54H25]

55M25 Degree, winding number

55M30 Lyusternik-Shnirel'man category of a space, topological complexity à la Farber, topological robotics (topological aspects)

55M35 Finite groups of transformations in algebraic topology (including Smith theory) [See also 57S17]

55M99 None of the above, but in this section

55Nxx Homology and cohomology theories in algebraic topology [See also 57Txx]

55N05 Čech types

55N07 Steenrod-Sitnikov homologies

55N10 Singular homology and cohomology theory

55N15 Topological K-theory [See also 19Lxx] {For algebraic K-theory, see 18F25, 19-XX}

55N20 Generalized (extraordinary) homology and cohomology theories in algebraic topology

55N22 Bordism and cobordism theories and formal group laws in algebraic topology [See also 14L05, 19L41, 57R75, 57R77, 57R85, 57R90]

55N25 Homology with local coefficients, equivariant cohomology

55N30 Sheaf cohomology in algebraic topology [See also 18F20, 32C35, 32L10]

55N31 Persistent homology and applications, topological data analysis [See also 62R40, 68T09]

55N32 Orbifold cohomology

55N33 Intersection homology and cohomology in algebraic topology

55N34 Elliptic cohomology

55N35 Other homology theories in algebraic topology

55N40 Axioms for homology theory and uniqueness theorems in algebraic topology

55N45 Products and intersections in homology and cohomology

55N91 Equivariant homology and cohomology in algebraic topology [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 in algebraic topology

55P10 Homotopy equivalences in algebraic topology

55P15 Classification of homotopy type

55P20 Eilenberg-Mac Lane spaces

55P25 Spanier-Whitehead duality

55P30 Eckmann-Hilton duality

55P35 Loop spaces

55P40 Suspensions

55P42 Stable homotopy theory, spectra

55P43 Spectra with additional structure (E_∞, A_∞, ring spectra, etc.)

55P45 H-spaces and duals

55P47 Infinite loop spaces

55P48 Loop space machines and operads in algebraic topology [See also 18Mxx]

55P50 String topology

55P55 Shape theory [See also 54C56, 55Q07]

55P57 Proper homotopy theory

55P60 Localization and completion in homotopy theory

55P62 Rational homotopy theory

55P65 Homotopy functors in algebraic topology

55P91 Equivariant homotopy theory in algebraic topology [See also 19L47]

55P92 Relations between equivariant and nonequivariant homotopy theory in algebraic topology

55P99 None of the above, but in this section

55Qxx Homotopy groups

55Q05 Homotopy groups, general; sets of homotopy classes

55Q07 Shape groups

55Q10 Stable homotopy groups

55Q15 Whitehead products and generalizations

55Q20 Homotopy groups of wedges, joins, and simple spaces

55Q25 Hopf invariants

55Q35 Operations in homotopy groups

55Q40 Homotopy groups of spheres

55Q45 Stable homotopy of spheres

55Q50 J-morphism [See also 19L20]

55Q51 v_n-periodicity

55Q52 Homotopy groups of special spaces

55Q55 Cohomotopy groups

55Q70 Homotopy groups of special types [See also 55N05, 55N07]

55Q91 Equivariant homotopy groups [See also 19L47]

55Q99 None of the above, but in this section

55Rxx Fiber spaces and bundles in algebraic topology [See also 18F15, 32Lxx, 46M20, 57R20, 57R22, 57R25]

55R05 Fiber spaces in algebraic topology

55R10 Fiber bundles in algebraic topology

55R12 Transfer for fiber spaces and bundles in algebraic topology

55R15 Classification of fiber spaces or bundles in algebraic topology

55R20 Spectral sequences and homology of fiber spaces in algebraic topology [See also 55Txx]

55R25 Sphere bundles and vector bundles in algebraic topology

55R35 Classifying spaces of groups and H-spaces in algebraic topology

55R37 Maps between classifying spaces in algebraic topology

55R40 Homology of classifying spaces and characteristic classes in algebraic topology [See also 57Txx, 57R20]

55R45 Homology and homotopy of BO and BU; Bott periodicity

55R50 Stable classes of vector space bundles in algebraic topology and relations to K-theory [See also 19Lxx] {For algebraic K-theory, see 18F25, 19-XX}

55R55 Fiberings with singularities in algebraic topology

55R60 Microbundles and block bundles in algebraic topology [See also 57N55, 57Q50]

55R65 Generalizations of fiber spaces and bundles in algebraic topology

55R70 Fibrewise topology

55R80 Discriminantal varieties and configuration spaces in algebraic topology

55R91 Equivariant fiber spaces and bundles in algebraic topology [See also 19L47]

55R99 None of the above, but in this section

55Sxx Operations and obstructions in algebraic topology

55S05 Primary cohomology operations in algebraic topology

55S10 Steenrod algebra

55S12 Dyer-Lashof operations

55S15 Symmetric products and cyclic products in algebraic topology

55S20 Secondary and higher cohomology operations in algebraic topology

55S25 K-theory operations and generalized cohomology operations in algebraic topology [See also 19D55, 19Lxx]

55S30 Massey products

55S35 Obstruction theory in algebraic topology

55S36 Extension and compression of mappings in algebraic topology

55S37 Classification of mappings in algebraic topology

55S40 Sectioning fiber spaces and bundles in algebraic topology

55S45 Postnikov systems, k-invariants

55S91 Equivariant operations and obstructions in algebraic topology [See also 19L47]

55S99 None of the above, but in this section

55Txx Spectral sequences in algebraic topology [See also 18G40, 55R20]

55T05 General theory of spectral sequences in algebraic topology

55T10 Serre spectral sequences

55T15 Adams spectral sequences

55T20 Eilenberg-Moore spectral sequences [See also 57T35]

55T25 Generalized cohomology and spectral sequences in algebraic topology

55T99 None of the above, but in this section

55Uxx Applied homological algebra and category theory in algebraic topology [See also 18Gxx]

55U05 Abstract complexes in algebraic topology

55U10 Simplicial sets and complexes in algebraic topology

55U15 Chain complexes in algebraic topology

55U20 Universal coefficient theorems, Bockstein operator

55U25 Homology of a product, Künneth formula

55U30 Duality in applied homological algebra and category theory (aspects of algebraic topology)

55U35 Abstract and axiomatic homotopy theory in algebraic topology

55U40 Topological categories, foundations of homotopy theory

55U99 None of the above, but in this section

57-XX Manifolds and cell complexes {For complex manifolds, see 32Qxx}

57-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to manifolds and cell complexes

57-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to manifolds and cell complexes

57-02 Research exposition (monographs, survey articles) pertaining to manifolds and cell complexes

57-03 History of manifolds and cell complexes [Consider also classification numbers pertaining to Section 01]

57-04 Software, source code, etc. for problems pertaining to manifolds and cell complexes

57-06 Proceedings, conferences, collections, etc. pertaining to manifolds and cell complexes

57-08 Computational methods for problems pertaining to manifolds and cell complexes

57-11 Research data for problems pertaining to manifolds and cell complexes

57Kxx Low-dimensional topology in specific dimensions

57K10 Knot theory

57K12 Generalized knots (virtual knots, welded knots, quandles, etc.)

57K14 Knot polynomials

57K16 Finite-type and quantum invariants, topological quantum field theories (TQFT)

57K18 Homology theories in knot theory (Khovanov, Heegaard-Floer, etc.)

57K20 2-dimensional topology (including mapping class groups of surfaces, Teichmüller theory, curve complexes, etc.)

57K30 General topology of 3-manifolds

57K31 Invariants of 3-manifolds (also skein modules; character varieties)

57K32 Hyperbolic 3-manifolds

57K33 Contact structures in 3 dimensions [See also 57R17]

57K35 Other geometric structures on 3-manifolds

57K40 General topology of 4-manifolds

57K41 Invariants of 4-manifolds (e.g., Donaldson and Seiberg-Witten invariants)

57K43 Symplectic structures in 4 dimensions [See also 57R17]

57K45 Higher-dimensional knots and links

57K50 Low-dimensional manifolds of specific dimension 5 or higher

57K99 None of the above, but in this section

57Mxx General low-dimensional topology

57M05 Fundamental group, presentations, free differential calculus

57M07 Topological methods in group theory

57M10 Covering spaces and low-dimensional topology

57M12 Low-dimensional topology of special (e.g., branched) coverings

57M15 Relations of low-dimensional topology with graph theory [See also 05Cxx]

57M30 Wild embeddings

57M50 General geometric structures on low-dimensional manifolds

57M60 Group actions on manifolds and cell complexes in low dimensions

57M99 None of the above, but in this section

57Nxx Topological manifolds

57N16 Geometric structures on manifolds of high or arbitrary dimension [See also 57M50]

57N17 Topology of topological vector spaces

57N20 Topology of infinite-dimensional manifolds [See also 58Bxx]

57N25 Shapes (aspects of topological manifolds) [See also 54C56, 55P55, 55Q07]

57N30 Engulfing in topological manifolds

57N35 Embeddings and immersions in topological manifolds

57N37 Isotopy and pseudo-isotopy

57N40 Neighborhoods of submanifolds

57N45 Flatness and tameness of topological manifolds

57N50 $S^{n-1} \subset E^n$, Schoenflies problem

57N55 Microbundles and block bundles [See also 55R60, 57Q50]

57N60 Cellularity in topological manifolds

57N65 Algebraic topology of manifolds

57N70 Cobordism and concordance in topological manifolds

57N75 General position and transversality

57N80 Stratifications in topological manifolds

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 in PL-topology

57Q25 Comparison of PL-structures: classification, Hauptvermutung

57Q30 Engulfing

57Q35 Embeddings and immersions in PL-topology

57Q37 Isotopy in PL-topology

57Q40 Regular neighborhoods in PL-topology

57Q50 Microbundles and block bundles [See also 55R60, 57N55]

57Q55 Approximations in PL-topology

57Q60 Cobordism and concordance in PL-topology

57Q65 General position and transversality

57Q70 Discrete Morse theory and related ideas in manifold topology

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 in differential topology

57R12 Smooth approximations in differential topology

57R15 Specialized structures on manifolds (spin manifolds, framed manifolds, etc.)

57R17 Symplectic and contact topology in high or arbitrary dimension [See also 57K33, 57K43]

57R18 Topology and geometry of orbifolds

57R19 Algebraic topology on manifolds and differential topology

57R20 Characteristic classes and numbers in differential topology

57R22 Topology of vector bundles and fiber bundles [See also 55Rxx]

57R25 Vector fields, frame fields in differential topology

57R27 Controllability of vector fields on C^∞ and real-analytic manifolds [See also 49Qxx, 37C10, 93B05]

57R30 Foliations in differential topology; geometric theory [See also 53C12]

57R32 Classifying spaces for foliations; Gelfand-Fuks cohomology [See also 58H10]

57R35 Differentiable mappings in differential topology

57R40 Embeddings in differential topology

57R42 Immersions in differential topology

57R45 Singularities of differentiable mappings in differential topology

57R50 Differential topological aspects of diffeomorphisms

57R52 Isotopy in differential topology

57R55 Differentiable structures in differential topology

57R56 Topological quantum field theories (aspects of differential topology)

57R57 Applications of global analysis to structures on manifolds [See also 57K41, 58-XX]

57R58 Floer homology

57R60 Homotopy spheres, Poincaré conjecture

57R65 Surgery and handlebodies

57R67 Surgery obstructions, Wall groups [See also 19J25]

57R70 Critical points and critical submanifolds in differential topology

57R75 O- and SO-cobordism

57R77 Complex cobordism (U- and SU-cobordism) [See also 55N22]

57R80 h- and s-cobordism

57R85 Equivariant cobordism

57R90 Other types of cobordism [See also 55N22]

57R91 Equivariant algebraic topology of manifolds

57R95 Realizing cycles by submanifolds

57R99 None of the above, but in this section

57Sxx Topological transformation groups [See also 20F34, 22-XX, 37-XX, 54H15, 58D05]

57S05 Topological properties of groups of homeomorphisms or diffeomorphisms

57S10 Compact groups of homeomorphisms

57S12 Toric topology

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 (aspects of homology and homotopy of topological groups) [See also 16T05]

57T10 Homology and cohomology of Lie groups

57T15 Homology and cohomology of homogeneous spaces of Lie groups

57T20 Homotopy groups of topological groups and homogeneous spaces

57T25 Homology and cohomology of H-spaces

57T30 Bar and cobar constructions [See also 18N40, 55Uxx]

57T35 Applications of Eilenberg-Moore spectral sequences [See also 55R20, 55T20]

57T99 None of the above, but in this section

57Zxx Relations of manifolds and cell complexes with science and engineering

57Z05 Relations of manifolds and cell complexes with physics

57Z10 Relations of manifolds and cell complexes with biology

57Z15 Relations of manifolds and cell complexes with chemistry

57Z20 Relations of manifolds and cell complexes with engineering

57Z25 Relations of manifolds and cell complexes with computer and data science

57Z99 None of the above, but in this section

58-XX Global analysis, analysis on manifolds [See also 32Cxx, 32Fxx, 32Wxx, 46-XX, 47Hxx, 53Cxx] {For geometric integration theory, see 49Q15}

58-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to global analysis

58-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to global analysis

58-02 Research exposition (monographs, survey articles) pertaining to global analysis

58-03 History of global analysis [Consider also classification numbers pertaining to Section 01]

58-04 Software, source code, etc. for problems pertaining to global analysis

58-06 Proceedings, conferences, collections, etc. pertaining to global analysis

58-08 Computational methods for problems pertaining to global analysis

58-11 Research data for problems pertaining to global analysis

58Axx General theory of differentiable manifolds [See also 32Cxx]

58A03 Topos-theoretic approach to differentiable manifolds

58A05 Differentiable manifolds, foundations

58A07 Real-analytic and Nash manifolds [See also 14P20, 32C07]

58A10 Differential forms in global analysis

58A12 de Rham theory in global analysis [See also 14Fxx]

58A14 Hodge theory in global analysis [See also 14C30, 14Fxx, 32J25, 32S35]

58A15 Exterior differential systems (Cartan theory)

58A17 Pfaffian systems

58A20 Jets in global analysis

58A25 Currents in global analysis [See also 32C30, 53C65]

58A30 Vector distributions (subbundles of the tangent bundles)

58A32 Natural bundles

58A35 Stratified sets [See also 32S60]

58A40 Differential spaces

58A50 Supermanifolds and graded manifolds [See also 14A22, 32C11]

58A99 None of the above, but in this section

58Bxx Infinite-dimensional manifolds

58B05 Homotopy and topological questions for infinite-dimensional manifolds

58B10 Differentiability questions for infinite-dimensional manifolds

58B12 Questions of holomorphy and infinite-dimensional manifolds [See also 32-XX, 46G20]

58B15 Fredholm structures on infinite-dimensional manifolds [See also 47A53]

58B20 Riemannian, Finsler and other geometric structures on infinite-dimensional manifolds [See also 53C20, 53C60]

58B25 Group structures and generalizations on infinite-dimensional manifolds [See also 22E65, 58D05]

58B32 Geometry of quantum groups

58B34 Noncommutative geometry (à la Connes)

58B99 None of the above, but in this section

58Cxx Calculus on manifolds; nonlinear operators [See also 46Txx, 47Hxx, 47Jxx]

58C05 Real-valued functions on manifolds

58C06 Set-valued and function-space-valued mappings on manifolds [See also 47H04, 54C60]

58C07 Continuity properties of mappings on manifolds

58C10 Holomorphic maps on manifolds [See also 32-XX]

58C15 Implicit function theorems; global Newton methods on manifolds

58C20 Differentiation theory (Gateaux, Fréchet, etc.) on manifolds [See also 26Exx, 46G05]

58C25 Differentiable maps on manifolds

58C30 Fixed-point theorems on manifolds [See also 47H10]

58C35 Integration on manifolds; measures on manifolds [See also 28Cxx]

58C40 Spectral theory; eigenvalue problems on manifolds [See also 47J10, 58E07]

58C50 Analysis on supermanifolds or graded manifolds

58C99 None of the above, but in this section

58Dxx Spaces and manifolds of mappings (including nonlinear versions of 46Exx) [See also 46Txx, 53Cxx]

58D05 Groups of diffeomorphisms and homeomorphisms as manifolds [See also 22E65, 57S05]

58D07 Groups and semigroups of nonlinear operators [See also 17B65, 47H20]

58D10 Spaces of embeddings and immersions

58D15 Manifolds of mappings [See also 46T10, 54C35]

58D17 Manifolds of metrics (especially Riemannian)

58D19 Group actions and symmetry properties

58D20 Measures (Gaussian, cylindrical, etc.) on manifolds of maps [See also 28Cxx, 46T12]

58D25 Equations in function spaces; evolution equations [See also 34Gxx, 35K90, 35L90, 35R15, 37Lxx, 47Jxx]

58D27 Moduli problems for differential geometric structures

58D29 Moduli problems for topological structures

58D30 Applications of manifolds of mappings to the sciences

58D99 None of the above, but in this section

58Exx Variational problems in infinite-dimensional spaces

58E05 Abstract critical point theory (Morse theory, Lyusternik-Shnirel'man theory, etc.) in infinite-dimensional spaces

58E07 Variational problems in abstract bifurcation theory in infinite-dimensional spaces

58E09 Group-invariant bifurcation theory in infinite-dimensional spaces

58E10 Variational problems in applications to the theory of geodesics (problems in one independent variable)

58E11 Critical metrics

58E12 Variational problems concerning minimal surfaces (problems in two independent variables) [See also 49Q05]

58E15 Variational problems concerning extremal problems in several variables; Yang-Mills functionals [See also 81T13], etc.

