Mathematics

AM Mathematics
AM2 . *Common subdivisions*
* For mathematical forms of presentation, see AM3 4.
* Add to AM2 numbers 2/9 from Auxiliary Schedule 1, with the adjustments indicated below.
. . *By level of presentation*
* Use these distinctions only if they are helpful to the library concerned.
3EM . . . Collegiate level
3EO . . . Advanced level, research level
3MC . . Aids to study
* For computer programs, see Operations AM7 H2M.
3MY . . Digests, abridgements
3N . . Mathematical tables
* And similar compilations.
. . . *By degree of accuracy*
3NK . . . . Figure tables
* Four-figure, five-figure, etc. tables.
. . . *By function*
3NL . . . . General tables, ready-reckoners
3NM . . . . Conversion tables
3NO . . . . Logarithmic & elementary function tables
3NP . . . . Higher function tables
3X . . Mathematical recreations, mathematical puzzles, mathematical games
7 . . History of mathematics
. . . Periods in history of mathematics
* Add to AM2 7 letters A/V from Auxiliary Schedule 4B.
8 . . . Places in history of mathematics
* Add to AM2 8 letters A/Z from Auxiliary Schedule 2.
. . . . *By cultural group*
8BT . . . . . Ethnomathematics
9 . . Biography of mathematicians
* For names of individuals used to characterize properties, etc., see AP2.
9B . . Relations with other subjects
9C . . . Comparison with other subjects
A . . . Philosophy of mathematics
* For quasi-philosophical doctrines underlying mathematical methodology, see Foundations of mathematics AM3 P.
* Add to AM2 letters A/J following A in AA/AJ. Some prominent concepts are given below for convenience.
BA . . . . Schools of philosophy in mathematics
* For philosophical schools in mathematical logic, see AM4 2BA.
COP . . . . . Mathematical Platonism
* See also Logicism AM3 R
GW . . . . . *Logic*
* See Mathematical logic AM4

Mathematics AM
Common subdivisions AM2
. . . . Logic AM2 GW

AM2 L *Agents*
M . Machines in mathematics
* The general class for machine computation is under Operations (AM7 H2M). Use this class only if needed to qualify concepts appearing earlier in the schedule than AM7 H or for completely general works on the subject.
N . . Computers in mathematics
P . . . Programs in mathematics
. *Conceptual agents*
S . . Symbols, notation in mathematics
Forms of mathematical presentation
* The primary use of the concepts below is in qualifying specific mathematical topics (e.g. Groups - Word problems ASA 3KR). Use the classes below on their own only for truly general studies of the concepts involved.
AM3 4 . Mathematical presentation
. . *Properties*
5 . . . Errors
6 . . . . Error bounds
9 . . Statements
A . . Theory, abstract theory
* Exposition of the abstract principles of a topic. For abstract mathematical theory as a method (and itself the topic studied) see AM3 N.
AX . . . Hypotheses
B . . . *Theories special to a context*
* For use when qualifying a specific topic studied.
* See also Models AM3 L
* Add to -3C letters H/W in Auxiliary Schedule AM1, e.g. -3CW B Potential theory
* An alternative (not recommended) to this division by concept is to arrange theories A/Z by name.
D . . Axioms, postulates
* For axiomatic method, see Mathematical logic, AM4 F.
E . . . *Special axioms*
* Add to AM3 E letters B/H following AM5 3E so far as applicable, e.g. -3EF Axioms of choice.
F . . Theorems
G . . Lemmas
H . . Formulae
I . . Demonstrations
J . . Proofs
* For proof theory as a subject, see AM4 P.
JKP . . Problems
* Will generally be used only as a qualifier of another topic, e.g. in collections of problems for students.
* For problem solving as a subject, see AM4 FV.
KR . . . Word problems
KS . . . Incorrectly posed problems
KV . . . *Problems special to a context*

Mathematical logic

Mathematics AM
Forms of mathematical presentation
. . Problems AM3 JKP
. . . Problems special to a context AM3 KV

AM3 L . . Models
* Representations assisting interpretation of a subject.
* For model theory as a subject, see AM4 Q.
* For models as mathematical relations, see AM9 S3L.

LX . . . Simulation
* Probabilistic modelling.

Methodologies in mathematics

M . Methodologies in general
N . . Abstract mathematical theory
* As a subject; for theory as a form of presentation, see AM3 A.

. . *Philosophical methodologies*
* Approaches to mathematics as a whole.

P . . . Foundations of mathematics, metamathematics
* The term 'metamathematics' is used loosely, sometimes being treated as a particular development of Formalism, sometimes more narrowly still, as equivalent to proof theory. It is used here in its widest sense.
* See also Philosophy of mathematics AM2 A.

. . . . *Schools of thought*
* General studies only. A particular topic in logic or mathematics as treated by a particular schoool goes with the topic.

R . . . . . Logicism, logicalists
* See also Mathematical Platonism, AM2 COP

S . . . . . Formalism
* For Metamathematics, see AM3 P and the note there.
* For properties of formal languages, see Mathematical logic, AM4 AD.

. . . . . *Proof theory*
* See AM4 P

. . . . . *Model theory*
* See AM4 Q

T . . . . . Constructivism & intuitionism
U . . . . . Constructivism
* See also Recursion theory AM4 H3A

V . . . . . Intuitionism
* See also Intuitionist logic AM4 RF

V3D . . . . . Axioms
V3E . . . . . Constructability postulate, effective constructability postulate
W . . . . . Inductive mathematics
* For mathematical induction see AM4 T.
* See also Recursion theory AM4 H3A

Mathematics AM
Methodologies in general AM3 M
Foundations of mathematics AM3 P
Schools of thought
. Inductive mathematics AM3 W

AM4 Mathematical logic
* Usually treated as nearly synonymous with symbolic logic. But for general studies of symbolic logic per se in mathematical logic, see AM4 9Y. For symbolic logic in general, see AL9 Y.
* As a subclass of mathematics the structure sought is one consistent with that in other subclasses of mathematics. The order of the mathematical concepts is therefore exactly the same.
* But in order to make the purely logical part completely consistent with logic in general (AL) the notation has been modified slightly. Division is directly by the scheduled class AM/AW and does not use the provisions of Auxiliary Schedule AM1. The effect of this is to shorten classmarks both here (in AM4) and in AL3 3X (Mathematics of logic); but it does this at the expense of dropping the facility in Auxiliary Schedule AM1 (at -H/-W) for specifying types of mathematical concepts. In both AM4 and AL3 3X concepts are primarily logical ones and when Types of these are required they are got by enumeration at the end of the relevant class; e.g. AM4 QR/AM4 RET Types of (logical) models; AM4 RH/RW Types of formal deductive systems. In the last example, division via Auxiliary Schedule AM1 is utilized for some of the types.
* Add to AM4 numbers 2/8 following AM in AM2/AM8.
* Add to AM4 9 number 9 following AM at AM9 and letters M/W following A in AM/AW. A selection is given below of some prominent concepts.

2A . Philosophy of mathematical logic
2BA . . Schools of philosophy in mathematical logic
2L . *Agents*
2N . . Computers
2P . . . Programs
34 . *Forms of mathematical presentation*
* Many of these (e.g. statements) have a special significance in logic and these are enumerated in their appropriate positions. In case of doubt, the latter should be preferred to the terms synthesized here.

3D . . Axioms in mathematical logic
* For axiomatic method see AM4 F.