58E17 Multiobjective variational problems, Pareto optimality, applications to economics, etc. [See also 90C29, 91Bxx]

58E20 Harmonic maps, etc. [See also 53C43]

58E25 Applications of variational problems to control theory [See also 49-XX, 93-XX]

58E30 Variational principles in infinite-dimensional spaces

58E35 Variational inequalities (global problems) in infinite-dimensional spaces

58E40 Variational aspects of group actions in infinite-dimensional spaces

58E50 Applications of variational problems in infinite-dimensional spaces to the sciences

58E99 None of the above, but in this section

58Hxx Pseudogroups, differentiable groupoids and general structures on manifolds

58H05 Pseudogroups and differentiable groupoids [See also 22A22, 22E65]

58H10 Cohomology of classifying spaces for pseudogroup structures (Spencer, Gelfand-Fuks, etc.) [See also 57R32]

58H15 Deformations of general structures on manifolds [See also 32Gxx, 58J10]

58H99 None of the above, but in this section

58Jxx Partial differential equations on manifolds; differential operators [See also 32Wxx, 35-XX, 53Cxx]

58J05 Elliptic equations on manifolds, general theory [See also 35-XX]

58J10 Differential complexes [See also 35Nxx]; elliptic complexes

58J15 Relations of PDEs on manifolds with hyperfunctions

58J20 Index theory and related fixed-point theorems on manifolds [See also 19K56, 46L80]

58J22 Exotic index theories on manifolds [See also 19K56, 46L05, 46L10, 46L80, 46M20]

58J26 Elliptic genera

58J28 Eta-invariants, Chern-Simons invariants

58J30 Spectral flows

58J32 Boundary value problems on manifolds

58J35 Heat and other parabolic equation methods for PDEs on manifolds

58J37 Perturbations of PDEs on manifolds; asymptotics

58J40 Pseudodifferential and Fourier integral operators on manifolds [See also 35Sxx]

58J42 Noncommutative global analysis, noncommutative residues

58J45 Hyperbolic equations on manifolds [See also 35Lxx]

58J47 Propagation of singularities; initial value problems on manifolds

58J50 Spectral problems; spectral geometry; scattering theory on manifolds [See also 35Pxx]

58J51 Relations between spectral theory and ergodic theory, e.g., quantum unique ergodicity

58J52 Determinants and determinant bundles, analytic torsion

58J53 Isospectrality

58J55 Bifurcation theory for PDEs on manifolds [See also 35B32]

58J60 Relations of PDEs with special manifold structures (Riemannian, Finsler, etc.)

58J65 Diffusion processes and stochastic analysis on manifolds [See also 35R60, 60H10, 60J60]

58J70 Invariance and symmetry properties for PDEs on manifolds [See also 35A30]

58J72 Correspondences and other transformation methods (e.g., Lie-Bäcklund) for PDEs on manifolds [See also 35A22]

58J90 Applications of PDEs on manifolds

58J99 None of the above, but in this section

58Kxx Theory of singularities and catastrophe theory [See also 32Sxx, 37-XX]

58K05 Critical points of functions and mappings on manifolds

58K10 Monodromy on manifolds

58K15 Topological properties of mappings on manifolds

58K20 Algebraic and analytic properties of mappings on manifolds

58K25 Stability theory for manifolds

58K30 Global theory of singularities

58K35 Catastrophe theory

58K40 Classification; finite determinacy of map germs

58K45 Singularities of vector fields, topological aspects

58K50 Normal forms on manifolds

58K55 Asymptotic behavior of solutions to equations on manifolds

58K60 Deformation of singularities

58K65 Topological invariants on manifolds

58K70 Symmetries, equivariance on manifolds

58K99 None of the above, but in this section

58Zxx Applications of global analysis to the sciences

58Z05 Applications of global analysis to the sciences

58Z99 None of the above, but in this section

60-XX Probability theory and stochastic processes {For additional applications, see 05Cxx, 11Kxx, 34-XX, 35-XX, 62-XX, 90-XX, 76-XX, 81-XX, 82-XX, 91-XX, 92-XX, 93-XX, 94-XX}

60-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to probability theory

60-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to probability theory

60-02 Research exposition (monographs, survey articles) pertaining to probability theory

60-03 History of probability theory [Consider also classification numbers pertaining to Section 01]

60-04 Software, source code, etc. for problems pertaining to probability theory

60-06 Proceedings, conferences, collections, etc. pertaining to probability theory

60-08 Computational methods for problems pertaining to probability theory

60-11 Research data for problems pertaining to probability theory

60Axx Foundations of probability theory

60A05 Axioms; other general questions in probability

60A10 Probabilistic measure theory {For ergodic theory, see 28Dxx, 60Fxx}

60A86 Fuzzy probability

60A99 None of the above, but in this section

60Bxx Probability theory on algebraic and topological structures

60B05 Probability measures on topological spaces

60B10 Convergence of probability measures

60B11 Probability theory on linear topological spaces [See also 28C20]

60B12 Limit theorems for vector-valued random variables (infinite-dimensional case)

60B15 Probability measures on groups or semigroups, Fourier transforms, factorization

60B20 Random matrices (probabilistic aspects) {For algebraic aspects, see 15B52}

60B99 None of the above, but in this section

60Cxx Combinatorial probability

60C05 Combinatorial probability

60C99 None of the above, but in this section

60Dxx Geometric probability and stochastic geometry [See also 52A22, 53C65]

60D05 Geometric probability and stochastic geometry [See also 52A22, 53C65]

60D99 None of the above, but in this section

60Exx Distribution theory [See also 62Exx, 62Hxx]

60E05 Probability distributions: general theory

60E07 Infinitely divisible distributions; stable distributions

60E10 Characteristic functions; other transforms

60E15 Inequalities; stochastic orderings

60E99 None of the above, but in this section

60Fxx Limit theorems in probability theory [See also 28Dxx, 60B12]

60F05 Central limit and other weak theorems

60F10 Large deviations

60F15 Strong limit 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 stochastic processes

60G09 Exchangeability for stochastic processes

60G10 Stationary stochastic processes

60G12 General second-order stochastic processes

60G15 Gaussian processes

60G17 Sample path properties

60G18 Self-similar stochastic processes

60G20 Generalized stochastic processes

60G22 Fractional processes, including fractional Brownian motion

60G25 Prediction theory (aspects of stochastic processes) [See also 62M20]

60G30 Continuity and singularity of induced measures

60G35 Signal detection and filtering (aspects of stochastic processes) [See also 62M20, 93E10, 93E11, 94Axx]

60G40 Stopping times; optimal stopping problems; gambling theory [See also 62L15, 91A60]

60G42 Martingales with discrete parameter

60G44 Martingales with continuous parameter

60G46 Martingales and classical analysis

60G48 Generalizations of martingales

60G50 Sums of independent random variables; random walks

60G51 Processes with independent increments; Lévy processes

60G52 Stable stochastic processes

60G53 Feller processes

60G55 Point processes (e.g., Poisson, Cox, Hawkes processes)

60G57 Random measures

60G60 Random fields

60G65 Nonlinear processes (e.g., G-Brownian motion, G-Lévy processes)

60G70 Extreme value theory; extremal stochastic processes

60G99 None of the above, but in this section

60Hxx Stochastic analysis [See also 58J65]

60H05 Stochastic integrals

60H07 Stochastic calculus of variations and the Malliavin calculus

60H10 Stochastic ordinary differential equations (aspects of stochastic analysis) [See also 34F05]

60H15 Stochastic partial differential equations (aspects of stochastic analysis) [See also 35R60]

60H17 Singular stochastic partial differential equations

60H20 Stochastic integral equations

60H25 Random operators and equations (aspects of stochastic analysis) [See also 47B80]

60H30 Applications of stochastic analysis (to PDEs, etc.)

60H35 Computational methods for stochastic equations (aspects of stochastic analysis) [See also 65C30]

60H40 White noise theory

60H50 Regularization by noise

60H99 None of the above, but in this section

60Jxx Markov processes

60J05 Discrete-time Markov processes on general state spaces

60J10 Markov chains (discrete-time Markov processes on discrete state spaces)

60J20 Applications of Markov chains and discrete-time Markov processes on general state spaces (social mobility, learning theory, industrial processes, etc.) [See also 90B30, 91D10, 91E40]

60J22 Computational methods in Markov chains [See also 65C40]

60J25 Continuous-time Markov processes on general state spaces

60J27 Continuous-time Markov processes on discrete state spaces

60J28 Applications of continuous-time Markov processes on discrete state spaces

60J35 Transition functions, generators and resolvents [See also 47D03, 47D07]

60J40 Right processes

60J45 Probabilistic potential theory [See also 31Cxx, 31D05]

60J46 Dirichlet form methods in Markov processes

60J50 Boundary theory for Markov processes

60J55 Local time and additive functionals

60J57 Multiplicative functionals and Markov processes

60J60 Diffusion processes [See also 58J65]

60J65 Brownian motion [See also 58J65]

60J67 Stochastic (Schramm-)Loewner evolution (SLE)

60J68 Superprocesses

60J70 Applications of Brownian motions and diffusion theory (population genetics, absorption problems, etc.) [See also 92Dxx]

60J74 Jump processes on discrete state spaces

60J76 Jump processes on general state spaces

60J80 Branching processes (Galton-Watson, birth-and-death, etc.)

60J85 Applications of branching processes [See also 92Dxx]

60J90 Coalescent processes

60J95 Applications of coalescent processes [See also 92Dxx]

60J99 None of the above, but in this section

60Kxx Special processes

60K05 Renewal theory

60K10 Applications of renewal theory (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 (aspects of probability theory) [See also 68M20, 90B22]

60K30 Applications of queueing theory (congestion, allocation, storage, traffic, etc.) [See also 90Bxx]

60K35 Interacting random processes; statistical mechanics type models; percolation theory [See also 82B43, 82C43]

60K37 Processes in random environments

60K40 Other physical applications of random processes

60K50 Anomalous diffusion models (subdiffusion, superdiffusion, continuous-time random walks, etc.) [See also 60G22, 60G55, 60J74, 60J76] {For applications to physics and the sciences, see 76-XX, 82Cxx, 92-XX}

60K99 None of the above, but in this section

60Lxx Rough analysis

60L10 Signatures and data streams

60L20 Rough paths

60L30 Regularity structures

60L40 Paracontrolled distributions and alternative approaches

60L50 Rough partial differential equations

60L70 Algebraic structures and computation

60L90 Applications of rough analysis

60L99 None of the above, but in this section

62-XX Statistics

62-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to statistics

62-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to statistics

62-02 Research exposition (monographs, survey articles) pertaining to statistics

62-03 History of statistics [Consider also classification numbers pertaining to Section 01]

62-04 Software, source code, etc. for problems pertaining to statistics

62-06 Proceedings, conferences, collections, etc. pertaining to statistics

62-08 Computational methods for problems pertaining to statistics

62-11 Research data for problems pertaining to statistics

62Axx Foundational topics in statistics

62A01 Foundations and philosophical topics in statistics

62A09 Graphical methods

62A86 Fuzzy analysis in statistics

62A99 None of the above, but in this section

62Bxx Sufficiency and information

62B05 Sufficient statistics and fields

62B10 Statistical aspects of information-theoretic topics [See also 94A17]

62B11 Information geometry (statistical aspects) {For differential geometric aspects, see 53B12}

62B15 Theory of statistical experiments

62B86 Statistical aspects of fuzziness, sufficiency, and information

62B99 None of the above, but in this section

62Cxx Statistical decision theory [See also 90B50, 91B06] {For game theory, see 91A35]

62C05 General considerations in statistical decision theory

62C07 Complete class results in statistical decision theory

62C10 Bayesian problems; characterization of Bayes procedures

62C12 Empirical decision procedures; empirical Bayes procedures

62C15 Admissibility in statistical decision theory

62C20 Minimax procedures in statistical decision theory

62C25 Compound decision problems in statistical decision theory

62C86 Statistical decision theory and fuzziness

62C99 None of the above, but in this section

62Dxx Statistical sampling theory and related topics

62D05 Sampling theory, sample surveys

62D10 Missing data

62D20 Causal inference from observational studies

62D99 None of the above, but in this section

62Exx Statistical distribution theory [See also 60Exx]

62E10 Characterization and structure theory of statistical distributions

62E15 Exact distribution theory in statistics

62E17 Approximations to statistical distributions (nonasymptotic)

62E20 Asymptotic distribution theory in statistics

62E86 Fuzziness in connection with statistical distributions

62E99 None of the above, but in this section

62Fxx Parametric inference

62F03 Parametric hypothesis testing

62F05 Asymptotic properties of parametric tests

62F07 Statistical ranking and selection procedures

62F10 Point estimation

62F12 Asymptotic properties of parametric estimators

62F15 Bayesian inference

62F25 Parametric tolerance and confidence regions

62F30 Parametric inference under constraints

62F35 Robustness and adaptive procedures (parametric inference)

62F40 Bootstrap, jackknife and other resampling methods

62F86 Parametric inference and fuzziness

62F99 None of the above, but in this section

62Gxx Nonparametric inference

62G05 Nonparametric estimation

62G07 Density estimation

62G08 Nonparametric regression and quantile regression

62G09 Nonparametric statistical resampling methods

62G10 Nonparametric hypothesis testing

62G15 Nonparametric tolerance and confidence regions

62G20 Asymptotic properties of nonparametric inference

62G30 Order statistics; empirical distribution functions

62G32 Statistics of extreme values; tail inference

62G35 Nonparametric robustness

62G86 Nonparametric inference and fuzziness

62G99 None of the above, but in this section

62Hxx Multivariate analysis [See also 60Exx]

62H05 Characterization and structure theory for multivariate probability distributions; copulas

62H10 Multivariate distribution of statistics

62H11 Directional data; spatial statistics

62H12 Estimation in multivariate analysis

62H15 Hypothesis testing in multivariate analysis

62H17 Contingency tables

62H20 Measures of association (correlation, canonical correlation, etc.)

62H22 Probabilistic graphical models

62H25 Factor analysis and principal components; correspondence analysis

62H30 Classification and discrimination; cluster analysis (statistical aspects) [See also 68T10, 91C20]; mixture models

62H35 Image analysis in multivariate analysis

62H86 Multivariate analysis and fuzziness

62H99 None of the above, but in this section

62Jxx Linear inference, regression

62J02 General nonlinear regression

62J05 Linear regression; mixed models

62J07 Ridge regression; shrinkage estimators (Lasso)

62J10 Analysis of variance and covariance (ANOVA)

62J12 Generalized linear models (logistic models)

62J15 Paired and multiple comparisons; multiple testing

62J20 Diagnostics, and linear inference and regression

62J86 Fuzziness, and linear inference and regression

62J99 None of the above, but in this section

62Kxx Design of statistical experiments [See also 05Bxx]

62K05 Optimal statistical designs

62K10 Statistical block designs

62K15 Factorial statistical designs

62K20 Response surface designs

62K25 Robust parameter designs

62K86 Fuzziness and design of statistical experiments

62K99 None of the above, but in this section

62Lxx Sequential statistical methods

62L05 Sequential statistical design

62L10 Sequential statistical analysis

62L12 Sequential estimation

62L15 Optimal stopping in statistics [See also 60G40, 91A60]

62L20 Stochastic approximation

62L86 Fuzziness and sequential statistical methods

62L99 None of the above, but in this section

62Mxx Inference from stochastic processes

62M02 Markov processes: hypothesis testing

62M05 Markov processes: estimation; hidden Markov models

62M07 Non-Markovian processes: hypothesis testing

62M09 Non-Markovian processes: estimation

62M10 Time series, auto-correlation, regression, etc. in statistics (GARCH) [See also 91B84]

62M15 Inference from stochastic processes and spectral analysis

62M20 Inference from stochastic processes and prediction [See also 60G25]; filtering [See also 60G35, 93E10, 93E11]

62M30 Inference from spatial processes

62M40 Random fields; image analysis

62M45 Neural nets and related approaches to inference from stochastic processes

62M86 Inference from stochastic processes and fuzziness

62M99 None of the above, but in this section

62Nxx Survival analysis and censored data

62N01 Censored data models

62N02 Estimation in survival analysis and censored data

62N03 Testing in survival analysis and censored data

62N05 Reliability and life testing [See also 90B25]

62N86 Fuzziness, and survival analysis and censored data

62N99 None of the above, but in this section

62Pxx Applications of statistics [See also 90-XX, 91-XX, 92-XX]

62P05 Applications of statistics to actuarial sciences and financial mathematics

62P10 Applications of statistics to biology and medical sciences; meta analysis

62P12 Applications of statistics to environmental and related topics

62P15 Applications of statistics to psychology

62P20 Applications of statistics to economics [See also 91Bxx]

62P25 Applications of statistics to social sciences

62P30 Applications of statistics in engineering and industry; control charts

62P35 Applications of statistics to physics

62P99 None of the above, but in this section

62Qxx Statistical tables

62Q05 Statistical tables

62Q99 None of the above, but in this section

62Rxx Statistics on algebraic and topological structures

62R01 Algebraic statistics

62R07 Statistical aspects of big data and data science {For computer science aspects, see 68T09; for information-theoretic aspects, see 94A16}

62R10 Functional data analysis

62R20 Statistics on metric spaces

62R30 Statistics on manifolds

62R40 Topological data analysis [See also 55N31]

62R99 None of the above, but in this section

65-XX Numerical analysis

65-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to numerical analysis

65-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to numerical analysis

65-02 Research exposition (monographs, survey articles) pertaining to numerical analysis

65-03 History of numerical analysis [Consider also classification numbers pertaining to Section 01]

65-04 Software, source code, etc. for problems pertaining to numerical analysis

65-06 Proceedings, conferences, collections, etc. pertaining to numerical analysis

65-11 Research data for problems pertaining to numerical analysis

65Axx Tables in numerical analysis

65A05 Tables in numerical analysis

65A99 None of the above, but in this section

65Bxx Acceleration of convergence in numerical analysis

65B05 Extrapolation to the limit, deferred corrections

65B10 Numerical summation of series

65B15 Euler-Maclaurin formula in numerical analysis

65B99 None of the above, but in this section

65Cxx Probabilistic methods, stochastic differential equations

65C05 Monte Carlo methods [See also 82M31]

65C10 Random number generation in numerical analysis [See also 11K45]

65C20 Probabilistic models, generic numerical methods in probability and statistics [See also 60-08, 62-08]

65C30 Numerical solutions to stochastic differential and integral equations {For theoretical aspects, see 60H35} [See also 65M75, 65N75]

65C35 Stochastic particle methods [See also 82M60]

65C40 Numerical analysis or methods applied to Markov chains [See also 60J22]

65C99 None of the above, but in this section

65Dxx Numerical approximation and computational geometry (primarily algorithms) {For theoretical aspects, see 41-XX, 68Uxx}

65D05 Numerical interpolation

65D07 Numerical computation using splines

65D10 Numerical smoothing, curve fitting

65D12 Numerical radial basis function approximation

65D15 Algorithms for approximation of functions

65D17 Computer-aided design (modeling of curves and surfaces) [See also 68U07]

65D18 Numerical aspects of computer graphics, image analysis, and computational geometry [See also 51N05, 68U05]

65D19 Computational issues in computer and robotic vision

65D20 Computation of special functions and constants, construction of tables [See also 33F05]

65D25 Numerical differentiation

65D30 Numerical integration

65D32 Numerical quadrature and cubature formulas

65D40 High-dimensional functions; sparse grids

65D99 None of the above, but in this section

65Exx Numerical methods in complex analysis (potential theory, etc.)

65E05 General theory of numerical methods in complex analysis (potential theory, etc.) [See also 30-08, 31-08, 32-08]

65E10 Numerical methods in conformal mappings [See also 30C30]

65E99 None of the above, but in this section

65Fxx Numerical linear algebra

65F05 Direct numerical methods for linear systems and matrix inversion

65F08 Preconditioners for iterative methods

65F10 Iterative numerical methods for linear systems [See also 65N22]

65F15 Numerical computation of eigenvalues and eigenvectors of matrices

65F18 Numerical solutions to inverse eigenvalue problems

65F20 Numerical solutions to overdetermined systems, pseudoinverses

65F22 Ill-posedness and regularization problems in numerical linear algebra

65F25 Orthogonalization in numerical linear algebra

65F35 Numerical computation of matrix norms, conditioning, scaling [See also 15A12, 15A60]

65F40 Numerical computation of determinants

65F45 Numerical methods for matrix equations

65F50 Computational methods for sparse matrices

65F55 Numerical methods for low-rank matrix approximation; matrix compression

65F60 Numerical computation of matrix exponential and similar matrix functions

65F99 None of the above, but in this section

65Gxx Error analysis and interval analysis

65G20 Algorithms with automatic result verification

65G30 Interval and finite arithmetic

65G40 General methods in interval analysis

65G50 Roundoff error

65G99 None of the above, but in this section

65Hxx Nonlinear algebraic or transcendental equations

65H04 Numerical computation of roots of polynomial equations

65H05 Numerical computation of solutions to single equations

65H10 Numerical computation of solutions to systems of equations

65H14 Numerical algebraic geometry

65H17 Numerical solution of nonlinear eigenvalue and eigenvector problems [See also 47Hxx, 47Jxx, 58C40, 58E07, 90C30]

65H20 Global methods, including homotopy approaches to the numerical solution of nonlinear equations [See also 58C30, 90C30]

65H99 None of the above, but in this section

65Jxx Numerical analysis in abstract spaces

65J05 General theory of numerical analysis in abstract spaces

65J08 Numerical solutions to abstract evolution equations

65J10 Numerical solutions to equations with linear operators (do not use 65Fxx)

65J15 Numerical solutions to equations with nonlinear operators (do not use 65Hxx)

65J20 Numerical solutions of ill-posed problems in abstract spaces; regularization

65J22 Numerical solution to inverse problems in abstract spaces

65J99 None of the above, but in this section

65Kxx Numerical methods for mathematical programming, optimization and variational techniques

65K05 Numerical mathematical programming methods [See also 90Cxx]

65K10 Numerical optimization and variational techniques [See also 49Mxx, 93-08]

65K15 Numerical methods for variational inequalities and related problems

65K99 None of the above, but in this section

65Lxx Numerical methods for ordinary differential equations

65L03 Numerical methods for functional-differential equations

65L04 Numerical methods for stiff equations

65L05 Numerical methods for initial value problems

65L06 Multistep, Runge-Kutta and extrapolation methods for ordinary differential equations

65L07 Numerical investigation of stability of solutions

65L08 Numerical solution of ill-posed problems involving ordinary differential equations

65L09 Numerical solution of inverse problems involving ordinary differential equations

65L10 Numerical solution of boundary value problems involving ordinary differential equations

65L11 Numerical solution of singularly perturbed problems involving ordinary differential equations

65L12 Finite difference and finite volume methods for ordinary differential equations

65L15 Numerical solution of eigenvalue problems involving ordinary differential equations

65L20 Stability and convergence of numerical methods for ordinary differential equations

65L50 Mesh generation, refinement, and adaptive methods for ordinary differential equations

65L60 Finite element, Rayleigh-Ritz, Galerkin and collocation methods for ordinary differential equations

65L70 Error bounds for numerical methods for ordinary differential equations

65L80 Numerical methods for differential-algebraic equations

65L99 None of the above, but in this section

65Mxx Numerical methods for partial differential equations, initial value and time-dependent initial-boundary value problems

65M06 Finite difference methods for initial value and initial-boundary value problems involving PDEs

65M08 Finite volume methods for initial value and initial-boundary value problems involving PDEs

65M12 Stability and convergence of numerical methods for initial value and initial-boundary value problems involving PDEs

65M15 Error bounds for initial value and initial-boundary value problems involving PDEs

65M20 Method of lines for initial value and initial-boundary value problems involving PDEs

65M22 Numerical solution of discretized equations for initial value and initial-boundary value problems involving PDEs [See also 65Fxx, 65Hxx]

65M25 Numerical aspects of the method of characteristics for initial value and initial-boundary value problems involving PDEs

65M30 Numerical methods for ill-posed problems for initial value and initial-boundary value problems involving PDEs

65M32 Numerical methods for inverse problems for initial value and initial-boundary value problems involving PDEs

65M38 Boundary element methods for initial value and initial-boundary value problems involving PDEs

65M50 Mesh generation, refinement, and adaptive methods for the numerical solution of initial value and initial-boundary value problems involving PDEs

65M55 Multigrid methods; domain decomposition for initial value and initial-boundary value problems involving PDEs

65M60 Finite element, Rayleigh-Ritz and Galerkin methods for initial value and initial-boundary value problems involving PDEs

65M70 Spectral, collocation and related methods for initial value and initial-boundary value problems involving PDEs

65M75 Probabilistic methods, particle methods, etc. for initial value and initial-boundary value problems involving PDEs

65M80 Fundamental solutions, Green's function methods, etc. for initial value and initial-boundary value problems involving PDEs

65M85 Fictitious domain methods for initial value and initial-boundary value problems involving PDEs

65M99 None of the above, but in this section

65Nxx Numerical methods for partial differential equations, boundary value problems

65N06 Finite difference methods for boundary value problems involving PDEs

65N08 Finite volume methods for boundary value problems involving PDEs

65N12 Stability and convergence of numerical methods for boundary value problems involving PDEs

65N15 Error bounds for boundary value problems involving PDEs

65N20 Numerical methods for ill-posed problems for boundary value problems involving PDEs

65N21 Numerical methods for inverse problems for boundary value problems involving PDEs

65N22 Numerical solution of discretized equations for boundary value problems involving PDEs [See also 65Fxx, 65Hxx]

65N25 Numerical methods for eigenvalue problems for boundary value problems involving PDEs

65N30 Finite element, Rayleigh-Ritz and Galerkin methods for boundary value problems involving PDEs

65N35 Spectral, collocation and related methods for boundary value problems involving PDEs

65N38 Boundary element methods for boundary value problems involving PDEs

65N40 Method of lines for boundary value problems involving PDEs

65N45 Method of contraction of the boundary for boundary value problems involving PDEs

65N50 Mesh generation, refinement, and adaptive methods for boundary value problems involving PDEs

65N55 Multigrid methods; domain decomposition for boundary value problems involving PDEs

65N75 Probabilistic methods, particle methods, etc. for boundary value problems involving PDEs

65N80 Fundamental solutions, Green's function methods, etc. for boundary value problems involving PDEs

65N85 Fictitious domain methods for boundary value problems involving PDEs

65N99 None of the above, but in this section

65Pxx Numerical problems in dynamical systems [See also 37Mxx]

65P10 Numerical methods for Hamiltonian systems including symplectic integrators

65P20 Numerical chaos

65P30 Numerical bifurcation problems

65P40 Numerical nonlinear stabilities in dynamical systems

65P99 None of the above, but in this section

65Qxx Numerical methods for difference and functional equations, recurrence relations

65Q10 Numerical methods for difference equations

65Q20 Numerical methods for functional equations

65Q30 Numerical aspects of recurrence relations

65Q99 None of the above, but in this section

65Rxx Numerical methods for integral equations, integral transforms

65R10 Numerical methods for integral transforms

65R15 Numerical methods for eigenvalue problems in integral equations

65R20 Numerical methods for integral equations

65R30 Numerical methods for ill-posed problems for integral equations

65R32 Numerical methods for inverse problems for integral equations

65R99 None of the above, but in this section

65Sxx Graphical methods in numerical analysis

65S05 Graphical methods in numerical analysis

65S99 None of the above, but in this section

65Txx Numerical methods in Fourier analysis

65T40 Numerical methods for trigonometric approximation and interpolation

65T50 Numerical methods for discrete and fast Fourier transforms

65T60 Numerical methods for wavelets

65T99 None of the above, but in this section

65Yxx Computer aspects of numerical algorithms

65Y04 Numerical algorithms for computer arithmetic, etc. [See also 68M07]

65Y05 Parallel numerical computation

65Y10 Numerical algorithms for specific classes of architectures

65Y15 Packaged methods for numerical algorithms

65Y20 Complexity and performance of numerical algorithms [See also 68Q25]

65Y99 None of the above, but in this section

65Zxx Applications to the sciences

65Z05 Applications to the sciences

65Z99 None of the above, but in this section

68-XX Computer science {For papers containing software, source code, etc. in a specific mathematical area, see the classification number -04 in that area}

68-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to computer science

68-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to computer science

68-02 Research exposition (monographs, survey articles) pertaining to computer science

68-03 History of computer science [Consider also classification numbers pertaining to Section 01]

68-04 Software, source code, etc. for problems pertaining to computer science

68-06 Proceedings, conferences, collections, etc. pertaining to computer science

68-11 Research data for problems pertaining to computer science

68Mxx Computer system organization

68M01 General theory of computer systems

68M07 Mathematical problems of computer architecture [See also 68W35]

68M10 Network design and communication in computer systems [See also 68R10, 90B18]

68M11 Internet topics [See also 68U35]

68M12 Network protocols

68M14 Distributed systems

68M15 Reliability, testing and fault tolerance of networks and computer systems

68M18 Wireless sensor networks as related to computer science [See also 90B18, 90B80]

68M20 Performance evaluation, queueing, and scheduling in the context of computer systems [See also 60K20, 60K25, 90B22, 90B35, 90B36]

68M25 Computer security

68M99 None of the above, but in this section

68Nxx Theory of software

68N01 General topics in the theory of software

68N15 Theory of programming languages

68N17 Logic programming

68N18 Functional programming and lambda calculus [See also 03B40]

68N19 Other programming paradigms (object-oriented, sequential, concurrent, automatic, etc.)

68N20 Theory of compilers and interpreters

68N25 Theory of operating systems

68N30 Mathematical aspects of software engineering (specification, verification, metrics, requirements, etc.)

68N99 None of the above, but in this section

68Pxx Theory of data

68P01 General topics in the theory of data

68P05 Data structures

68P10 Searching and sorting

68P15 Database theory

68P20 Information storage and retrieval of data

68P25 Data encryption (aspects in computer science) [See also 81P94, 94A60]

68P27 Privacy of data

68P30 Coding and information theory (compaction, compression, models of communication, encoding schemes, etc.) (aspects in computer science) [See also 94Axx, 94Bxx]

68P99 None of the above, but in this section

68Qxx Theory of computing

68Q01 General topics in the theory of computing

68Q04 Classical models of computation (Turing machines, etc.) [See also 03D10]

68Q06 Networks and circuits as models of computation; circuit complexity [See also 94C11]

68Q07 Biologically inspired models of computation (DNA computing, membrane computing, etc.)