3M . *Methodologies*
3P . . Foundations of mathematical logic, metamathematics in mathematical logic
* See also Proof theory AM4 P; Model theory AM4 Q.

3R . . . Logicism in mathematical logic
3S . . . Formalism in mathematical logic
3T . . . Constructivism & intuitionism
5 . . . Set theory in mathematical logic
62 . . *Mathematical methods by various characteristics*
74 . *Mathematical operations & processes*
8J . *Mathematical relations*
993 . . Forms
994 . . *Mathematical relations by various characteristics*

Deductive logic in mathematics

Mathematics AM
Methodologies in general AM3 M
Foundations of mathematics AM3 P
Mathematical logic AM4
Mathematical relations AM4 8J
. Mathematical relations by various characteristics AM4 994

AM4 9MN *Mathematical properties*
9PA *Parts, elements & entities in mathematics*
9R5 *Mathematical systems, branches*

9WZ Systems in mathematical logic
* From this point onwards, the schedule for mathematical logic is basically an expansion of that for general logic (AL), with additional material incorporating mathematical operations, relations, etc. and expanding particular classes (e.g. algorithms).
* It is important to note that, apart from the expanded classes, the following schedule is only a selection of the concepts in AL. This selection is designed to show the scope and structure of the class and to indicate the concepts particularly relevant to mathematical logic.But all the detail in AL is available here and this class should be used in conjunction with AL.
* Add to AM4 numbers 9X/9Y and letters A/W following AL in ALA/ALW.

9X . Classical logic in mathematics
* Classical logic in general is at AL9 X.

9Y . Symbolic logic in mathematics
* For works considering symbolic logic as an element in mathematical logic, rather than synonymous with it. For symbolic logic in general see AL9 Y.
* Do NOT qualify this class, but treat apparent divisions of it (e.g. axioms of symbolic logic) as divisions of mathematical logic in general.

A . Deductive logic in mathematics
* This is usually assumed. Locate here general works on the role of deductive logic per se in mathematics.

AD . . *Logical properties*
* Most of these are unlikely to be used on their own (i.e. have general works on them). They will usually feature as qualifiers of other concepts, e.g. Propositions - Equivalence AM4 KBB.

AF . . . Effectiveness
AG . . . Complexity
AH . . . Consistency in mathematical logic
AL . . . Independence
AM . . . Completeness in mathematical logic
AM3 A . . . . Theories
AM3 F . . . . . Godel's incompleteness theorem
AQ . . . Constructability in mathematical logic
AS . . . Enumerability
AT . . . Decidability
AU . . . . Undecidability in mathematical logic
BB . . . Equivalence in mathematical logic
BC . . . . Identity in mathematical logic

Foundations of mathematics AM3 P
Mathematical logic AM4
Deductive logic in mathematics AM4 A
Logical properties AM4 AD
. Equivalence in mathematical logic AM4 BB
. . Identity in mathematical logic AM4 BC

AM4 BE . Opposition
BH . Truth
BH8 L . . Truth functions
BV *Properties special to a given context*
* For example, stability of models AM4 QBV.
CL *Logical operations*
D . Reasoning
. . Elements
DF . . . Fallacies
DL . . . Paradoxes
DP . . . Contradictions
EB . Analysis in mathematical logic
ED . Interpretation
EF . Formalization
EH . Implication
F . Axiomatics in mathematical logic
* For axioms as statements (used in qualifying other concepts), see AM3 D.

F3E . . Axioms
F3F . . . Theorems
F3H . . Formulae
FH . . Syntax, rules of syntax
FJ . . . Formation rules
FK . . . Introduction rules
FL . . . Elimination rules
FN . . . Transformation rules
FS . . Semantics (general)
FV . Problem solving
G . . Algorithms in mathematical logic
. . . *Operations*
GF . . . . Axiomatics
GFN . . . . . Transformation rules
. . . . *Special to algorithms*
GJ . . . . . Decision procedures
* Determining whether a proposition is logically true, i.e. proving by a demonstration.
* For word problems see Groups ASA 3KR.

. . . . . *Properties*
GJA S . . . . . Enumerability
GJA T . . . . . Decidability
GJA U . . . . . Undecidability
. . . . . Theorems
GJA U3F . . . . . Church's theorem
GJA V . . . . . Truth tables
GK . . . . . Solution & solvability
GL . . . . . Unsolvability
GLM . . . . . Degrees of unsolvability, Turing degrees

Deductive logic in mathematics

Mathematical logic AM4
Deductive logic in mathematics AM4 A
Logical operations AM4 CL
. . . Operations
. . . . . Solution & solvability AM4 GK
. . . . . Degrees of unsolvability AM4 GLM

AM4 GN . . . . . Calculation & calculability
* For immediately calculable, see Recursion AM4 H8L.
GP . . . . . Effectively computable
GP3 A . . . . . Theory
GP3 C . . . . . Computability theory in algorithms
H . . . . . Recursion
H3A . . . . . Theory
H3B B . . . . . Higher type recursion theory
H3B C . . . . . Church's hypothesis
. . . . . *By method*
H3C HD . . . . . Axiomatic recursion theory
. . . . . *By property*
H3C MO . . . . . Abstract recursion theory
H74 P . . . . . *Operations & processes*
H76 . . . . . Recursion analysis
H8J . . . . . *Relations*
. . . . . Functions
H8L . . . . . Recursive functions, immediately calculable functions
* What can or cannot be done by an ideal computer.
H8L LR . . . . . Generalized recursive functions
H8M TP . . . . . Primitive recursive functions
H9R . . . . . *Mathematical systems*
. . . . . Ordinals
H9R KD . . . . . Recursive ordinals
HI . . . . . *Logical elements*
HJ . . . . . Hierarchies
HM . . . Algebraic forms of algorithms
HN . . . . Calculus of equations
HP . . . . Turing machine
HR . . . . Lamda calculus
HS . . . . Post algorithms
* Of E.L. Post.
HV . . . . Markov algorithms
* Of A.A. Markov.
JX Formal structures in mathematical logic
JXF S . Semantics
JY . Logical calculi in mathematical logic
* Use for propositional and predicate calculus together.
. . *Elements of logical calculi*
K . . . Propositions in mathematical logic
* Includes works on propositions, statements and sentences together.
* For the last two considered per se, see AM4 ME.
K8J . . . . *Mathematical relations*
. . . . . Functions
K8L . . . . . Propositional functions

Mathematical logic AM4
Deductive logic in mathematics AM4 A
Formal structures in mathematical logic AM4 JX
. . . Propositions in mathematical logic AM4 K
. . . . Mathematical relations AM4 K8J
. . . . . Propositional functions AM4 K8L

AM4 KAD . . . . *Logical properties*
KBB . . . . . Equivalence
KBC . . . . . Identity
KBE . . . . . Opposition
KBH . . . . . Truth
. . . . *Logical elements*
KL . . . . . Truth functional elements
KM . . . . . Operators in mathematical logic
KN . . . . . Quantifiers
KR . . . . . Terms, expressions in mathematical logic
L . . . . Propositions (narrowly), judgements
LM . . . . . Simple propositions
LQ . . . . . Compound propositions
LW . . . . . Truth function propositions
ME . . . Statements in mathematical logic
MG . . . Sentences in mathematical logic
MH . . . . Infinitely long sentences
Systems
MS . Formal systems in mathematical logic
* Any set of axioms and formal rules in some specified formal language.
MV . . Calculus of classes
* See also General logic ALM V; Intuitionist logic AM4 RF
N . . . Propositional calculus in mathematical logic
* Includes classical propositional calculus.
O . . . Predicate calculus in mathematical logic
* Includes classical predicate calculus.
. . . . *Types by interpretation*
OP . . . . . One sorted logic
* Usually assumed.
* General works only.
OQ . . . . . Many sorted logic
OS . . . . . First order calculus of classes
OT . . . . . Higher order predicate calculus, higher order logic
P . . Proofs in mathematical logic, proof theory
* Syntactic study of formal systems by examination of the structure of the proofs within them.
* See also Inductive logic AM4 T; Constructive mathematics AM6 9
P8J . . . *Mathematical relations*
P8X . . . . Functionals in proof theory
. . . *Logical properties*
PAG . . . . Complexity
PAH . . . . Consistency
. . . *Operations & processes*
PED . . . . Interpretation
PG . . . . Algorithms
PH . . . . . Recursion
. . . . . Analysis
PH7 6 . . . . . Recursion analysis

Formal systems in mathematical logic

Mathematical logic AM4
Deductive logic in mathematics AM4 A
Formal systems in mathematical logic AM4 MS
Proofs in mathematical logic AM4 P
. Operations & processes
. . . . . Recursion analysis AM4 PH7 6

. *Types*

AM4 PQ . . Normal form proofs

PR . . . Cut-free segment proofs

PS . . Forcing proofs

* See also Model theory - Forcing AM4 QPS.

Q Models in mathematical logic, model theory

* Semantic study of formal systems, via their models (i.e. set theoretic interpretations).

* See also Universal algebras ATA NI

Q3A . Theories

Q3C NA . . First order model theory

. *Methods*

Q6R S . . Model theoretic algebra

. *Logical properties*

QBV . . Stability

. . *Special operations*

QCN . . . Construction of models

QCP . . . . Ultra products method

QCQ . . . . . Indiscernibles, Ehrenfeucht-Mostowski models

. *Subsystems*

QK . . Propositions

QKN . . . Quantifiers

QKN FL . . . . Elimination of quantifiers

. *Systems*

QP . . Proof theory

. . . Forcing

QPS . . . . Model theoretic forcing

. *Types of models*

. . *By property*

QR . . . Non-classical models

QT . . . Abstract models

QV . . . Non-standard models

QV9 NLH . . . . Infinitesimal analysis (models)

QX . . . Generic models

RB . . . Countable models

RD . . . *Other*

* E.g saturated models.

. . *By system*

RES . . . Algebraic categorical models

RET . . . . Topoi, elementary topoi

RF Intuitionist logic

* See also Intuitionism AM3 V

RFN . Propositional calculus

RFO . Predicate calculus

RFS . Intermediate logic, superintuitionist logic

* Intermediate between classical and intuitionist logic.

Methodologies in general AM3 M
Foundations of mathematics AM3 P
Mathematical logic AM4
. . Deductive logic in mathematics AM4 A
. . . . . Intuitionist logic AM4 RF
. . . . . Intermediate logic, superintuitionist logic AM4 RFS

. . . . . *Types of formal deductive systems*

* For the logic of particular conceptual systems, see system, e.g. lattices, quantum mechanics.

AM4 RH . . . . . *By mathematical characteristics*

* Add to AM4 R letters H/W from Auxiliary Schedule AM1.

. . . . . *By relation*

RLL . . . . . Equational logic

. . . . . *By property*

RO2 F . . . . . Fuzzy logic

. . . . . *By system*

RRB . . . . . Logic on admissible sets

RRR X . . . . . Partially ordered systems

RRS . . . . . Algebraic logic in general

* For Boolean algebra, see ARB X.

RSX . . . . . Categorical logic

* See also Topoi (model theory) AM4 RET

. . . . . *By values*

SB . . . . . Two valued logic in general

* Usually asumed.

SD . . . . . Three or more valued logics, many valued logics

* See also Cybernetics Class 3.

SF . . . . . K-valued logics

T . . Inductive logic in mathematics, mathematical induction

* The term mathematical induction is usually equated with one prominent application - the proving of a theorem relating to natural numbers (e.g. Peano's axiom). But its applications are potentially wider.

V . . *Other forms of arguments*

* From general logic so far as applicable.

* Add to AM4 letters V/W following AL in ALV/ALW.

AM5 Set theory

* Sets themselves are not a purely mathematical concept, whether defined by enumeration of membership or by defining conditions (properties). But set theory is a formal language which constitutes an integral part of mathematical foundations and is therefore located here.

* For sets as mathematical structures, see ARB.

* For sets in general (non-mathematical applications) see Logic, AL9 RB.

. Hypotheses

3AX . . Continuum hypothesis

3D . Axioms

3EB . . Extensionality axiom

3EC . . Replacement axiom

Methods in mathematics

Mathematics AM
Methodologies in general AM3 M
. . . . Axioms AM5 3D
. . . . . Replacement axiom AM5 3EC

AM5 3ED . . . . . Regularity axiom
3EF . . . . . Axioms of choice
3EG . . . . . Axioms of determinacy
3EH . . . . . Infinity axiom
. . . . *Properties*
AN4 AH . . . . . Consistency in set theory
AN4 AL . . . . . Independence in set theory
AN4 AT . . . . . Decidability in set theory
. . . . *Types of set theory*
HD . . . . . *Axiomatic set theory*
* Use AM5 X.
M66 . . . . . *Descriptive set theory*
* Use AM5 YD.
P2 . . . . . Cantor set theory
X . . . . . Axiomatic set theory
. . . . . *Special systems*
XXC . . . . . Zermelo-Fraenkel system, ZF system
XXE . . . . . Neumann-Bernays-Godel system, NBG system, Bernays-Godel set theory
XXG . . . . . Morse & Kelley system, MK system
XY . . . . . Others by name A/Z
* For example, Quine AM5 XYQ.
YD . . . . . Descriptive set theory
. . . . . Inductive logic
YD4 T . . . . . Inductive definition

AM6 Methods in mathematics
* Do not add numbers or letters from Auxiliary Schedule AM1 to AM6 alone - only to its divisions.
. *Methods by mixed characteristics*
2 . . Elementary methods
3 . . Advanced methods
* For advanced as a level of presentation, see AM2 3EO.
4 . . Classical methods
5 . . Non-classical methods
6 . . Descriptive methods
7 . . Heuristic methods
8 . . Algorithmic methods
9 . . Constructive methods
B . . Formal methods
D . . Numerical analysis
E . . Iterative methods, recursive methods
. *Methods by relations, by property etc*
* Add to AM6 letters H/Q from Auxiliary Schedule AM1. Some prominent examples are given here to demonstrate application.
KL . . Function theoretic methods
MQG . . Non-standard methods
NJ . . Finite methods
QR . . Approximation methods

Mathematics AM
Methodologies in mathematics
. . Methods by relations, by property etc
. . . Approximation methods AM6 QR

. . *Methods by mathematical branch used*
* For use in synthesis only, when a method derived from a particular branch of mathematics is applied to a particular topic, e.g. geometric methods in solution of differential equations AWE ME 6TS. General works on a method so derived nearly always go with the branch (e.g. geometric methods in general under geometry).
* Often, the name of a branch used adjectivally seems to specify a type of the thing it describes (e.g. geometric number theory) whereas it is in fact describing only a method used; e.g. geometric number theory indicates not a type of number theory but number theory using geometric methods. In such cases this position should be used to qualify the concept in question (e.g. Number theory - Methods - Geometric, ARJ 6TS).
* Add to AM6 letters R/W following A in AR/AW.
* A selection of frequently occuring methods is given here for convenience.