68Q09 Other nonclassical models of computation {For quantum computing, see mainly 68Q12, 81P68}

68Q10 Modes of computation (nondeterministic, parallel, interactive, probabilistic, etc.) [See also 68Q85]

68Q11 Communication complexity, information complexity

68Q12 Quantum algorithms and complexity in the theory of computing [See also 68Q09, 81P68]

68Q15 Complexity classes (hierarchies, relations among complexity classes, etc.) [See also 03D15, 68Q17, 68Q19]

68Q17 Computational difficulty of problems (lower bounds, completeness, difficulty of approximation, etc.) [See also 68Q15]

68Q19 Descriptive complexity and finite models [See also 03C13]

68Q25 Analysis of algorithms and problem complexity [See also 68W40]

68Q27 Parameterized complexity, tractability and kernelization

68Q30 Algorithmic information theory (Kolmogorov complexity, etc.) [See also 03D32]

68Q32 Computational learning theory [See also 68T05]

68Q42 Grammars and rewriting systems

68Q45 Formal languages and automata [See also 03D05, 68Q70, 94A45]

68Q55 Semantics in the theory of computing [See also 03B70, 06B35, 18C50]

68Q60 Specification and verification (program logics, model checking, etc.) [See also 03B70]

68Q65 Abstract data types; algebraic specification [See also 18C50]

68Q70 Algebraic theory of languages and automata [See also 18B20, 20M35]

68Q80 Cellular automata (computational aspects) {For cellular automata as dynamical systems, see 37B15}

68Q85 Models and methods for concurrent and distributed computing (process algebras, bisimulation, transition nets, etc.)

68Q87 Probability in computer science (algorithm analysis, random structures, phase transitions, etc.) [See also 68W20, 68W40]

68Q99 None of the above, but in this section

68Rxx Discrete mathematics in relation to computer science

68R01 General topics of discrete mathematics in relation to computer science

68R05 Combinatorics in computer science

68R07 Computational aspects of satisfiability [See also 68T20]

68R10 Graph theory (including graph drawing) in computer science [See also 05Cxx, 90B10, 90C35]

68R12 Metric embeddings as related to computational problems and algorithms

68R15 Combinatorics on words

68R99 None of the above, but in this section

68Txx Artificial intelligence

68T01 General topics in artificial intelligence

68T05 Learning and adaptive systems in artificial intelligence [See also 68Q32]

68T07 Artificial neural networks and deep learning

68T09 Computational aspects of data analysis and big data [See also 62R07] {For homological aspects, see 55N31}

68T10 Pattern recognition, speech recognition {For cluster analysis, see 62H30}

68T20 Problem solving in the context of artificial intelligence (heuristics, search strategies, etc.)

68T27 Logic in artificial intelligence

68T30 Knowledge representation

68T35 Theory of languages and software systems (knowledge-based systems, expert systems, etc.) for artificial intelligence

68T37 Reasoning under uncertainty in the context of artificial intelligence

68T40 Artificial intelligence for robotics [See also 93C85]

68T42 Agent technology and artificial intelligence

68T45 Machine vision and scene understanding

68T50 Natural language processing [See also 03B65, 91F20]

68T99 None of the above, but in this section

68Uxx Computing methodologies and applications

68U01 General topics in computing methodologies

68U03 Computational aspects of digital topology {For topological aspects, see 54H30; for homological aspects, see 55-XX}

68U05 Computer graphics; computational geometry (digital and algorithmic aspects) {For methods of numerical mathematics, see 65D18}

68U07 Computer science aspects of computer-aided design {For methods of numerical mathematics, see 65D17}

68U10 Computing methodologies for image processing

68U15 Computing methodologies for text processing; mathematical typography

68U35 Computing methodologies for information systems (hypertext navigation, interfaces, decision support, etc.) [See also 68M11]

68U99 None of the above, but in this section

68Vxx Computer science support for mathematical research and practice

68V05 Computer assisted proofs of proofs-by-exhaustion type {For rigorous numerics, see 65Gxx; for proofs employing automated or interactive theorem provers, see 68V15}

68V15 Theorem proving (automated and interactive theorem provers, deduction, resolution, etc.) [See also 03B35]

68V20 Formalization of mathematics in connection with theorem provers [See also 03B35, 68V15]

68V25 Presentation and content markup for mathematics

68V30 Mathematical knowledge management

68V35 Digital mathematics libraries and repositories

68V99 None of the above, but in this section

68Wxx Algorithms in computer science {For numerical algorithms, see 65-XX; for combinatorics and graph theory, see 05C85, 68Rxx}

68W01 General topics in the theory of algorithms

68W05 Nonnumerical algorithms

68W10 Parallel algorithms in computer science

68W15 Distributed algorithms

68W20 Randomized algorithms

68W25 Approximation algorithms

68W27 Online algorithms; streaming algorithms

68W30 Symbolic computation and algebraic computation [See also 11Yxx, 12-08, 13Pxx, 14Qxx, 16Z05, 17-08, 33F10]

68W32 Algorithms on strings

68W35 Hardware implementations of nonnumerical algorithms (VLSI algorithms, etc.) [See also 68M07]

68W40 Analysis of algorithms [See also 68Q25]

68W50 Evolutionary algorithms, genetic algorithms (computational aspects) [See also 68T05, 68T20, 90C59]

68W99 None of the above, but in this section

70-XX Mechanics of particles and systems {For relativistic mechanics, see 83A05, 83C10; for statistical mechanics, see 82-XX}

70-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to mechanics of particles and systems

70-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to mechanics of particles and systems

70-02 Research exposition (monographs, survey articles) pertaining to mechanics of particles and systems

70-03 History of mechanics of particles and systems [Consider also classification numbers pertaining to Section 01]

70-04 Software, source code, etc. for problems pertaining to mechanics of particles and systems

70-05 Experimental work for problems pertaining to mechanics of particles and systems

70-06 Proceedings, conferences, collections, etc. pertaining to mechanics of particles and systems

70-08 Computational methods for problems pertaining to mechanics of particles and systems

70-10 Mathematical modeling or simulation for problems pertaining to mechanics of particles and systems

70-11 Research data for problems pertaining to mechanics of particles and systems

70Axx Axiomatics, foundations

70A05 Axiomatics, foundations

70A99 None of the above, but in this section

70Bxx Kinematics [See also 53A17]

70B05 Kinematics of a particle

70B10 Kinematics of a rigid body

70B15 Kinematics of mechanisms and robots [See also 68T40, 70Q05, 93C85]

70B99 None of the above, but in this section

70Cxx Statics

70C20 Statics

70C99 None of the above, but in this section

70Exx Dynamics of a rigid body and of multibody systems

70E05 Motion of the gyroscope

70E15 Free motion of a rigid body [See also 70M20]

70E17 Motion of a rigid body with a fixed point

70E18 Motion of a rigid body in contact with a solid surface [See also 70F25]

70E20 Perturbation methods for rigid body dynamics

70E40 Integrable cases of motion in rigid body dynamics

70E45 Higher-dimensional generalizations in rigid body dynamics

70E50 Stability problems in rigid body dynamics

70E55 Dynamics of multibody systems

70E60 Robot dynamics and control of rigid bodies [See also 68T40, 70Q05, 93C85]

70E99 None of the above, but in this section

70Fxx Dynamics of a system of particles, including celestial mechanics

70F05 Two-body problems

70F07 Three-body problems

70F10 n-body problems

70F15 Celestial mechanics

70F16 Collisions in celestial mechanics, regularization

70F17 Inverse problems for systems of particles

70F20 Holonomic systems related to the dynamics of a system of particles

70F25 Nonholonomic systems related to the dynamics of a system of particles

70F35 Collision of rigid or pseudo-rigid bodies

70F40 Problems involving a system of particles with friction

70F45 The dynamics of infinite particle systems

70F99 None of the above, but in this section

70Gxx General models, approaches, and methods [See also 37-XX]

70G10 Generalized coordinates; event, impulse-energy, configuration, state, or phase space for problems in mechanics

70G40 Topological and differential topological methods for problems in mechanics

70G45 Differential geometric methods (tensors, connections, symplectic, Poisson, contact, Riemannian, nonholonomic, etc.) for problems in mechanics [See also 53Cxx, 53Dxx, 58Axx]

70G55 Algebraic geometry methods for problems in mechanics

70G60 Dynamical systems methods for problems in mechanics

70G65 Symmetries, Lie group and Lie algebra methods for problems in mechanics

70G70 Functional analytic methods for problems in mechanics

70G75 Variational methods for problems in mechanics

70G99 None of the above, but in this section

70Hxx Hamiltonian and Lagrangian mechanics [See also 37Jxx]

70H03 Lagrange's equations

70H05 Hamilton's equations

70H06 Completely integrable systems and methods of integration for problems in Hamiltonian and Lagrangian mechanics

70H07 Nonintegrable systems for problems in Hamiltonian and Lagrangian mechanics

70H08 Nearly integrable Hamiltonian systems, KAM theory

70H09 Perturbation theories for problems in Hamiltonian and Lagrangian mechanics

70H11 Adiabatic invariants for problems in Hamiltonian and Lagrangian mechanics

70H12 Periodic and almost periodic solutions for problems in Hamiltonian and Lagrangian mechanics

70H14 Stability problems for problems in Hamiltonian and Lagrangian mechanics

70H15 Canonical and symplectic transformations for problems in Hamiltonian and Lagrangian mechanics

70H20 Hamilton-Jacobi equations in mechanics

70H25 Hamilton's principle

70H30 Other variational principles in mechanics

70H33 Symmetries and conservation laws, reverse symmetries, invariant manifolds and their bifurcations, reduction for problems in Hamiltonian and Lagrangian mechanics

70H40 Relativistic dynamics for problems in Hamiltonian and Lagrangian mechanics

70H45 Constrained dynamics, Dirac's theory of constraints [See also 70F20, 70F25, 70Gxx]

70H50 Higher-order theories for problems in Hamiltonian and Lagrangian mechanics

70H99 None of the above, but in this section

70Jxx Linear vibration theory

70J10 Modal analysis in linear vibration theory

70J25 Stability for problems in linear vibration theory

70J30 Free motions in linear vibration theory

70J35 Forced motions in linear vibration theory

70J40 Parametric resonances in linear vibration theory

70J50 Systems arising from the discretization of structural vibration problems

70J99 None of the above, but in this section

70Kxx Nonlinear dynamics in mechanics [See also 34Cxx, 37-XX]

70K05 Phase plane analysis, limit cycles for nonlinear problems in mechanics

70K20 Stability for nonlinear problems in mechanics

70K25 Free motions for nonlinear problems in mechanics

70K28 Parametric resonances for nonlinear problems in mechanics

70K30 Nonlinear resonances for nonlinear problems in mechanics

70K40 Forced motions for nonlinear problems in mechanics

70K42 Equilibria and periodic trajectories for nonlinear problems in mechanics

70K43 Quasi-periodic motions and invariant tori for nonlinear problems in mechanics

70K44 Homoclinic and heteroclinic trajectories for nonlinear problems in mechanics

70K45 Normal forms for nonlinear problems in mechanics

70K50 Bifurcations and instability for nonlinear problems in mechanics

70K55 Transition to stochasticity (chaotic behavior) for nonlinear problems in mechanics [See also 37D45]

70K60 General perturbation schemes for nonlinear problems in mechanics

70K65 Averaging of perturbations for nonlinear problems in mechanics

70K70 Systems with slow and fast motions for nonlinear problems in mechanics

70K75 Nonlinear modes

70K99 None of the above, but in this section

70Lxx Random and stochastic aspects of the mechanics of particles and systems

70L05 Random vibrations in mechanics of particles and systems [See also 74H50]

70L10 Stochastic geometric mechanics

70L99 None of the above, but in this section

70Mxx Orbital mechanics

70M20 Orbital mechanics

70M99 None of the above, but in this section

70Pxx Variable mass, rockets

70P05 Variable mass, rockets

70P99 None of the above, but in this section

70Qxx Control of mechanical systems [See also 60Gxx, 60Jxx]

70Q05 Control of mechanical systems

70Q99 None of the above, but in this section

70Sxx Classical field theories [See also 37Kxx, 37Lxx, 78-XX, 81Txx, 83-XX]

70S05 Lagrangian formalism and Hamiltonian formalism in mechanics of particles and systems

70S10 Symmetries and conservation laws in mechanics of particles and systems

70S15 Yang-Mills and other gauge theories in mechanics of particles and systems

70S20 More general nonquantum field theories in mechanics of particles and systems

70S99 None of the above, but in this section

74-XX Mechanics of deformable solids

74-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to mechanics of deformable solids

74-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to mechanics of deformable solids

74-02 Research exposition (monographs, survey articles) pertaining to mechanics of deformable solids

74-03 History of mechanics of deformable solids [Consider also classification numbers pertaining to Section 01]

74-04 Software, source code, etc. for problems pertaining to mechanics of deformable solids

74-05 Experimental work for problems pertaining to mechanics of deformable solids

74-06 Proceedings, conferences, collections, etc. pertaining to mechanics of deformable solids

74-10 Mathematical modeling or simulation for problems pertaining to mechanics of deformable solids

74-11 Research data for problems pertaining to mechanics of deformable solids

74Axx Generalities, axiomatics, foundations of continuum mechanics of solids

74A05 Kinematics of deformation

74A10 Stress

74A15 Thermodynamics in solid mechanics

74A20 Theory of constitutive functions in solid mechanics

74A25 Molecular, statistical, and kinetic theories in solid mechanics

74A30 Nonsimple materials

74A35 Polar materials

74A40 Random materials and composite materials

74A45 Theories of fracture and damage

74A50 Structured surfaces and interfaces, coexistent phases

74A55 Theories of friction (tribology)

74A60 Micromechanical theories

74A65 Reactive materials

74A70 Peridynamics

74A99 None of the above, but in this section

74Bxx Elastic materials

74B05 Classical linear elasticity

74B10 Linear elasticity with initial stresses

74B15 Equations linearized about a deformed state (small deformations superposed on large)

74B20 Nonlinear elasticity

74B99 None of the above, but in this section

74Cxx Plastic materials, materials of stress-rate and internal-variable type

74C05 Small-strain, rate-independent theories of plasticity (including rigid-plastic and elasto-plastic materials)

74C10 Small-strain, rate-dependent theories of plasticity (including theories of viscoplasticity)

74C15 Large-strain, rate-independent theories of plasticity (including nonlinear plasticity)

74C20 Large-strain, rate-dependent theories of plasticity

74C99 None of the above, but in this section

74Dxx Materials of strain-rate type and history type, other materials with memory (including elastic materials with viscous damping, various viscoelastic materials)

74D05 Linear constitutive equations for materials with memory

74D10 Nonlinear constitutive equations for materials with memory

74D99 None of the above, but in this section

74Exx Material properties given special treatment

74E05 Inhomogeneity in solid mechanics

74E10 Anisotropy in solid mechanics

74E15 Crystalline structure

74E20 Granularity

74E25 Texture in solid mechanics

74E30 Composite and mixture properties

74E35 Random structure in solid mechanics

74E40 Chemical structure in solid mechanics

74E99 None of the above, but in this section

74Fxx Coupling of solid mechanics with other effects

74F05 Thermal effects in solid mechanics

74F10 Fluid-solid interactions (including aero- and hydro-elasticity, porosity, etc.)

74F15 Electromagnetic effects in solid mechanics

74F20 Mixture effects in solid mechanics

74F25 Chemical and reactive effects in solid mechanics

74F99 None of the above, but in this section

74Gxx Equilibrium (steady-state) problems in solid mechanics

74G05 Explicit solutions of equilibrium problems in solid mechanics

74G10 Analytic approximation of solutions (perturbation methods, asymptotic methods, series, etc.) of equilibrium problems in solid mechanics

74G15 Numerical approximation of solutions of equilibrium problems in solid mechanics

74G22 Existence of solutions of equilibrium problems in solid mechanics

74G30 Uniqueness of solutions of equilibrium problems in solid mechanics

74G35 Multiplicity of solutions of equilibrium problems in solid mechanics

74G40 Regularity of solutions of equilibrium problems in solid mechanics

74G45 Bounds for solutions of equilibrium problems in solid mechanics

74G50 Saint-Venant's principle

74G55 Qualitative behavior of solutions of equilibrium problems in solid mechanics

74G60 Bifurcation and buckling

74G65 Energy minimization in equilibrium problems in solid mechanics

74G70 Stress concentrations, singularities in solid mechanics

74G75 Inverse problems in equilibrium solid mechanics

74G99 None of the above, but in this section

74Hxx Dynamical problems in solid mechanics

74H05 Explicit solutions of dynamical problems in solid mechanics

74H10 Analytic approximation of solutions (perturbation methods, asymptotic methods, series, etc.) of dynamical problems in solid mechanics

74H15 Numerical approximation of solutions of dynamical problems in solid mechanics

74H20 Existence of solutions of dynamical problems in solid mechanics

74H25 Uniqueness of solutions of dynamical problems in solid mechanics

74H30 Regularity of solutions of dynamical problems in solid mechanics

74H35 Singularities, blow-up, stress concentrations for dynamical problems in solid mechanics

74H40 Long-time behavior of solutions for dynamical problems in solid mechanics

74H45 Vibrations in dynamical problems in solid mechanics

74H50 Random vibrations in dynamical problems in solid mechanics

74H55 Stability of dynamical problems in solid mechanics

74H60 Dynamical bifurcation of solutions to dynamical problems in solid mechanics

74H65 Chaotic behavior of solutions to dynamical problems in solid mechanics

74H75 Inverse problems in dynamical solid mechanics

74H80 Energy minimization in dynamical problems in solid mechanics

74H99 None of the above, but in this section

74Jxx Waves in solid mechanics

74J05 Linear waves in solid mechanics

74J10 Bulk waves in solid mechanics

74J15 Surface waves in solid mechanics

74J20 Wave scattering in solid mechanics

74J25 Inverse problems for waves in solid mechanics

74J30 Nonlinear waves in solid mechanics

74J35 Solitary waves in solid mechanics

74J40 Shocks and related discontinuities in solid mechanics

74J99 None of the above, but in this section

74Kxx Thin bodies, structures

74K05 Strings

74K10 Rods (beams, columns, shafts, arches, rings, etc.)

74K15 Membranes

74K20 Plates

74K25 Shells

74K30 Junctions

74K35 Thin films

74K99 None of the above, but in this section

74Lxx Special subfields of solid mechanics

74L05 Geophysical solid mechanics [See also 86-XX]

74L10 Soil and rock mechanics

74L15 Biomechanical solid mechanics [See also 92C10]

74L99 None of the above, but in this section

74Mxx Special kinds of problems in solid mechanics

74M05 Control, switches and devices ("smart materials") in solid mechanics [See also 93Cxx]

74M10 Friction in solid mechanics

74M15 Contact in solid mechanics

74M20 Impact in solid mechanics

74M25 Micromechanics of solids

74M99 None of the above, but in this section

74Nxx Phase transformations in solids [See also 74A50, 80Axx, 82B26, 82C26]

74N05 Crystals in solids

74N10 Displacive transformations in solids

74N15 Analysis of microstructure in solids

74N20 Dynamics of phase boundaries in solids

74N25 Transformations involving diffusion in solids

74N30 Problems involving hysteresis in solids

74N99 None of the above, but in this section

74Pxx Optimization problems in solid mechanics [See also 49Qxx]

74P05 Compliance or weight optimization in solid mechanics

74P10 Optimization of other properties in solid mechanics

74P15 Topological methods for optimization problems in solid mechanics

74P20 Geometrical methods for optimization problems in solid mechanics

74P99 None of the above, but in this section

74Qxx Homogenization, determination of effective properties in solid mechanics

74Q05 Homogenization in equilibrium problems of solid mechanics

74Q10 Homogenization and oscillations in dynamical problems of solid mechanics

74Q15 Effective constitutive equations in solid mechanics

74Q20 Bounds on effective properties in solid mechanics

74Q99 None of the above, but in this section

74Rxx Fracture and damage

74R05 Brittle damage

74R10 Brittle fracture

74R15 High-velocity fracture

74R20 Anelastic fracture and damage

74R99 None of the above, but in this section

74Sxx Numerical and other methods in solid mechanics [See also 65-XX, 74G15, 74H15]

74S05 Finite element methods applied to problems in solid mechanics

74S10 Finite volume methods applied to problems in solid mechanics

74S15 Boundary element methods applied to problems in solid mechanics

74S20 Finite difference methods applied to problems in solid mechanics

74S22 Isogeometric methods applied to problems in solid mechanics

74S25 Spectral and related methods applied to problems in solid mechanics

74S40 Applications of fractional calculus in solid mechanics

74S50 Applications of graph theory in solid mechanics

74S60 Stochastic and other probabilistic methods applied to problems in solid mechanics

74S70 Complex-variable methods applied to problems in solid mechanics

74S99 None of the above, but in this section

76-XX Fluid mechanics {For general continuum mechanics, see 74Axx, or other parts of 74-XX}

76-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to fluid mechanics

76-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to fluid mechanics

76-02 Research exposition (monographs, survey articles) pertaining to fluid mechanics

76-03 History of fluid mechanics [Consider also classification numbers pertaining to Section 01]

76-04 Software, source code, etc. for problems pertaining to fluid mechanics

76-05 Experimental work for problems pertaining to fluid mechanics

76-06 Proceedings, conferences, collections, etc. pertaining to fluid mechanics

76-10 Mathematical modeling or simulation for problems pertaining to fluid mechanics

76-11 Research data for problems pertaining to fluid mechanics

76Axx Foundations, constitutive equations, rheology, hydrodynamical models of non-fluid phenomena

76A02 Foundations of fluid mechanics

76A05 Non-Newtonian fluids

76A10 Viscoelastic fluids

76A15 Liquid crystals [See also 82D30]

76A20 Thin fluid films

76A25 Superfluids (classical aspects)

76A30 Traffic and pedestrian flow models

76A99 None of the above, but in this section

76Bxx Incompressible inviscid fluids

76B03 Existence, uniqueness, and regularity theory for incompressible inviscid fluids [See also 35Q35]

76B07 Free-surface potential flows for incompressible inviscid fluids

76B10 Jets and cavities, cavitation, free-streamline theory, water-entry problems, airfoil and hydrofoil theory, sloshing

76B15 Water waves, gravity waves; dispersion and scattering, nonlinear interaction [See also 35Q30]

76B20 Ship waves

76B25 Solitary waves for incompressible inviscid fluids [See also 35C11]

76B45 Capillarity (surface tension) for incompressible inviscid fluids [See also 76D45]

76B47 Vortex flows for incompressible inviscid fluids

76B55 Internal waves for incompressible inviscid fluids

76B70 Stratification effects in inviscid fluids

76B75 Flow control and optimization for incompressible inviscid fluids [See also 49Q10, 93C20, 93C95]

76B99 None of the above, but in this section

76Dxx Incompressible viscous fluids

76D03 Existence, uniqueness, and regularity theory for incompressible viscous fluids [See also 35Q30]

76D05 Navier-Stokes equations for incompressible viscous fluids [See also 35Q30]

76D06 Statistical solutions of Navier-Stokes and related equations [See also 60H30, 76M35]

76D07 Stokes and related (Oseen, etc.) flows

76D08 Lubrication theory

76D09 Viscous-inviscid interaction

76D10 Boundary-layer theory, separation and reattachment, higher-order effects

76D17 Viscous vortex flows

76D25 Wakes and jets

76D27 Other free boundary flows; Hele-Shaw flows

76D33 Waves for incompressible viscous fluids

76D45 Capillarity (surface tension) for incompressible viscous fluids [See also 76B45]

76D50 Stratification effects in viscous fluids

76D55 Flow control and optimization for incompressible viscous fluids [See also 49Q10, 93C20, 93C95]

76D99 None of the above, but in this section

76Exx Hydrodynamic stability

76E05 Parallel shear flows in hydrodynamic stability

76E06 Convection in hydrodynamic stability

76E07 Rotation in hydrodynamic stability

76E09 Stability and instability of nonparallel flows in hydrodynamic stability

76E15 Absolute and convective instability and stability in hydrodynamic stability

76E17 Interfacial stability and instability in hydrodynamic stability

76E19 Compressibility effects in hydrodynamic stability

76E20 Stability and instability of geophysical and astrophysical flows

76E25 Stability and instability of magnetohydrodynamic and electrohydrodynamic flows

76E30 Nonlinear effects in hydrodynamic stability

76E99 None of the above, but in this section

76Fxx Turbulence [See also 37-XX, 60Gxx, 60Jxx]

76F02 Fundamentals of turbulence

76F05 Isotropic turbulence; homogeneous turbulence

76F06 Transition to turbulence

76F10 Shear flows and turbulence

76F20 Dynamical systems approach to turbulence [See also 37-XX]

76F25 Turbulent transport, mixing

76F30 Renormalization and other field-theoretical methods for turbulence [See also 81T99]

76F35 Convective turbulence [See also 76E15, 76Rxx]

76F40 Turbulent boundary layers

76F45 Stratification effects in turbulence

76F50 Compressibility effects in turbulence

76F55 Statistical turbulence modeling [See also 76M35]

76F60 k-ε modeling in turbulence

76F65 Direct numerical and large eddy simulation of turbulence

76F70 Control of turbulent flows

76F80 Turbulent combustion; reactive turbulence

76F99 None of the above, but in this section

76Gxx General aerodynamics and subsonic flows

76G25 General aerodynamics and subsonic flows

76G99 None of the above, but in this section

76Hxx Transonic flows

76H05 Transonic flows

76H99 None of the above, but in this section

76Jxx Supersonic flows

76J20 Supersonic flows

76J99 None of the above, but in this section

76Kxx Hypersonic flows

76K05 Hypersonic flows

76K99 None of the above, but in this section

76Lxx Shock waves and blast waves in fluid mechanics [See also 35L67]

76L05 Shock waves and blast waves in fluid mechanics [See also 35L67]

76L99 None of the above, but in this section

76Mxx Basic methods in fluid mechanics [See also 65-XX]

76M10 Finite element methods applied to problems in fluid mechanics

76M12 Finite volume methods applied to problems in fluid mechanics

76M15 Boundary element methods applied to problems in fluid mechanics

76M20 Finite difference methods applied to problems in fluid mechanics

76M21 Inverse problems in fluid mechanics

76M22 Spectral methods applied to problems in fluid mechanics

76M23 Vortex methods applied to problems in fluid mechanics

76M27 Visualization algorithms applied to problems in fluid mechanics

76M28 Particle methods and lattice-gas methods

76M30 Variational methods applied to problems in fluid mechanics

76M35 Stochastic analysis applied to problems in fluid mechanics

76M40 Complex variables methods applied to problems in fluid mechanics

76M45 Asymptotic methods, singular perturbations applied to problems in fluid mechanics

76M50 Homogenization applied to problems in fluid mechanics

76M55 Dimensional analysis and similarity applied to problems in fluid mechanics

76M60 Symmetry analysis, Lie group and Lie algebra methods applied to problems in fluid mechanics

76M99 None of the above, but in this section

76Nxx Compressible fluids and gas dynamics, general

76N06 Compressible Navier-Stokes equations

76N10 Existence, uniqueness, and regularity theory for compressible fluids and gas dynamics [See also 35L60, 35L65, 35Q30]

76N15 Gas dynamics, general

76N17 Viscous-inviscid interaction for compressible fluids and gas dynamics

76N20 Boundary-layer theory for compressible fluids and gas dynamics

76N25 Flow control and optimization for compressible fluids and gas dynamics

76N30 Waves in compressible fluids

76N99 None of the above, but in this section

76Pxx Rarefied gas flows, Boltzmann equation in fluid mechanics [See also 82B40, 82C40, 82D05]

76P05 Rarefied gas flows, Boltzmann equation in fluid mechanics [See also 82B40, 82C40, 82D05]

76P99 None of the above, but in this section

76Qxx Hydro- and aero-acoustics

76Q05 Hydro- and aero-acoustics

76Q99 None of the above, but in this section

76Rxx Diffusion and convection

76R05 Forced convection

76R10 Free convection

76R50 Diffusion [See also 60J60]

76R99 None of the above, but in this section

76Sxx Flows in porous media; filtration; seepage

76S05 Flows in porous media; filtration; seepage

76S99 None of the above, but in this section

76Txx Multiphase and multicomponent flows

76T06 Liquid-liquid two component flows

76T10 Liquid-gas two-phase flows, bubbly flows

76T15 Dusty-gas two-phase flows

76T17 Two gas multicomponent flows

76T20 Suspensions

76T25 Granular flows [See also 74C99, 74E20]

76T30 Three or more component flows

76T99 None of the above, but in this section

76Uxx Rotating fluids

76U05 General theory of rotating fluids

76U60 Geophysical flows [See also 86A05, 86A10]

76U65 Rossby waves [See also 86A05, 86A10]

76U99 None of the above, but in this section

76Vxx Reaction effects in flows [See also 80A32]

76V05 Reaction effects in flows [See also 80A32]

76V99 None of the above, but in this section

76Wxx Magnetohydrodynamics and electrohydrodynamics

76W05 Magnetohydrodynamics and electrohydrodynamics

76W99 None of the above, but in this section

76Xxx Ionized gas flow in electromagnetic fields; plasmic flow [See also 82D10]

76X05 Ionized gas flow in electromagnetic fields; plasmic flow [See also 82D10]

76X99 None of the above, but in this section

76Yxx Quantum hydrodynamics and relativistic hydrodynamics [See also 82D50, 83C55, 85A30]

76Y05 Quantum hydrodynamics and relativistic hydrodynamics [See also 82D50, 83C55, 85A30]

76Y99 None of the above, but in this section

76Zxx Biological fluid mechanics [See also 74F10, 74L15, 92Cxx]

76Z05 Physiological flows [See also 92C35]

76Z10 Biopropulsion in water and in air

76Z99 None of the above, but in this section

78-XX Optics, electromagnetic theory {For quantum optics, see 81V80}

78-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to optics and electromagnetic theory

78-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to optics and electromagnetic theory

78-02 Research exposition (monographs, survey articles) pertaining to optics and electromagnetic theory

78-03 History of optics and electromagnetic theory [Consider also classification numbers pertaining to Section 01]

78-04 Software, source code, etc. for problems pertaining to optics and electromagnetic theory

78-05 Experimental work for problems pertaining to optics and electromagnetic theory

78-06 Proceedings, conferences, collections, etc. pertaining to optics and electromagnetic theory

78-10 Mathematical modeling or simulation for problems pertaining to optics and electromagnetic theory

78-11 Research data for problems pertaining to optics and electromagnetic theory

78Axx General

78A02 Foundations in optics and electromagnetic theory

78A05 Geometric optics

78A10 Physical optics

78A15 Electron optics

78A20 Space charge waves

78A25 Electromagnetic theory, general

78A30 Electro- and magnetostatics

78A35 Motion of charged particles

78A37 Ion traps

78A40 Waves and radiation in optics and electromagnetic theory

78A45 Diffraction, scattering {For WKB methods see 34E20}

78A46 Inverse problems (including inverse scattering) in optics and electromagnetic theory

78A48 Composite media; random media in optics and electromagnetic theory

78A50 Antennas, waveguides in optics and electromagnetic theory

78A55 Technical applications of optics and electromagnetic theory

78A57 Electrochemistry

78A60 Lasers, masers, optical bistability, nonlinear optics [See also 81V80]

78A70 Biological applications of optics and electromagnetic theory [See also 91D30, 92C30]

78A97 Mathematically heuristic optics and electromagnetic theory (must also be assigned at least one other classification number in Section 78)

78A99 None of the above, but in this section

78Mxx Basic methods for problems in optics and electromagnetic theory [See also 65-XX]

78M05 Method of moments applied to problems in optics and electromagnetic theory

78M10 Finite element, Galerkin and related methods applied to problems in optics and electromagnetic theory

78M12 Finite volume methods, finite integration techniques applied to problems in optics and electromagnetic theory

78M15 Boundary element methods applied to problems in optics and electromagnetic theory

78M16 Multipole methods applied to problems in optics and electromagnetic theory

78M20 Finite difference methods applied to problems in optics and electromagnetic theory

78M22 Spectral, collocation and related methods applied to problems in optics and electromagnetic theory

78M30 Variational methods applied to problems in optics and electromagnetic theory

78M31 Monte Carlo methods applied to problems in optics and electromagnetic theory

78M32 Neural and heuristic methods applied to problems in optics and electromagnetic theory