AM6 RD . . . Combinatorial methods
RI . . . Arithmetic methods, numerical methods
RS . . . Algebraic methods
RU . . . . Homological methods
RVK . . . . Cohomological methods
RVL . . . . Homotopy methods
ST . . . . Modular methods
SX . . . . Categorical methods
TB . . . . Matrix methods
TS . . . Geometric methods
VE . . . . Trigonometric methods
VJ . . . Topological methods
W . . . Analytic methods
. . . . *Methods special to analysis*
* Add to AM6 letters X/Y following AW6.
* Add to AM7 letters 2/49 following AW7, e.g. Sequences & series - Summability - Integral methods AWL EOC 4Y7 3.
* Note that numbers 45/49 following AW7 are reserved for special methods; see introduction, section 13.35, title 5 for an example.
X . . . Probalistic methods
* Use AM7 4L.

AM7 4L . . . Probalistic methods
* Add to AM7 4L numbers & letters 5/9, A/X following AX so far as applicable.

Operations
* Mappings in the widest possible sense. For the normal and exact use of the term, use the position at AM8 K.
* The main use of the terms below is in qualfying specific mathematical topics. In some cases, it is very unlikely that the term will reflect any literature on the concept in general, but in many cases it will. But note that only truly general works on the concepts go here.

Mathematics

Mathematics AM
Operations

* Where the results of an operation are significant in the literature (e.g. sums, products) these have been enumerated in the Elements facet (see Elements resulting... at APG et seq). A document considering both the operation and the result together is preferred in the Elements facet (see note preceding APG).

AM7 4P . Operations in general
5 . . Testing (general)
* For use primarily in statistics and probability.
6 . . Analysis (general operations)
* In most general sesnse (as distinct from its usual specific sense at AW).
7 . . Synthesis
8 . . Solution
* This represents the 'presentational' role of the concept, used for simple qualification of a topic (e.g. Differential equations - Solutions AM9 ME7 8). For problem-solving as a subject in its own right, see mathematical logic AM4 FV.
9 . . Resolution
A . . Enumeration
B . . Definition
C . . Classification
D . . Construction
E . . Substitution
F . . Combination
* For combinatorial structures and analysis, see ARD.
H . . Computation
* For numerical computation see ARI 7H.
* See also Algorithms AM4 G
. . . *Agents*
H2M . . . . Machine computation
. . . *Computation operations*
* Most of the operations below generate products (sums, quotients, etc.). These are treated as elements and enumerated at APK/APW. When a document deals with the operation and its product together, class under the latter, e.g. addition with sums. The primary use of this array of operations is in simple qualification (e.g. Integers - Addition; Groups - Factorization).
J . . . . Addition
K . . . . Subtraction
L . . . . Multiplication
M . . . . . Complex multiplication
N . . . . Division
P . . . . Factorization
Q . . . . Extraction of roots
R . . . Differentiation
S . . . . Differentiable
* Property dependent on Differentiation.
T . . . . Partial differentiation
U . . . . Pseudo-differentiation
V . . . Integration
W . . . Partition

Mathematics AM
Operations
. Operations in general AM7 4P
. . . Partition AM7 W

AM7 X . . . Ramification
AM8 2 . . . Extension
32 . . . Surgery
33 . . . Cobordism
4 . *Operations special to a context*

Processes
* The main use of the terms below is in qualifying specific mathematical topics. Only truly general treatment of the concepts will go here.
5P . Processes in general
6 . . Approximation
* See also Approximations (expansions) AQR
63F . . . Approximation theorems
. . . *Processes*
68B . . . . Convergence of approximations
68B 35 . . . . . Convergence errors
. . . *Types by property*
6OG . . . . Asymptotic approximation
7 . . Continuation
8 . . Variation
9 . . Growth
A . . Distribution
B . . Convergence
C . . Divergence
D . . Oscillation
E . . Interpolation
EX . . Superposition
F . . Generation, generating
GE . . Perturbation
GJ . . Involution
GM . . Decomposition
GP . . Splitting
GS . . Separation
GV . . Valuation
H . . Optimization
HX . . Minimization

Mathematics

Mathematics AM
Processes
. . Minimization AM8 HX

Relations
* This is a composite facet in that most of its terms reflect more than one broad principle of division at a time. These terms (many of them prominent in the literature) reflect concepts in which it is difficult in practice to distinguish between the operation or process concerned, or the end product or property of these. Very often the same term is used to describe all three categories and no clear distinction is drawn between them in the literature.
* The main use of the terms below is in qualifying mathematical topics (e.g. Lattices - Generalizations). Only truly general treatments of the concepts go here.

AM8 J . Relation in general
* For general relations of one concept with another, e.g. categories and geometry ASX 8JT S.
* Add to AM8 J numbers and letters 3/9, A/E, R/W in Auxiliary Schedule AM1.

JX . . Analogue
K . Mappings, functions (broadly)
* For functions in the narrower and more usual sense, use AM8 L below.
* See also Theory of functions (under Analysis) AW8 L3A.

. . *Types by property*
KJS . . . Differentiable mappings
KNV . . . Continuous mappings
KOM . . . Conformal mappings
L . . Functions, operators (broadly)
* The main use of this class is in qualifying concepts and branches other than from Analysis, e.g. Algebraic number theory - Zeta functions, ARM 8YG. A selection of frequently occurring functions used in qualifying specific topics outside Analysis proper is given here for convenience.

L3A . . . Theory of functions
* Use Analysis (AW8 L3A) for the classical theory of functions; this location is for theory of functions in other disciplines.

L74 P . . . *Operations on functions*
LAN . . . *Properties of functions*
. . . *Types of functions*
* Add to AM8 L letters H/L from Auxiliary Schedule AM1.
* Add to AM8 letters M/W in Special Auxiliary AM1.
* Some prominent examples are given below for convenience.
* See also Special functions AWD XE

. . . . *By relation*
LLR . . . . . Generalized functions
LLS . . . . . Representation functions
MC . . . . . Automorphic functions
. . . . *By property*
MY . . . . . Rational functions
N4F . . . . . Transcendental functions
N9 . . . . . Polynomials (functions)

Mathematics AM
Relations
Mappings AM8 K
. Functions AM8 L
. . . By property
. . . . Polynomials AM8 N9

AM8 NDX . . . . Exponential functions
NXH . . . . Potential functions
P2 . . . . Named after a mathematician
. . . *By system*
RI . . . . Arithmetic functions
. . . *Special types of functions*
X . . . . Functionals
YD . . . . Determinants
* Function of a square matrix.

YG . . . . Zeta functions
YH . . . . Hypergeometric functions
AM9 3 . Forms
. . *Methods*
36T S . . . Geometry of forms
. . *Types of forms*
3MC . . . Automorphic forms
3NA . . . Linear forms
3NC . . . Quadratic forms
3ND H . . . Forms of higher degree
3ND N . . . Forms in several variables
3ND P . . . Bilinear forms
Relations arising from operations on structures
* Includes the operation/process itself, as no useful distinction can normally be made.