78M34 Model reduction in optics and electromagnetic theory

78M35 Asymptotic analysis in optics and electromagnetic theory

78M40 Homogenization in optics and electromagnetic theory

78M50 Optimization problems in optics and electromagnetic theory

78M99 None of the above, but in this section

80-XX Classical thermodynamics, heat transfer {For thermodynamics of solids, see 74A15}

80-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to classical thermodynamics

80-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to classical thermodynamics

80-02 Research exposition (monographs, survey articles) pertaining to classical thermodynamics

80-03 History of classical thermodynamics [Consider also classification numbers pertaining to Section 01]

80-04 Software, source code, etc. for problems pertaining to classical thermodynamics

80-05 Experimental work for problems pertaining to classical thermodynamics

80-06 Proceedings, conferences, collections, etc. pertaining to classical thermodynamics

80-10 Mathematical modeling or simulation for problems pertaining to classical thermodynamics

80-11 Research data for problems pertaining to classical thermodynamics

80Axx Thermodynamics and heat transfer

80A05 Foundations of thermodynamics and heat transfer

80A10 Classical and relativistic thermodynamics

80A17 Thermodynamics of continua [See also 74A15]

80A19 Diffusive and convective heat and mass transfer, heat flow

80A21 Radiative heat transfer

80A22 Stefan problems, phase changes, etc. [See also 74Nxx]

80A23 Inverse problems in thermodynamics and heat transfer

80A25 Combustion

80A30 Chemical kinetics in thermodynamics and heat transfer [See also 76V05, 92C45, 92E20]

80A32 Chemically reacting flows [See also 92C45, 92E20]

80A50 Chemistry (general) in thermodynamics and heat transfer [See mainly 92Exx]

80A99 None of the above, but in this section

80Mxx Basic methods in thermodynamics and heat transfer [See also 65-XX]

80M10 Finite element, Galerkin and related methods applied to problems in thermodynamics and heat transfer

80M12 Finite volume methods applied to problems in thermodynamics and heat transfer

80M15 Boundary element methods applied to problems in thermodynamics and heat transfer

80M20 Finite difference methods applied to problems in thermodynamics and heat transfer

80M22 Spectral, collocation and related (meshless) methods applied to problems in thermodynamics and heat transfer

80M30 Variational methods applied to problems in thermodynamics and heat transfer

80M31 Monte Carlo methods applied to problems in thermodynamics and heat transfer

80M35 Asymptotic analysis for problems in thermodynamics and heat transfer

80M40 Homogenization for problems in thermodynamics and heat transfer

80M50 Optimization problems in thermodynamics and heat transfer

80M60 Stochastic analysis in thermodynamics and heat transfer

80M99 None of the above, but in this section

81-XX Quantum theory

81-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to quantum theory

81-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to quantum theory

81-02 Research exposition (monographs, survey articles) pertaining to quantum theory

81-03 History of quantum theory [Consider also classification numbers pertaining to Section 01]

81-04 Software, source code, etc. for problems pertaining to quantum theory

81-05 Experimental work for problems pertaining to quantum theory

81-06 Proceedings, conferences, collections, etc. pertaining to quantum theory

81-08 Computational methods for problems pertaining to quantum theory

81-10 Mathematical modeling or simulation for problems pertaining to quantum theory

81-11 Research data for problems pertaining to quantum theory

81Pxx Foundations, quantum information and its processing, quantum axioms, and philosophy

81P05 General and philosophical questions in quantum theory

81P10 Logical foundations of quantum mechanics; quantum logic (quantum-theoretic aspects) [See also 03G12, 06C15]

81P13 Contextuality in quantum theory

81P15 Quantum measurement theory, state operations, state preparations

81P16 Quantum state spaces, operational and probabilistic concepts

81P17 Quantum entropies

81P18 Quantum state tomography, quantum state discrimination

81P20 Stochastic mechanics (including stochastic electrodynamics)

81P40 Quantum coherence, entanglement, quantum correlations

81P42 Entanglement measures, concurrencies, separability criteria

81P43 Quantum discord

81P45 Quantum information, communication, networks (quantum-theoretic aspects) [See also 94A15, 94A17]

81P47 Quantum channels, fidelity [See also 94A40]

81P48 LOCC, teleportation, dense coding, remote state operations, distillation

81P50 Quantum state estimation, approximate cloning

81P55 Special bases (entangled, mutual unbiased, etc.)

81P65 Quantum gates

81P68 Quantum computation [See also 68Q09] {For algorithmic aspects, see 68Q12}

81P70 Quantum coding (general)

81P73 Computational stability and error-correcting codes for quantum computation and communication processing

81P94 Quantum cryptography (quantum-theoretic aspects) [See also 94A60]

81P99 None of the above, but in this section

81Qxx General mathematical topics and methods in quantum theory

81Q05 Closed and approximate solutions to the Schrödinger, Dirac, Klein-Gordon and other equations of quantum mechanics

81Q10 Selfadjoint operator theory in quantum theory, including spectral analysis

81Q12 Nonselfadjoint operator theory in quantum theory including creation and destruction operators

81Q15 Perturbation theories for operators and differential equations in quantum theory

81Q20 Semiclassical techniques, including WKB and Maslov methods applied to problems in quantum theory

81Q30 Feynman integrals and graphs; applications of algebraic topology and algebraic geometry [See also 14D05, 32S40]

81Q35 Quantum mechanics on special spaces: manifolds, fractals, graphs, lattices [See also 81R20]

81Q37 Quantum dots, waveguides, ratchets, etc. [See also 82D20, 82D77]

81Q40 Bethe-Salpeter and other integral equations arising in quantum theory

81Q50 Quantum chaos [See also 37Dxx]

81Q60 Supersymmetry and quantum mechanics

81Q65 Alternative quantum mechanics (including hidden variables, etc.)

81Q70 Differential geometric methods, including holonomy, Berry and Hannay phases, Aharonov-Bohm effect, etc. in quantum theory

81Q80 Special quantum systems, such as solvable systems

81Q93 Quantum control

81Q99 None of the above, but in this section

81Rxx Groups and algebras in quantum theory

81R05 Finite-dimensional groups and algebras motivated by physics and their representations [See also 20C35, 22E70]

81R10 Infinite-dimensional groups and algebras motivated by physics, including Virasoro, Kac-Moody, W-algebras and other current algebras and their representations [See also 17B65, 17B67, 22E65, 22E67, 22E70]

81R12 Groups and algebras in quantum theory and relations with integrable systems [See also 17Bxx, 37J35]

81R15 Operator algebra methods applied to problems in quantum theory [See also 46Lxx, 81T05]

81R20 Covariant wave equations in quantum theory, relativistic quantum mechanics [See also 81Q35]

81R25 Spinor and twistor methods applied to problems in quantum theory [See also 32L25]

81R30 Coherent states [See also 22E45]; squeezed states in quantum theory [See also 81V80]

81R40 Symmetry breaking in quantum theory

81R50 Quantum groups and related algebraic methods applied to problems in quantum theory [See also 16T20, 17B37]

81R60 Noncommutative geometry in quantum theory

81R99 None of the above, but in this section

81Sxx General quantum mechanics and problems of quantization

81S05 Commutation relations and statistics as related to quantum mechanics (general)

81S07 Uncertainty relations, also entropic

81S08 Canonical quantization

81S10 Geometry and quantization, symplectic methods [See also 53D50]

81S20 Stochastic quantization

81S22 Open systems, reduced dynamics, master equations, decoherence [See also 82C31]

81S25 Quantum stochastic calculus

81S30 Phase-space methods including Wigner distributions, etc. applied to problems in quantum mechanics

81S40 Path integrals in quantum mechanics [See also 58D30, 81Q30, 81T18]

81S99 None of the above, but in this section

81Txx Quantum field theory; related classical field theories [See also 70Sxx]

81T05 Axiomatic quantum field theory; operator algebras

81T08 Constructive quantum field theory

81T10 Model quantum field theories

81T11 Higher spin theories

81T12 Effective quantum field theories

81T13 Yang-Mills and other gauge theories in quantum field theory [See also 53C07, 58E15]

81T15 Perturbative methods of renormalization applied to problems in quantum field theory

81T16 Nonperturbative methods of renormalization applied to problems in quantum field theory

81T17 Renormalization group methods applied to problems in quantum field theory

81T18 Feynman diagrams

81T20 Quantum field theory on curved space or spacetime backgrounds

81T25 Quantum field theory on lattices

81T27 Continuum limits in quantum field theory

81T28 Thermal quantum field theory [See also 82B30]

81T30 String and superstring theories; other extended objects (e.g., branes) in quantum field theory [See also 83E30]

81T32 Matrix models and tensor models for quantum field theory

81T33 Dimensional compactification in quantum field theory

81T35 Correspondence, duality, holography (AdS/CFT, gauge/gravity, etc.) [See also 83E05]

81T40 Two-dimensional field theories, conformal field theories, etc. in quantum mechanics

81T45 Topological field theories in quantum mechanics [See also 57R56, 58Dxx]

81T50 Anomalies in quantum field theory

81T55 Casimir effect in quantum field theory

81T60 Supersymmetric field theories in quantum mechanics

81T70 Quantization in field theory; cohomological methods [See also 58D29]

81T75 Noncommutative geometry methods in quantum field theory [See also 46L85, 46L87, 58B34]

81T99 None of the above, but in this section

81Uxx Quantum scattering theory [See also 34A55, 34L25, 34L40, 35P25, 47A40]

81U05 2-body potential quantum scattering theory {For WKB methods, see also 34E20}

81U10 n-body potential quantum scattering theory

81U15 Exactly and quasi-solvable systems arising in quantum theory

81U20 S-matrix theory, etc. in quantum theory

81U24 Resonances in quantum scattering theory

81U26 Tunneling in quantum theory

81U30 Dispersion theory, dispersion relations arising in quantum theory

81U35 Inelastic and multichannel quantum scattering

81U40 Inverse scattering problems in quantum theory

81U90 Particle decays in scattering

81U99 None of the above, but in this section

81Vxx Applications of quantum theory to specific physical systems

81V05 Strong interaction, including quantum chromodynamics

81V10 Electromagnetic interaction; quantum electrodynamics

81V15 Weak interaction in quantum theory

81V17 Gravitational interaction in quantum theory [See also 83Cxx, 83Exx]

81V19 Other fundamental interactions in quantum theory

81V22 Unified quantum theories

81V25 Other elementary particle theory in quantum theory

81V27 Anyons

81V35 Nuclear physics

81V45 Atomic physics

81V55 Molecular physics [See also 92E10]

81V60 Mono-, di- and multipole moments (EM and other), gyromagnetic relations

81V65 Quantum dots as quasi particles [See also 82D20]

81V70 Many-body theory; quantum Hall effect

81V72 Particle exchange symmetries in quantum theory (general)

81V73 Bosonic systems in quantum theory

81V74 Fermionic systems in quantum 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.) pertaining to statistical mechanics

82-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to statistical mechanics

82-02 Research exposition (monographs, survey articles) pertaining to statistical mechanics

82-03 History of statistical mechanics [Consider also classification numbers pertaining to Section 01]

82-04 Software, source code, etc. for problems pertaining to statistical mechanics

82-05 Experimental work for problems pertaining to statistical mechanics

82-06 Proceedings, conferences, collections, etc. pertaining to statistical mechanics

82-10 Mathematical modeling or simulation for problems pertaining to statistical mechanics

82-11 Research data for problems pertaining to statistical mechanics

82Bxx Equilibrium statistical mechanics

82B03 Foundations of equilibrium statistical mechanics

82B05 Classical equilibrium statistical mechanics (general)

82B10 Quantum equilibrium statistical mechanics (general)

82B20 Lattice systems (Ising, dimer, Potts, etc.) and systems on graphs arising in equilibrium statistical mechanics

82B21 Continuum models (systems of particles, etc.) arising in equilibrium statistical mechanics

82B23 Exactly solvable models; Bethe ansatz

82B24 Interface problems; diffusion-limited aggregation arising in equilibrium statistical mechanics

82B26 Phase transitions (general) in equilibrium statistical mechanics

82B27 Critical phenomena in equilibrium statistical mechanics

82B28 Renormalization group methods in equilibrium statistical mechanics [See also 81T17]

82B30 Statistical thermodynamics [See also 80-XX]

82B31 Stochastic methods applied to problems in equilibrium statistical mechanics

82B35 Irreversible thermodynamics, including Onsager-Machlup theory [See also 92E20]

82B40 Kinetic theory of gases in equilibrium statistical mechanics

82B41 Random walks, random surfaces, lattice animals, etc. in equilibrium statistical mechanics [See also 60G50, 82C41]

82B43 Percolation [See also 60K35]

82B44 Disordered systems (random Ising models, random Schrödinger operators, etc.) in equilibrium statistical mechanics

82B99 None of the above, but in this section

82Cxx Time-dependent statistical mechanics (dynamic and nonequilibrium)

82C03 Foundations of time-dependent statistical mechanics

82C05 Classical dynamic and nonequilibrium statistical mechanics (general)

82C10 Quantum dynamics and nonequilibrium statistical mechanics (general)

82C20 Dynamic lattice systems (kinetic Ising, etc.) and systems on graphs in time-dependent statistical mechanics

82C21 Dynamic continuum models (systems of particles, etc.) in time-dependent statistical mechanics

82C22 Interacting particle systems in time-dependent statistical mechanics [See also 60K35]

82C23 Exactly solvable dynamic models in time-dependent statistical mechanics [See also 37K60]

82C24 Interface problems; diffusion-limited aggregation in time-dependent statistical mechanics

82C26 Dynamic and nonequilibrium phase transitions (general) in statistical mechanics

82C27 Dynamic critical phenomena in statistical mechanics

82C28 Dynamic renormalization group methods applied to problems in time-dependent statistical mechanics [See also 81T17]

82C31 Stochastic methods (Fokker-Planck, Langevin, etc.) applied to problems in time-dependent statistical mechanics [See also 60H10]

82C32 Neural nets applied to problems in time-dependent statistical mechanics [See also 68T05, 91E40, 92B20]

82C35 Irreversible thermodynamics, including Onsager-Machlup theory

82C40 Kinetic theory of gases in time-dependent statistical mechanics

82C41 Dynamics of random walks, random surfaces, lattice animals, etc. in time-dependent statistical mechanics [See also 60G50]

82C43 Time-dependent percolation in statistical mechanics [See also 60K35]

82C44 Dynamics of disordered systems (random Ising systems, etc.) in time-dependent statistical mechanics

82C70 Transport processes in time-dependent statistical mechanics

82C99 None of the above, but in this section

82Dxx Applications of statistical mechanics to specific types of physical systems

82D03 Statistical mechanical studies in condensed matter (general)

82D05 Statistical mechanical studies of gases

82D10 Statistical mechanical studies of plasmas

82D15 Statistical mechanical studies of liquids

82D20 Statistical mechanical studies of solids

82D25 Statistical mechanical studies of crystals {For crystallographic group theory, see 20H15}

82D30 Statistical mechanical studies of random media, disordered materials (including liquid crystals and spin glasses)

82D35 Statistical mechanical studies of metals

82D37 Statistical mechanical studies of semiconductors

82D40 Statistical mechanical studies of magnetic materials

82D45 Statistical mechanical studies of ferroelectrics

82D50 Statistical mechanical studies of superfluids

82D55 Statistical mechanical studies of superconductors

82D60 Statistical mechanical studies of polymers

82D75 Nuclear reactor theory; neutron transport

82D77 Quantum waveguides, quantum wires [See also 78A50]

82D80 Statistical mechanical studies of nanostructures and nanoparticles

82D99 None of the above, but in this section

82Mxx Basic methods in statistical mechanics [See also 65-XX]

82M10 Finite element, Galerkin and related methods applied to problems in statistical mechanics

82M12 Finite volume methods applied to problems in statistical mechanics

82M15 Boundary element methods applied to problems in statistical mechanics

82M20 Finite difference methods applied to problems in statistical mechanics

82M22 Spectral, collocation and related (meshless) methods applied to problems in statistical mechanics

82M30 Variational methods applied to problems in statistical mechanics

82M31 Monte Carlo methods applied to problems in statistical mechanics [See also 65C05]

82M36 Computational density functional analysis in statistical mechanics

82M37 Computational molecular dynamics in statistical mechanics

82M60 Stochastic analysis in statistical mechanics [See also 65C35]

82M99 None of the above, but in this section

83-XX Relativity and gravitational theory

83-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to relativity and gravitational theory

83-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to relativity and gravitational theory

83-02 Research exposition (monographs, survey articles) pertaining to relativity and gravitational theory

83-03 History of relativity and gravitational theory [Consider also classification numbers pertaining to Section 01]

83-04 Software, source code, etc. for problems pertaining to relativity and gravitational theory

83-05 Experimental work for problems pertaining to relativity and gravitational theory

83-06 Proceedings, conferences, collections, etc. pertaining to relativity and gravitational theory

83-08 Computational methods for problems pertaining to relativity and gravitational theory

83-10 Mathematical modeling or simulation for problems pertaining to relativity and gravitational theory

83-11 Research data for problems pertaining to relativity and gravitational theory

83Axx Special relativity

83A05 Special relativity

83A99 None of the above, but in this section

83Bxx Observational and experimental questions in relativity and gravitational theory

83B05 Observational and experimental questions in relativity and gravitational theory

83B99 None of the above, but in this section

83Cxx General relativity

83C05 Einstein's equations (general structure, canonical formalism, Cauchy problems)

83C10 Equations of motion in general relativity and gravitational theory

83C15 Exact solutions to problems in general relativity and gravitational theory

83C20 Classes of solutions; algebraically special solutions, metrics with symmetries for problems in general relativity and gravitational theory

83C22 Einstein-Maxwell equations

83C25 Approximation procedures, weak fields in general relativity and gravitational theory

83C27 Lattice gravity, Regge calculus and other discrete methods in general relativity and gravitational theory

83C30 Asymptotic procedures (radiation, news functions, $\mathcal{H}$-spaces, etc.) in general relativity and gravitational theory

83C35 Gravitational waves

83C40 Gravitational energy and conservation laws; groups of motions

83C45 Quantization of the gravitational field

83C47 Methods of quantum field theory in general relativity and gravitational theory [See also 81T20]

83C50 Electromagnetic fields in general relativity and gravitational theory

83C55 Macroscopic interaction of the gravitational field with matter (hydrodynamics, etc.)

83C56 Dark matter and dark energy

83C57 Black holes

83C60 Spinor and twistor methods in general relativity and gravitational theory; Newman-Penrose formalism

83C65 Methods of noncommutative geometry in general relativity [See also 58B34]

83C75 Space-time singularities, cosmic censorship, etc.

83C80 Analogues of general relativity in lower dimensions

83C99 None of the above, but in this section

83Dxx Relativistic gravitational theories other than Einstein's, including asymmetric field theories

83D05 Relativistic gravitational theories other than Einstein's, including asymmetric field theories

83D99 None of the above, but in this section

83Exx Unified, higher-dimensional and super field theories

83E05 Geometrodynamics and the holographic principle [See also 81T35]

83E15 Kaluza-Klein and other higher-dimensional theories

83E30 String and superstring theories in gravitational theory [See also 81T30]

83E50 Supergravity

83E99 None of the above, but in this section

83Fxx Cosmology

83F05 Cosmology

83F99 None of the above, but in this section

85-XX Astronomy and astrophysics {For celestial mechanics, see 70F15}

85-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to astronomy and astrophysics

85-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to astronomy and astrophysics

85-02 Research exposition (monographs, survey articles) pertaining to astronomy and astrophysics

85-03 History of astronomy and astrophysics [Consider also classification numbers pertaining to Section 01]

85-04 Software, source code, etc. for problems pertaining to astronomy and astrophysics

85-05 Experimental work for problems pertaining to astronomy and astrophysics

85-06 Proceedings, conferences, collections, etc. pertaining to astronomy and astrophysics

85-08 Computational methods for problems pertaining to astronomy and astrophysics

85-10 Mathematical modeling or simulation for problems pertaining to astronomy and astrophysics

85-11 Research data for problems pertaining to astronomy and astrophysics

85Axx Astronomy and astrophysics {For celestial mechanics, see 70F15}

85A04 General questions in astronomy and astrophysics

85A05 Galactic and stellar dynamics

85A15 Galactic and stellar structure

85A20 Planetary atmospheres

85A25 Radiative transfer in astronomy and astrophysics

85A30 Hydrodynamic and hydromagnetic problems in astronomy and astrophysics [See also 76Y05]

85A35 Statistical astronomy

85A40 Cosmology {For relativistic cosmology, see 83F05}

85A99 None of the above, but in this section

86-XX Geophysics [See also 76U05, 76V05]

86-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to geophysics

86-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to geophysics

86-02 Research exposition (monographs, survey articles) pertaining to geophysics

86-03 History of geophysics [Consider also classification numbers pertaining to Section 01]

86-04 Software, source code, etc. for problems pertaining to geophysics

86-05 Experimental work for problems pertaining to geophysics

86-06 Proceedings, conferences, collections, etc. pertaining to geophysics

86-08 Computational methods for problems pertaining to geophysics

86-10 Mathematical modeling or simulation for problems pertaining to geophysics

86-11 Research data for problems pertaining to geophysics

86Axx Geophysics [See also 76U05, 76V05]

86A04 General questions in geophysics

86A05 Hydrology, hydrography, oceanography [See also 76Bxx, 76E20, 76Q05, 76Rxx, 76U05]

86A08 Climate science and climate modeling

86A10 Meteorology and atmospheric physics [See also 76Bxx, 76E20, 76N15, 76Q05, 76Rxx, 76U05]

86A15 Seismology (including tsunami modeling), earthquakes

86A20 Potentials, prospecting

86A22 Inverse problems in geophysics [See also 35R30]

86A25 Geo-electricity and geomagnetism [See also 76W05, 78A25]

86A30 Geodesy, mapping problems

86A32 Geostatistics

86A40 Glaciology

86A60 Geological problems

86A70 Vulcanology; magma and lava flow

86A99 None of the above, but in this section

90-XX Operations research, mathematical programming

90-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to operations research and mathematical programming

90-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to operations research and mathematical programming

90-02 Research exposition (monographs, survey articles) pertaining to operations research and mathematical programming

90-03 History of operations research and mathematical programming [Consider also classification numbers pertaining to Section 01]

90-04 Software, source code, etc. for problems pertaining to operations research and mathematical programming

90-05 Experimental work for problems pertaining to operations research and mathematical programming

90-06 Proceedings, conferences, collections, etc. pertaining to operations research and mathematical programming

90-08 Computational methods for problems pertaining to operations research and mathematical programming

90-10 Mathematical modeling or simulation for problems pertaining to operations research and mathematical programming

90-11 Research data for problems pertaining to operations research and mathematical programming

90Bxx Operations research and management science

90B05 Inventory, storage, reservoirs

90B06 Transportation, logistics and supply chain management

90B10 Deterministic network models in operations research {For network control, see 93B70}

90B15 Stochastic network models in operations research {For network control, see 93B70}

90B18 Communication networks in operations research [See also 68M10, 68M12, 68M18, 94A05] {For networks as computational models, see 68Q06}

90B20 Traffic problems in operations research

90B22 Queues and service in operations research [See also 60K25, 68M20]

90B25 Reliability, availability, maintenance, inspection in operations research [See also 60K10, 62N05]

90B30 Production models

90B35 Deterministic scheduling theory in operations research [See also 68M20]

90B36 Stochastic scheduling theory in operations research [See also 68M20]

90B40 Search theory

90B50 Management decision making, including multiple objectives [See also 90C29, 90C31, 91A35, 91B06]

90B60 Marketing, advertising [See also 91B60]

90B70 Theory of organizations, manpower planning in operations research [See also 91D35]

90B80 Discrete location and assignment [See also 90C10]

90B85 Continuous location

90B90 Case-oriented studies in operations research

90B99 None of the above, but in this section

90Cxx Mathematical programming [See also 49Mxx, 65Kxx]

90C05 Linear programming

90C06 Large-scale problems in mathematical programming

90C08 Special problems of linear programming (transportation, multi-index, data envelopment analysis, etc.)

90C09 Boolean programming

90C10 Integer programming

90C11 Mixed integer programming

90C15 Stochastic programming

90C17 Robustness in mathematical programming

90C20 Quadratic programming

90C22 Semidefinite programming

90C23 Polynomial optimization

90C24 Tropical optimization (e.g., max-plus optimization)

90C25 Convex programming

90C26 Nonconvex programming, global optimization

90C27 Combinatorial optimization

90C29 Multi-objective and goal programming

90C30 Nonlinear programming

90C31 Sensitivity, stability, parametric optimization

90C32 Fractional programming

90C33 Complementarity and equilibrium problems and variational inequalities (finite dimensions) (aspects of mathematical programming)

90C34 Semi-infinite programming

90C35 Programming involving graphs or networks [See also 90C27]

90C39 Dynamic programming [See also 49L20]

90C40 Markov and semi-Markov decision processes

90C46 Optimality conditions and duality in mathematical programming [See also 49N15]

90C47 Minimax problems in mathematical programming [See also 49K35]

90C48 Programming in abstract spaces

90C49 Extreme-point and pivoting methods

90C51 Interior-point methods

90C52 Methods of reduced gradient type

90C53 Methods of quasi-Newton type

90C55 Methods of successive quadratic programming type

90C56 Derivative-free methods and methods using generalized derivatives [See also 49J52]

90C57 Polyhedral combinatorics, branch-and-bound, branch-and-cut

90C59 Approximation methods and heuristics in mathematical programming

90C60 Abstract computational complexity for mathematical programming problems [See also 68Q25]

90C70 Fuzzy and other nonstochastic uncertainty mathematical programming

90C90 Applications of mathematical programming

90C99 None of the above, but in this section

91-XX Game theory, economics, finance, and other social and behavioral sciences

91-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to game theory, economics, and finance

91-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to game theory, economics, and finance

91-02 Research exposition (monographs, survey articles) pertaining to game theory, economics, and finance

91-03 History of game theory, economics, and finance [Consider also classification numbers pertaining to Section 01]

91-04 Software, source code, etc. for problems pertaining to game theory, economics, and finance

91-05 Experimental work for problems pertaining to game theory, economics, and finance

91-06 Proceedings, conferences, collections, etc. pertaining to game theory, economics, and finance

91-08 Computational methods for problems pertaining to game theory, economics, and finance

91-10 Mathematical modeling or simulation for problems pertaining to game theory, economics, and finance

91-11 Research data for problems pertaining to game theory, economics, and finance

91Axx Game theory

91A05 2-person games

91A06 n-person games, $n > 2$

91A07 Games with infinitely many players

91A10 Noncooperative games

91A11 Equilibrium refinements

91A12 Cooperative games

91A14 Potential and congestion games

91A15 Stochastic games, stochastic differential games

91A16 Mean field games (aspects of game theory) [See also 35Q89, 49N80]

91A18 Games in extensive form

91A20 Multistage and repeated games

91A22 Evolutionary games

91A23 Differential games (aspects of game theory) [See also 49N70]

91A24 Positional games (pursuit and evasion, etc.) [See also 49N75]

91A25 Dynamic games

91A26 Rationality and learning in game theory

91A27 Games with incomplete information, Bayesian games

91A28 Signaling and communication in game theory

91A30 Utility theory for games [See also 91B16]

91A35 Decision theory for games [See also 62Cxx, 90B50, 91B06]

91A40 Other game-theoretic models

91A43 Games involving graphs {For games on graphs, see 05C57}

91A44 Games involving topology, set theory, or logic

91A46 Combinatorial games

91A50 Discrete-time games

91A55 Games of timing

91A60 Probabilistic games; gambling [See also 60G40]

91A65 Hierarchical games (including Stackelberg games)

91A68 Algorithmic game theory and complexity [See also 68Qxx, 68Wxx]

91A70 Spaces of games

91A80 Applications of game theory

91A81 Quantum games

91A86 Game theory and fuzziness

91A90 Experimental studies

91A99 None of the above, but in this section

91Bxx Mathematical economics {For econometrics, see 62P20}

91B02 Fundamental topics (basic mathematics, methodology; applicable to economics in general)

91B03 Mechanism design theory

91B05 Risk models (general) {For actuarial and financial risk, see 91Gxx}

91B06 Decision theory [See also 62Cxx, 90B50, 91A35]

91B08 Individual preferences

91B10 Group preferences

91B12 Voting theory

91B14 Social choice

91B15 Welfare economics

91B16 Utility theory [See also 91A30]

91B18 Public goods

91B24 Microeconomic theory (price theory and economic markets)

91B26 Auctions, bargaining, bidding and selling, and other market models

91B32 Resource and cost allocation (including fair division, apportionment, etc.)

91B38 Production theory, theory of the firm

91B39 Labor markets

91B41 Contract theory (moral hazard, adverse selection)

91B42 Consumer behavior, demand theory

91B43 Principal-agent models

91B44 Economics of information

91B50 General equilibrium theory

91B51 Dynamic stochastic general equilibrium theory

91B52 Special types of economic equilibria

91B54 Special types of economic markets (including Cournot, Bertrand)

91B55 Economic dynamics

91B60 Trade models

91B62 Economic growth models

91B64 Macroeconomic theory (monetary models, models of taxation)

91B66 Multisectoral models in economics

91B68 Matching models

91B69 Heterogeneous agent models

91B70 Stochastic models in economics

91B72 Spatial models in economics [See also 91D25]

91B74 Economic models of real-world systems (e.g., electricity markets, etc.)

91B76 Environmental economics (natural resource models, harvesting, pollution, etc.)

91B80 Applications of statistical and quantum mechanics to economics (econophysics)

91B82 Statistical methods; economic indices and measures [See also 62P20]

91B84 Economic time series analysis {For statistical theory of time series, see 62M10}

91B86 Mathematical economics and fuzziness

91B99 None of the above, but in this section

91Cxx Social and behavioral sciences: general topics {For statistics, see 62P25}

91C05 Measurement theory in the social and behavioral sciences

91C15 One- and multidimensional scaling in the social and behavioral sciences

91C20 Clustering in the social and behavioral sciences [See also 62H30]

91C99 None of the above, but in this section

91Dxx Mathematical sociology (including anthropology)

91D10 Models of societies, social and urban evolution

91D15 Social learning

91D20 Mathematical geography and demography

91D25 Spatial models in sociology [See also 91B72]

91D30 Social networks; opinion dynamics

91D35 Manpower systems in sociology [See also 90B70, 91B39]

91D99 None of the above, but in this section

91Exx Mathematical psychology {For psychometrics, see 62P15}

91E10 Cognitive psychology

91E30 Psychophysics and psychophysiology; perception

91E40 Memory and learning in psychology [See also 68T05]

91E45 Measurement and performance in psychology

91E99 None of the above, but in this section

91Fxx Other social and behavioral sciences (mathematical treatment)

91F10 History, political science

91F20 Linguistics [See also 03B65, 68T50]

91F99 None of the above, but in this section

91Gxx Actuarial science and mathematical finance {For statistics, see 62P05}

91G05 Actuarial mathematics

91G10 Portfolio theory

91G15 Financial markets

91G20 Derivative securities (option pricing, hedging, etc.)

91G30 Interest rates, asset pricing, etc. (stochastic models)

91G40 Credit risk

91G45 Financial networks (including contagion, systemic risk, regulation)

91G50 Corporate finance (dividends, real options, etc.)

91G60 Numerical methods (including Monte Carlo methods)

91G70 Statistical methods; risk measures [See also 62P05, 62P20]

91G80 Financial applications of other theories [See also 35Q91, 37N40, 49N90, 60J70, 60K10, 60H30, 93E20]

91G99 None of the above, but in this section

92-XX Biology and other natural sciences

92-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to biology

92-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to biology

92-02 Research exposition (monographs, survey articles) pertaining to biology

92-03 History of biology [Consider also classification numbers pertaining to Section 01]

92-04 Software, source code, etc. for problems pertaining to biology

92-05 Experimental work for problems pertaining to biology

92-06 Proceedings, conferences, collections, etc. pertaining to biology

92-08 Computational methods for problems pertaining to biology

92-10 Mathematical modeling or simulation for problems pertaining to biology

92-11 Research data for problems pertaining to biology

92Bxx Mathematical biology in general

92B05 General biology and biomathematics

92B10 Taxonomy, cladistics, statistics in mathematical biology

92B15 General biostatistics [See also 62P10]

92B20 Neural networks for/in biological studies, artificial life and related topics [See also 68T05, 82C32, 94Cxx]

92B25 Biological rhythms and synchronization

92B99 None of the above, but in this section

92Cxx Physiological, cellular and medical topics

92C05 Biophysics

92C10 Biomechanics [See also 74L15]

92C15 Developmental biology, pattern formation

92C17 Cell movement (chemotaxis, etc.)