4 . Transforms
5 . Transformations
62 . . Rotation
64 . . Reflection
66 . . Translation
7 . . Deformation
8 . . . Torsion
9 . . Projection
AD . . . Dilatation
AF . . . Enlargement
AI . . Injection
AK . . Surjection
AM . . Bijection
AP . . Compression
B . . Compactification
C . . Topological transformations, homeomorphisms
CX . . Diffeomorphisms
D . Derivation
E . Extensions
E3A . . Extensions theory
F . Conjugates, adjoints
G . . Self-adjoints

Mathematics AM
Relations
Relations arising from operations on structures
. . Self-adjoints AM9 G

Status relations and relations of magnitude

AM9 HE . Correspondence
HG . Similarity
I . Congruence
J . Equivalence
K . Identity, identity relations
* In general sense of a statement of equality, e.g. identies of place figure trigonometry. For narrower sense implying the use of an operator to produce a special value (e.g. identity matrix) see Entities AQU Y.
L . Equations, equality
L3A . . Theory of equations
. . . *Subsystems*
L3A FTB . . . . Matrices in the theory of equations
. . *Types by method - operations*
* It is unlikely that the need will arise to specify equations by the facets of Forms of mathematical presentation or by Methodology (AM3/AM7 4N). But provision is made for it here in case the need does arise.
LH . . . *By form of mathematical presentation*
* Add to AM9 L letter H from Auxiliary Schedule AM1.
LI . . . *By methodology*
* Add to AM9 L letter I from Auxiliary Schedule AM1.
* Add to AM9 LJ numbers 2/4N following J in Auxiliary Schedule AM1 (representing AM72/AM74N), e.g. Recursive equations AM9 LIE.
LJ4 P . . . *By operation*
* Add to AM9 JL numbers and letters 4P/Y following J in Auxiliary Schedule AM1 with the modification indicated at AM9 LJR below.
LJL . . . . Multiplicative equations
LJR . . . . Differential equations
* Use AM9 ME. Normal synthesis is interrupted here; it is resumed at AM9 MJW.
* Add to AM9 M letters E/ENG following AWE M.
* Add to AM9 M letters F/I following AW.
ME . . . . Differential equations
MEN G . . . . . P-adic differential equations
MF . . . . Ordinary differential equations
MH . . . Integral equations
. . *Types by other operations etc*
* Normal synthesis by Auxiliary Schedule AM1 is resumed here after the interruption at AM9 LJR.
* Add to AM9 M letters JW/W from Auxiliary schedule AM1.
MN9 . . . Polynomial equations

Mathematics AM
Relations
Status relations and relations of magnitude
. Equations AM9 L
. . . Polynomial equations AM9 MN9

AM9 MNA . . . Linear equations
MNB . . . Non-linear equations
MNC . . . Quadratic equations
MND A . . . Cubic equations
MND C . . . Quartic equations
MND P . . . Bilinear equations
MND T . . . Mixed equations
MND X . . . Exponential equations
N . Inequality, inequalities
NX . . Greater than
NY . . Less than
P . . Inverse, inversion
PY . . Reverse, reversion
Q . . Complement
QY . . Proportion, ratio

Relations of structure and composition

R . Generalizations
S . Representations
S3A . . Representation theory
* Main application is to groups. This position takes only truly general works.
S3L . . Models
* For model theory in general, see Mathematical logic, AM4 Q.
. . *Types*
* For asymptotic representations, see Asymptotic approximation AM8 6OG.
SJV . . . Integral representations
SL9 . . . Projective representations
SQX . . . Modular representations
SXP 8A . . . Ordinary representations
SXP 8B . . . Unitary representations

Spatial relations, relations of location

T . Packing and covering
TRR . . Lattice packing and covering
U . . Packing
URR . . . Lattice packing
V . . Covering
VRR . . . Lattice covering
WI . Incidence
WM . Immersions
WS . Suspensions
X . Embedding, imbedding
* Of a configuration in enveloping space.
. . *By embedded system*
* Add to AM9 Y letters R/W following A in AR/AW, e.g. Banach space - Embedding - of manifolds AWP P29 YUG.

Properties in general

Mathematics AM
Relations
. Spatial relations, relations of location
. . . By embedded system

. *Functional relations, relations of association*
AMB . . Homomorphisms, morphisms
* Mappings from one system to a like system which preserve structure.
Y . . . Isomorphisms
AMC . . . Automorphisms
AMD . . . Endomorphisms
AME E . . . Epimorphisms
H . . . Monomorphisms
N . . . Null morphisms
AMF . . . Complexes (homomorphisms)
AMG . . Holomorphisms
AMH . . Meromorphisms
AMI . . Holonomy
X . . Non-holonomy
AMJ . . Homology
* Including homology and cohomology together.
AMK . . . Cohomology
3B . . . . K-theory (cohomology)
NV . . . . Continuous cohomology
AML . . . Homotopy
Y . . . Isotopy

Properties
* There is relatively little literature on these properties per se (e.g. on uniqueness, linearity, complexity). So the main role of this facet is to provide for qualification of mathematical objects by their properties (e.g. Lattices - Distributivity) and for specification of them (i.e. using a property to specify a type or species, e.g. elliptic equations). In some cases both roles will appear in a single index description, e.g. Geometry - Convex sets - Spherical convexity. Use the classes below on their own only for truly general works on the property per se.
* When properties per se are intended, the strict form is preferred (e.g. duality). But the adjectival form (e.g. dual) used in specifiers is far commoner; so this facet uses it, and the property per se is implicit, e.g. bilinear implies bilinearity.
* It should be noted that although some properties appear to be special to particular disciplines (e.g. elliptic to geometry) this is not necessarily the case. Many terms with strong disciplinary associations may well be applicable in other areas (e.g. elliptic equations) and it is for this purpose that they are included here.

Mathematics AM
Properties

AMN Properties in general
. *Properties derived from other facets*
* These are used only for the properties per se, NOT as specifiers (defining Types). For example, Distributivity as a lattice property (ARR AN8 A); modularity as a property of congruence in algebraic varieties (ATL 9ID 6X). But 'distributive' used as a specifier would be taken from Distribution as a Process; 'Modular' as specifier would be taken from moduli as an entity (e.g. modular lattices ARR QX).
* Since there is very little literature considering properties per se, a comprehensive listing here would be unwarranted. So only a brief selection is given below to show how each facet may provide such properties.
. *Properties derived from earlier facets*
* For properties derived from later facets see AP5/AP7.
* Add to AMN numbers and letters 3/9, A/L following AM. A selection of frequently occuring terms is given below for convenience and to show scope.
. . *Properties derived from mathematical presentations*
3D . . . Axiomatic
. . *Properties derived from methodologies*
* Note that the methodologies used here exclude those which are themselves derived from other facets, e.g. algebraic properties are to be taken from the Systems and branches facet (see below for examples).
3U . . . Constructive
4O . . . Predicate
4T . . . Inductive
62 . . . Elementary
64 . . . Classical
66 . . . Descriptive
6B . . . Formal
. . *Properties derived from operations*
* For properties reflecting the products of operations (e.g. sums, produced by addition), see Properties derived from entities and elements AP5/AP6.
76 . . . Analytic
* See note under Analysis at AM7.
77 . . . Synthetic
7B . . . Definability
7D . . . Constructability
7F . . . Combinatorial
7J . . . Additive
7K . . . Subtractive
7L . . . Multiplicative
7N . . . Divisibility
7P . . . Factorization properties
7Q . . . Radical
7R . . . Differential
7S . . . . Differentiable
* Use AM7 S.
7T . . . . Partially differential
7U . . . . Pseudo-differential
7V . . . Integral