92C20 Neural biology

92C30 Physiology (general)

92C32 Pathology, pathophysiology

92C35 Physiological flow [See also 76Z05]

92C37 Cell biology

92C40 Biochemistry, molecular biology

92C42 Systems biology, networks

92C45 Kinetics in biochemical problems (pharmacokinetics, enzyme kinetics, etc.) [See also 80A30]

92C47 Biosensors (not for medical applications)

92C50 Medical applications (general)

92C55 Biomedical imaging and signal processing [See also 44A12, 65R10, 94A08, 94A12]

92C60 Medical epidemiology {For theoretical aspects, see 92D30}

92C70 Microbiology

92C75 Biotechnology

92C80 Plant biology

92C99 None of the above, but in this section

92Dxx Genetics and population dynamics

92D10 Genetics and epigenetics {For genetic algebras, see 17D92}

92D15 Problems related to evolution

92D20 Protein sequences, DNA sequences

92D25 Population dynamics (general)

92D30 Epidemiology {For medical applications, see 92C60}

92D40 Ecology

92D45 Pest management

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. in chemistry [See also 80A30, 80A32]

92E99 None of the above, but in this section

92Fxx Other natural sciences (mathematical treatment)

92F05 Other natural sciences (mathematical treatment)

92F99 None of the above, but in this section

93-XX Systems theory; control {For optimal control, see 49-XX}

93-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to systems and control theory

93-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to systems and control theory

93-02 Research exposition (monographs, survey articles) pertaining to systems and control theory

93-03 History of systems and control theory [Consider also classification numbers pertaining to Section 01]

93-04 Software, source code, etc. for problems pertaining to systems and control theory

93-05 Experimental work for problems pertaining to systems and control theory

93-06 Proceedings, conferences, collections, etc. pertaining to systems and control theory

93-08 Computational methods for problems pertaining to systems and control theory

93-10 Mathematical modeling or simulation for problems pertaining to systems and control theory

93-11 Research data for problems pertaining to systems and control theory

93Axx General systems theory

93A05 Axiomatic systems theory

93A10 General systems

93A13 Hierarchical systems

93A14 Decentralized systems

93A15 Large-scale systems

93A16 Multi-agent systems

93A99 None of the above, but in this section

93Bxx Controllability, observability, and system structure

93B03 Attainable sets, reachability

93B05 Controllability

93B07 Observability

93B10 Canonical structure

93B11 System structure simplification

93B12 Variable structure systems

93B15 Realizations from input-output data

93B17 Transformations

93B18 Linearizations

93B20 Minimal systems representations

93B24 Topological methods

93B25 Algebraic methods

93B27 Geometric methods

93B28 Operator-theoretic methods [See also 47A48, 47A57, 47B35, 47N70]

93B30 System identification

93B35 Sensitivity (robustness)

93B36 H^∞-control

93B45 Model predictive control

93B47 Iterative learning control

93B50 Synthesis problems

93B51 Design techniques (robust design, computer-aided design, etc.)

93B52 Feedback control

93B53 Observers

93B55 Pole and zero placement problems

93B60 Eigenvalue problems

93B70 Networked control

93B99 None of the above, but in this section

93Cxx Model systems in control theory

93C05 Linear systems in control theory

93C10 Nonlinear systems in control theory

93C15 Control/observation systems governed by ordinary differential equations [See also 34H05]

93C20 Control/observation systems governed by partial differential equations

93C23 Control/observation systems governed by functional-differential equations [See also 34K35]

93C25 Control/observation systems in abstract spaces

93C27 Impulsive control/observation systems

93C28 Positive control/observation systems

93C29 Boolean control/observation systems

93C30 Control/observation systems governed by functional relations other than differential equations (such as hybrid and switching systems)

93C35 Multivariable systems, multidimensional control systems

93C40 Adaptive control/observation systems

93C41 Control/observation systems with incomplete information

93C42 Fuzzy control/observation systems

93C43 Delay control/observation systems

93C55 Discrete-time control/observation systems

93C57 Sampled-data control/observation systems

93C62 Digital control/observation systems

93C65 Discrete event control/observation systems

93C70 Time-scale analysis and singular perturbations in control/observation systems

93C73 Perturbations in control/observation systems

93C80 Frequency-response methods in control theory

93C83 Control/observation systems involving computers (process control, etc.)

93C85 Automated systems (robots, etc.) in control theory [See also 68T40, 70B15, 70Q05]

93C95 Application models in control theory

93C99 None of the above, but in this section

93Dxx Stability of control systems

93D05 Lyapunov and other classical stabilities (Lagrange, Poisson, L^p, l^p, etc.) in control theory

93D09 Robust stability

93D10 Popov-type stability of feedback systems

93D15 Stabilization of systems by feedback

93D20 Asymptotic stability in control theory

93D21 Adaptive or robust stabilization

93D23 Exponential stability

93D25 Input-output approaches in control theory

93D30 Lyapunov and storage functions

93D40 Finite-time stability

93D50 Consensus

93D99 None of the above, but in this section

93Exx Stochastic systems and control

93E03 Stochastic systems in control theory (general)

93E10 Estimation and detection in stochastic control theory [See also 60G35]

93E11 Filtering in stochastic control theory [See also 60G35]

93E12 Identification in stochastic control theory

93E14 Data smoothing in stochastic control theory

93E15 Stochastic stability in control theory

93E20 Optimal stochastic control [See also 49J55, 49K45]

93E24 Least squares and related methods for stochastic control systems

93E35 Stochastic learning and adaptive control

93E99 None of the above, but in this section

94-XX Information and communication theory, circuits

94-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to information and communication theory

94-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to information and communication theory

94-02 Research exposition (monographs, survey articles) pertaining to information and communication theory

94-03 History of information and communication theory [Consider also classification numbers pertaining to Section 01]

94-04 Software, source code, etc. for problems pertaining to information and communication theory

94-05 Experimental work for problems pertaining to information and communication theory

94-06 Proceedings, conferences, collections, etc. pertaining to information and communication theory

94-08 Computational methods for problems pertaining to information and communication theory

94-10 Mathematical modeling or simulation for problems pertaining to information and communication theory

94-11 Research data for problems pertaining to information and communication theory

94Axx Communication, information

94A05 Communication theory [See also 60G35, 90B18]

94A08 Image processing (compression, reconstruction, etc.) in information and communication theory [See also 68U10]

94A11 Application of orthogonal and other special functions

94A12 Signal theory (characterization, reconstruction, filtering, etc.)

94A13 Detection theory in information and communication theory

94A14 Modulation and demodulation in information and communication theory

94A15 Information theory (general) [See also 62B10, 81P45]

94A16 Informational aspects of data analysis and big data [See also 62R07, 68T09] {For homological aspects, see 55N31}

94A17 Measures of information, entropy

94A20 Sampling theory in information and communication theory

94A24 Coding theorems (Shannon theory)

94A29 Source coding [See also 68P30]

94A34 Rate-distortion theory in information and communication theory

94A40 Channel models (including quantum) in information and communication theory [See also 81P47]

94A45 Prefix, length-variable, comma-free codes [See also 20M35, 68Q45]

94A50 Theory of questionnaires

94A55 Shift register sequences and sequences over finite alphabets in information and communication theory

94A60 Cryptography [See also 11T71, 14G50, 68P25, 81P94]

94A62 Authentication, digital signatures and secret sharing [See also 81P94]

94A99 None of the above, but in this section

94Bxx Theory of error-correcting codes and error-detecting codes

94B05 Linear codes, general

94B10 Convolutional codes

94B12 Combined modulation schemes (including trellis codes) in coding theory

94B15 Cyclic codes

94B20 Burst-correcting codes

94B25 Combinatorial codes

94B27 Geometric methods (including applications of algebraic geometry) applied to coding theory [See also 11T71, 14G50]

94B30 Majority codes

94B35 Decoding

94B40 Arithmetic codes [See also 11T71, 14G50]

94B50 Synchronization error-correcting codes

94B60 Other types of codes

94B65 Bounds on codes

94B70 Error probability in coding theory

94B75 Applications of the theory of convex sets and geometry of numbers (covering radius, etc.) to coding theory [See also 11H31, 11H71]

94B99 None of the above, but in this section

94Cxx Circuits, networks [See also 68Q06]

94C05 Analytic circuit theory

94C11 Switching theory, applications of Boolean algebras to circuits and networks

94C12 Fault detection; testing in circuits and networks

94C15 Applications of graph theory to circuits and networks [See also 05Cxx, 68R10]

94C30 Applications of design theory to circuits and networks [See also 05Bxx]

94C60 Circuits in qualitative investigation and simulation of models

94C99 None of the above, but in this section

94Dxx Miscellaneous topics in information and communication theory

94D05 Fuzzy sets and logic (in connection with information, communication, or circuits theory) [See also 03B52, 03E72, 28E10]

94D10 Boolean functions [See also 06E30] {For connections with circuits and networks, see 94C11}

94D99 None of the above, but in this section

97-XX Mathematics education

97-00 General reference works (handbooks, dictionaries, bibliographies, etc.) pertaining to mathematics education

97-01 Introductory exposition (textbooks, tutorial papers, etc.) pertaining to mathematics education

97-02 Research exposition (monographs, survey articles) pertaining to mathematics education

97-03 History of mathematics education [Consider also classification numbers pertaining to Section 01]

97-06 Proceedings, conferences, collections, etc. pertaining to mathematics education

97-11 Research data for problems pertaining to mathematics education

97Axx History and society (aspects of mathematics education)

97A30 History in mathematics education {For mathematics history, see 01-XX; for biographies, see 01A70; for history of mathematics education, see 97-03}

97A40 Mathematics education and society {For sociology (and profession) of mathematics, see 01A80}

97A99 None of the above, but in this section

97Bxx Educational policy and systems

97B10 Mathematics educational research and planning

97B20 Educational policy for general education

97B30 Educational policy for vocational education

97B40 Educational policy for higher education

97B50 Mathematics teacher education

97B60 Educational policy for adult and further education

97B70 Syllabuses, educational standards

97B99 None of the above, but in this section

97Cxx Psychology of mathematics education, research in mathematics education

97C10 Comprehensive works on psychology of mathematics education

97C20 Affective behavior and mathematics education

97C30 Cognitive processes, learning theories (aspects of mathematics education)

97C40 Intelligence and aptitudes (aspects of mathematics education)

97C50 Language and verbal communities (aspects of mathematics education)

97C60 Sociological aspects of learning (aspects of mathematics education)

97C70 Teaching-learning processes in mathematics education

97C99 None of the above, but in this section

97Dxx Education and instruction in mathematics

97D10 Comprehensive works and comparative studies on education and instruction in mathematics

97D20 Philosophical and theoretical contributions (maths didactics)

97D30 Objectives and goals of mathematics teaching

97D40 Mathematics teaching methods and classroom techniques

97D50 Teaching mathematical problem solving and heuristic strategies

97D60 Student assessment, achievement control and rating (aspects of mathematics education)

97D70 Learning difficulties and student errors (aspects of mathematics education)

97D80 Mathematics teaching units and draft lessons

97D99 None of the above, but in this section

97Exx Education of foundations of mathematics

97E10 Comprehensive works on education of foundations of mathematics

97E20 Philosophy and mathematics (educational aspects)

97E30 Logic (educational aspects)

97E40 Language of mathematics (educational aspects)

97E50 Reasoning and proving in the mathematics classroom

97E60 Sets, relations, set theory (educational aspects)

97E99 None of the above, but in this section

97Fxx Education of arithmetic and number theory

97F10 Comprehensive works on education of arithmetic and number theory

97F20 Pre-numerical stage, concept of numbers

97F30 Natural numbers (educational aspects)

97F40 Integers, rational numbers (educational aspects)

97F50 Real numbers, complex numbers (educational aspects)

97F60 Number theory (educational aspects)

97F70 Measures and units (educational aspects)

97F80 Ratio and proportion, percentages (educational aspects)

97F90 Real life mathematics, practical arithmetic (educational aspects)

97F99 None of the above, but in this section

97Gxx Geometry education

97G10 Comprehensive works on geometry education

97G20 Informal geometry (educational aspects)

97G30 Area and volume (educational aspects)

97G40 Plane and solid geometry (educational aspects)

97G50 Transformation geometry (educational aspects)

97G60 Plane and spherical trigonometry (educational aspects)

97G70 Analytic geometry, vector algebra (educational aspects)

97G80 Descriptive geometry (educational aspects)

97G99 None of the above, but in this section

97Hxx Algebra education

97H10 Comprehensive works on algebra education

97H20 Elementary algebra (educational aspects)

97H30 Equations and inequalities (educational aspects)

97H40 Groups, rings, fields (educational aspects)

97H50 Ordered algebraic structures (educational aspects)

97H60 Linear algebra (educational aspects)

97H99 None of the above, but in this section

97Ixx Analysis education

97I10 Comprehensive works on analysis education

97I20 Mappings and functions (educational aspects)

97I30 Sequences and series (educational aspects)

97I40 Differential calculus (educational aspects)

97I50 Integral calculus (educational aspects)

97I60 Functions of several variables (educational aspects)

97I70 Functional equations (educational aspects)

97I80 Complex analysis (educational aspects)

97I99 None of the above, but in this section

97Kxx Education of combinatorics, graph theory, probability theory, and statistics

97K10 Comprehensive works on combinatorics, graph theory, and probability (educational aspects)

97K20 Combinatorics (educational aspects)

97K30 Graph theory (educational aspects)

97K40 Descriptive statistics (educational aspects)

97K50 Probability theory (educational aspects)

97K60 Distributions and stochastic processes (educational aspects)

97K70 Foundations and methodology of statistics (educational aspects)

97K80 Applied statistics (educational aspects)

97K99 None of the above, but in this section

97Mxx Education of mathematical modeling and applications of mathematics

97M10 Modeling and interdisciplinarity (aspects of mathematics education)

97M20 Mathematics in vocational training and career education

97M30 Financial and insurance mathematics (aspects of mathematics education)

97M40 Operations research, economics (aspects of mathematics education)

97M50 Physics, astronomy, technology, engineering (aspects of mathematics education)

97M60 Biology, chemistry, medicine (aspects of mathematics education)

97M70 Behavioral and social sciences (aspects of mathematics education)

97M80 Arts, music, language, architecture (aspects of mathematics education)

97M99 None of the above, but in this section

97Nxx Education of numerical mathematics

97N10 Comprehensive works education of numerical mathematics

97N20 Rounding, estimation, theory of errors (educational aspects)

97N30 Numerical algebra (educational aspects)

97N40 Numerical analysis (educational aspects)

97N50 Interpolation and approximation (educational aspects)

97N60 Mathematical programming (educational aspects)

97N70 Discrete mathematics (educational aspects)

97N80 Mathematical software, computer programs (educational aspects)

97N99 None of the above, but in this section

97Pxx Computer science (educational aspects)

97P10 Comprehensive works on computer science (educational aspects)

97P20 Theoretical computer science (educational aspects)

97P30 Systems, databases (educational aspects)

97P40 Programming languages (educational aspects)

97P50 Programming techniques (educational aspects)

97P80 Artificial intelligence (educational aspects)

97P99 None of the above, but in this section

97Uxx Educational material and media and educational technology in mathematics education

97U10 Comprehensive works on educational material and media and educational technology in mathematics education

97U20 Textbooks, textbook research (aspects of mathematics education)

97U30 Teachers' manuals and planning aids (aspects of mathematics education)

97U40 Problem books, competitions, examinations (aspects of mathematics education)

97U50 Computer-assisted instruction, e-learning (aspects of mathematics education)

97U60 Manipulative materials (aspects of mathematics education)

97U70 Technological tools, calculators (aspects of mathematics education)

97U80 Audiovisual media (aspects of mathematics education)

97U99 None of the above, but in this section