Properties in general

Mathematics AM
Properties
Properties in general AMN
Properties derived from earlier facets
. Properties derived from operations
. . Integral AMN 7V

. *Properties derived from processes*
AMN 86 . . Approximate
87 . . Continuous
* Use ANV.
8A . . Distributive, distributivity
8B . . Convergent
8C . . Divergent
8D . . Oscillatory
8GJ . . Involute, involuted
8GM . . Decomposable, decomposed
8GV . . Valuation (properties), valued
. *Properties derived from relations*
8L . . Functional
95 . . Transformation properties
98 . . . Torsion (properties)
99 . . . Projective
9D . . Derivative, derived
* From derivation; cf. derivative as end-product of differentiation.
9F . . Conjugate, Adjoint
9G . . . Self-adjoint
9I . . Congruent
9J . . Equivalent
9L . . Equational
9P . . Inverse (properties)
9R . . Generalized, generalizing
9S . . Representational, representative
9V . . Covering properties
9WI . . Incidence (properties)
B . . Homomorphic
C . . . Automorphic
G . . Holomorphic
H . . Meromorphic
Properties derived from later facets
* See AP5.
General special properties
* General in scope, but special to this facet in that they are not derived from other facets.
. *By nature of other elements involved*
T . . Existence
U . . Uniqueness
AMO . Abstract
AMP . Concrete
AMQ B . Definite
D . Standard, neutral
G . Non-standard
M . Mean, average
P . Fundamental
AMR . Normal
AMS . Intrinsic
AMT C . Characteristic

Mathematics AM
Properties
Properties in general AMN
General special properties
. Characteristic AMT C

AMT E . Exceptional
L . Principal
P . Primitive
AMU . Simple
AMV . . Semisimple
AMW . Complex
AMX . . Almost complex
AMY . Rational
AN2 . . Diophantine
Y . . Birational
AN3 . Real
Y . . Formally real
AN4 D . Ideal
E . Imaginary
F . Transcendental
By number of elements/operations involved
H . Discrete, discreteness
* For Continuous, see ANV.
By sign
J . Positive
K . . Non-positive
L . Negative
M . . Non-negative
N . Zero
O . . Non-zero
By value
Q . Absolute value
R . Relative value
S . Conditional
By dimension
V . Dimensional, dimension
* See also Degree AN9 Y; Finiteness ANJ
AN5 . . Measure
X . . . Special measures
* For example, Baire categories.
Y . . Large
AN6 . . Small, low dimension
Y . . Dimension less than one (<1)
AN7 . . One dimensional, line, linear (dimensions), singular
* For linear as a degree, see ANA; for singularities, see AQC G.
AN8 B . . . Non-linear (dimensional)
D . . Two dimensional, plane (dimensional), planar (dimensional)
F . . Three dimensional, space (dimension), spatial (dimension), solid (dimension)
H . . Higher dimensional, polydimensional, multidimensional, n-dimensional
J . . Height
L . . Length
N . . Width, breadth
P . . Volume, capacity

Properties in general

Mathematics AM
Properties
Properties in general AMN
By dimension
. . Volume AN8 P

AN8 R . . Weight
T . . Density
. . *Special forms of dimension*
VB . . . Norms (dimension)
By number of terms
W . Monomial
X . Binomial
AN9 . Polynomial
By degree of terms
* For dimensions (1-d, 2-d, etc.) see AN7.
Y . Order (degree of terms)
ANA . Linear, first order
ANB . Non-linear (order)
ANC . Quadratic, second order
AND A . Cubic, third order
C . Quartic
H . Higher order
I . . Infinite order
By number of variables
K . With one variable
L . Binary
M . Ternary
N . With several variables
By degree of variables
P . Bilinear
Q . Multilinear
By nature of variables
S . Homogeneous variables
T . Mixed variables
V . Symmetric variables
X . Exponential variables, exponential
ANE C . Complex variables
E . . One complex variable
H . . Several complex variables
R . Real variables
By range of applicability
ANF . Local
ANG . . P-adic
ANH . . . Galois properties and theory
Y . Semilocal
ANI . Universal, global
By level of finiteness
ANJ . Finite, finiteness
* Including related conditions.
Y . . Finite dimensional
ANK . Infinite
* For infinite order see AND I.
ANL D . . Infinite dimensional, infinite dimensions
F . . Infinitary
H . . Infinitesimal

Mathematics AM
Properties
Properties in general AMN
By level of finiteness
. . Infinitesimal ANL H

Special properties
* Special in scope as well as special to this facet (i.e. not derived from other facets).
Compositional etc properties
ANL N . Strong
P . Poor, weak
R . Open
T . Closed
ANM . Smooth
ANN . Regular
ANO B . . Non-regular
D . Uniform
G . Homogeneous
H . Heterogeneous, mixed
J . Symmetric, symmetry
L . . Asymmetric
N . Reflex, reflexivity
T . Monotone, monotonic
ANP . Ordered
ANQ B . . Partially ordered
L . . Linearly ordered
R . Graded
ANR . Compact, compactness
NF . . Locally compact
ANS . Free, freeness
* For Connected, see AOC H.
ANT E . Amalgamated
G . Coupled
J . Complemented
L . Partial, partially
N . Complete, completeness
P . . Almost complete
R . . Pre-complete
T . . Quasi-complete
ANU . Entire
Y . Perfect
ANV . Continuous, continuity
* For Discrete, see AN4 H.
ANW . . Completely continuous
ANX B . . Discontinuous
D . Dual, duality
D3F . . Duality theorems
F . Periodic
G . . Almost periodic
H . . Harmonic, potential
K . . . Subharmonic
M . . . Biharmonic
P . . . Polyharmonic
Q . Cyclic
R . Direct
S . . Subdirect

Properties in general

Mathematics AM
Properties
Properties in general AMN
Compositional etc properties
. . Subdirect ANX S

Properties by performance
ANX T . Qualitative behaviour
V . Optimal, optimality
X . Maximal
* See note at AP6 2.
Y . Minimal
* See note at AP6 3.
ANY . Stable
AO2 D . Wild
F . Fuzzy
H . Exact
J . Invariant
L . Equivariant
N . Covariant
P . Contravariant
S . Separable
AO3 . Solvable
AO4 . . Non-solvable
Y . Summable, summability
AO5 . Nilpotent
AO6 C . Nil
E . Idempotent
By conformity to fundamental laws
AO7 . Associative
AO8 . . Non-associative
AO9 . Commutative, Abelian
AOA . . Non-commutative, non-Abelian
Spatial properties
AOB . Proximity
AOC D . Neighbouring
F . Neighbourhood
H . Connectedness, connected
J . Shape
L . Interior
N . Exterior
P . Geodesic
R . Curvature
T . Concave
V . . Pseudo-concave
AOD . Convex, convexity
AOE C . . Pseudo-convex
P . Parallel, parallelism
AOF . Biaxial
Y . Direction
AOG . . Asymptotic
Properties of space
AOI . Euclidean
AOJ . Non-Euclidean
AOK . Pseudo-Euclidean
Y . Affine & projective
AOL . Affine

Mathematics AM
Properties
Properties in general AMN
Properties of space
. Affine AOL

AOM . Conformal
X . . Pseudo-conformal
AON . Metric
AOO . . Metrizable
AOP . Symplectic, simplicial
AOQ B . Riemannian
D . . Pseudo-Riemannian
Properties of motion
R . Speed, rate
AOR . Dynamic
AOS . Kinematic
Properties derived from geometric figures
AOT . Plane (properties)
Y . Square
AOU . Orthogonal
X . Orthonormal
AOV . Elliptic
AOW . Parabolic
AOX . Hyperbolic
AOY B . Spherical
By name of mathematician
* Where exactly defined these should be subordinated according to the concept defined; (e.g. Boolean algebra = Algebra of sets, and is thus subordinated to Sets, and not to Types of algebras; Abelian groups = Commutative groups and is located as the latter.
AP2 . *Mathematician especially prominent in context*
* AP2 and AP3 are used for the two most prominent. AP4 accommodates any others, followed by first letter of name.
* If the 'negative' of a mathematician's property is given, allow for the 'positive' to precede it, e.g. AVL 8L Functions in analytic spaces; AVL 8P3 Non-Archimedean functions (which allows for the use of AVL 8P2 Archimedean functions - should these ever arise in this context).
AP4 . Others (A/Z)
Properties derived from later facets
* The first note following AMN applies here also.
* For properties derived from earlier facets, see AMN and the explanatory notes there.
AP5 . *Properties derived from elements*
* Derived properties should be distinguished carefully from the originating structures (in the Elements and components array), e.g. boundary properties should be distinguished from boundaries.
* Add to AP5 letters A/Y following AP.
* Add to AP6 numbers and letters 2/9, A/D following AQ.
F . . Bounded
L . . Difference
M . . Product
N . . Power
P . . Quotient

Mathematics

Mathematics AM
Properties
Properties in general AMN
Properties derived from later facets
. Properties derived from elements AP5
. . Quotient AP5 P

AP5 Q . . Residual
R . . Factor
AP6 3 . . Maximal (extrema)
* When implies extrema (AQ2). For the loose use of maximal to mean most and minimal to mean least, use ANX X and ANX Y.
4 . . Minimal (extrema)
* See note above at AP6 3.
8Y . . Adjunctive
9 . . Connective
. *Properties derived from Entities*
* Derived properties should be distinguished carefully from the originating structures (in the Entities array).
* Add to AP6 letters E/Y following AQ.
E . . Scalar
H . . Vector
I . . Tensor
N . . Spectral
P . . Sequential
S . . Invariant (derived properties)
T . . Variable
UY . . Identity (properties)
X . . Modularity
AP7 . *Properties derived from systems & branches*
* Care is needed here to distinguish qualification of a concept by these properties per se from situations in which the system represents a subsystem (see -F in Auxiliary Schedule AM1) or acts as the specifier of a type of the concept concerned. For example, under the concept Algebras, the simple intersections of the concept with the 'Groups' disguises three different relationships: group properties of algebras (which would use class AOX as a qualifier by properties); groups of algebras (which would use -F from Auxiliary Schedule AM1 to represent this as a subsystem); group algebras (representing a type of algebra).
* These distinctions are probably more difficult to make at the broad level of 'disciplines' (e.g. distinguishing topological properties of rings from topology of rings). But at the more specific level of particular structures the distinctions are usually clearer.
AP8 *Properties by other characteristics*
* Use for any property which cannot be equated or nearly equated with the various kinds of properties already provided for.

Mathematics AM
Properties
. . Properties by other characteristics AP8

Parts of mathematical structures or systems
APA . *Elements, components*
* Elements within some containing whole, but more concrete in conception than properties per se.
. . *Elements in mapping or function or operation*
APC . . . Domain
Y . . . Range
APD . . . . Value
APE . . . . . Initial value
* Use for initial value problems.
APF . . . Boundary, boundaries
* Use for boundary problems.
85 . . . . Boundary behaviour
AN . . . . Boundary properties
DD . . . . Boundary value
* Use for boundary value problems.
. . *Elements resulting from mapping or function or operation*
* Most of these imply some operation. These will be found in the Operations facet (AM7/8). But if a document considers the operation and its resulting element together, prefer here. See note preceding AM7 4P.
* The order of elements is consistent with that of operations, etc. from which they result; but the notation is different in order to maximize brevity.
APG . . . Solutions
Y . . . . Bounds
APH . . . . Limits
Y . . . . . Limit cycles
API . . . . Moment problems
APJ . . . Classes
APK . . . Sums
NXR . . . . Direct sums
NXS . . . . . Subdirect sums
PN . . . . Exponential sums
APL . . . Differences
APM . . . Products
NS . . . . Free products
NXR . . . . Direct products
NXS . . . . . Subdirect products
OCL . . . . Inner products
APN . . . . Powers, exponents
APO . . . Divisors
APP . . . Quotients
Y . . . Completions
APQ . . . Residues
AN . . . . Residual properties
APR . . . Factors
Y . . . . Unique factors
APS . . . . Primes
X . . . . . Semiprimes
APT . . . Radicals, Roots
3A . . . . Radical theory

Mathematics AM
Parts of mathematical structures or systems
Elements resulting from mapping or function or operation
. Radicals APT
. . Radical theory APT 3A

APT RKF . . Integral roots
APU . Derivatives
X . . Partial derivatives
APV . Differentials
APW . Integrals
APX *Elements resulting from other operations etc*
* That is, other than those enumerated above (APA/APW).
* Add to APX numbers 7/9 and letters A/D from Auxiliary Schedule AM1. Two examples are given below to demonstrate their use.
9D . Derivations
AD . Endomorphisms
* E.g. rings of endomorphisms ASM DXA D.
Elements reflecting structure
APY . Structural elements, structures
* For mathematical structures as systems, see ARA.
* See also Model theory AM4 Q
X . . Richer structures
AQ2 . . Extrema, maxima and minima
AQ3 . . . Maxima
AQ4 . . . Minima
AQ5 . . Conditions
E3 . . . Maximal conditions
E4 . . . Minimal conditions
AQ6 . . . Chain conditions
AQ7 C . . . . Side conditions
E . . . . Necessary & sufficient conditions
G . . . . . Necessary conditions, significant conditions
AQ8 . . Additional structures
Y . . Adjunctions
AQ9 . . Connections
Elements reflecting space
AQA . Spatial elements
AQB . . Points
AQC G . . . Singular points, singularities
K . . . Co-ordinates
N . . . Fixed points
P . . . Coincidence points
R . . . Critical points
R3A . . . . Critical point theory
AQD . . Spaces
* Use for the general concept only. In most cases where a specific type of space is concerned, the preferred arrangement is to treat them as subsystems and to draw the detail from the Branches and Systems facets; e.g. Hilbert spaces in functional analysis AWO FUA P2.
NOG . . . Homogeneous spaces
VJ . . . Topological spaces
Y . . Projectives

Mathematics AM
Parts of mathematical structures or systems
Elements, components APA
. . . Projectives AQD Y

Entities
* Subsystems which may exist independently of any given containing system, i.e. act as quasi-systems or simple systems themselves.
. *By dimension*
AQE . . Scalars
AQG . . . Eigenvalues, Eigenfunctions
AQH . . Vectors
Y . . . Spinors
AQI . . Tensors
. *By form*
AQJ K . . Characters
S . . Symbols (mathematical entities)
AQK . . Coefficients
Y . . Expressions
AQL . . . Polynomials
Y . . Continua
AQM . . Spectra and series (together)
AQN . . . Spectra, spectrum
3A . . . . Spectral theory
3B . . . . . Scattering theory
AQO . . . Sequences & series (general)
* See explanatory note preceding AWL EP on the treatment of these.
AQP . . . . Sequences (general), progressions (general)
* For types of sequences, use AQQ H/AQQ W.
AQQ . . . . Series (general)
* For types of series, use AQQ H/AQQ W.
. . . . *Specific types of sequences & series*
* Add to AQQ letters H/W from Auxiliary Schedule AM1.
MR . . . . . Normal series
PN . . . . . Power series
QN . . . . . Spectral sequences
AQR . . . . . Approximations, expansions
. . . . . *Methods*
. . . . . Polynomials
6N9 . . . . . Splines
. *By performance*
AQS . . Invariants
AQT . . Variables
AQU . Operators, linear operators
* For operators in the wider and looser sense of functions see AM8 L.
Y . . Identities
* For identity relations in general, see AM9 K and the note there.
AQV . . Functors
. . . *Properties*
BXD . . . . Duality of functors
. *Entities with particular values*
AQW . . Bases
AQX . . Moduli

Mathematical systems

Mathematics AM
Parts of mathematical structures or systems
. . Entities with particular values
. . . Moduli AQX

. . *Subsystems*
* This class does not exist as a general class. But particular systems, branches, etc. below (AR/AW) often have subsystems derived from other branches and systems. These are provided for via Auxiliary Schedule 1 (at -F) and are divided like AR/AW.

. . *Special parts*
* This class does not exist as a general class. But particular systems, branches, etc. below (AP/AV) may well display parts additional to those elements and entities indicated above and defined by the systems themselves. These are provided for via Auxiliary Schedule AM1 (at -G).

Types of mathematical structures or systems
* The facets at AM2/AQ are all used primarily to qualify particular mathematical concepts (e.g., Groups - Factorization ASA 7P; Finite groups - Automorphisms ASD AC).
* To show the types ('species') of anything (i.e. to specify them) Auxiliary Schedule AM1 provides (at H/W) facilities for adding concepts from any facet. This gives, for example, types of groups by relation, such as automorphism groups, or types by property, such as commutative groups.
* Where a concept has types special to it (i.e. not derived synthetically from other facets), these are enumerated in the schedule after types got synthetically.
* The arrangement under any system is as follows: % (Forms of mathematical presentation) % (Methodologies) % (Operations) % (Processes) % (Relations) % (Properties) % (Elements & Entities) % (Subsystems) % (Parts or subsystems special to the context) % (Types) % . (Specified by previous facets, AM/AQ) % . (Specified by branches or systems, AR/AW) % . (Special to the class divided) % . . . * Enumerated under the class concerned.
* When types of anything are specified synthetically care should be taken to distinguish the use of Methods to define a type and the use of Systems or Branches; e.g., if 'arithmetic groundfields' reflects groundfields characterized by the use of arithmetic methods rather than by arithmetic structure, the classmark would be ATQ IRI (where the first 'I' indicates a division of AM6 Methods - see Auxiliary Schedule AM1) and not ATQ RI (where the 'RI' is taken directly from ARI Arithmetic). When in doubt, treat such cases as specification by System.

Mathematics AM
Types of mathematical structures or systems

AR5 Mathematical systems, mathematical disciplines, branches of mathematics
* Any given system may be qualified by all preceding facets (and if necessary specified by them as to its types) as instructed in Auxiliary Schedule AM1.

ARA . Mathematical structures in general
* For literature on the nature of a mathematical structure or system.
* For structural elements within systems, see APY.
* For specific structures, see individual branches, etc. below (AR/AW)
* For model theory, see AM4 Q.

ARB . . Sets
* As mathematical structures.

3A . . . Theory
* For general set theory, see AM5.

. . . *Relations*

8L . . . . Functions

. . . *Elements*

E6 . . . . Chain conditions

. . . *Subsystems*

FRI . . . . Arithmetic structures
* For cardinal and ordinal numbers, see ARK C/D.

FRX . . . . Algebraic structures, algebra of sets

. . . . . *By property*

FRX NTN . . . . . Complete algebras

. . . . . *Named systems*

FRX P2 . . . . . Boolean
* For Boolean algebra use ARB X.
* Normal synthesis by Auxiliary schedule AM1 is interrupted here; it is resumed at ARC A.

X . . . . . Boolean algebra

. . . . . *Relations*

X9S . . . . . Representations of Boolean algebra

. . . . . *Elements*

XE6 . . . . . Chain conditions in Boolean algebra

. . . . . *Subsystems*

XFS M . . . . . Boolean rings

ARC A . . . *Other subsystems of sets*
* Normal synthesis is resumed here after its interruption at ARB FRX P2
* Add to ARC A letters P3/Q from Auxiliary Schedule AM1 and R/W following A in AR/AW.

Combinatorics

Mathematics AM
Mathematical systems AR5
Mathematical structures in general ARA
Sets ARB
. Other subsystems of sets ARC A

ARC H . *Types of sets*
* Add to ARC letters H/W from Auxiliary Schedule AM1.
. . *By operation*
JB . . . Definable sets
. . *By process*
KF . . . Generating sets
. . . . *Special parts*
KFG . . . . . Generators, generatrix
. . *By property*
. . . *By special dimension*
N8U . . . . Fractals
* Sets with non-integral Hausdorff dimension.
* See also Generating sets ARC KF; Topological vector spaces AWP FRC N8U; Hausdorff dimension AWR YN5 B8U
NP . . . Ordered sets
. . . . *Relations*
NP9 HE . . . . . Correspondence
NP9 HEP 2 . . . . . Galois correspondence
NQB . . . . Partially ordered sets
NUY . . . Perfect sets
O2F . . . Fuzzy sets
OP . . . Simplicial sets
. . *By elements*
PL . . . Difference sets
PLN UY . . . . Perfect difference sets
X . . Subsets
. . . *Subsystems*
XFR R . . . . Lattices of subsets

ARD Combinatorics, combinatorial structures, combinatorial analysis
* Branch of mathematics concerned with the computation of the number of different ways certain operations can be performed.
. *Mathematical forms*
3A . . Combinatorial theory
5 . . Set theory
53E F . . Axioms of choice
. *Operations*
7A . . Enumeration
* See also specific problems involving enumeration, e.g. generating functions, identities.
7W . . Partition
. *Relations*
. . Functions
8L . . . Combinatorial functions
8LK F . . . Generating functions
9K . . Identity

Mathematics AM
Mathematical systems AR5
Mathematical structures in general ARA
Combinatorics ARD
Relations
. Identity ARD 9K

ARD 9N . Inequalities
9P . . Inversion
9P3 H . . . Inversion formulae
9T . Packing & covering
9TR R . . Lattice packing & covering
Special combinatorial structures
ARE C . Combinations & permutations
D . . Permutations
E . . Combinations
G . Matroids
H . Hypergraphs
N . Finite geometries in combinatorics
ARF . Designs & configurations
* For design of experiment see Probability and statistics AXR.
. . *Relations*
9T . . . Packing & covering
. . *Types*
. . . *By system*
TB . . . . Matrices as designs
X . . . Tesselation & tiling
ARG . Graphs & maps
3A . . Graph theory
. . *Methods*
6VJ . . . Topological graph theory
* See also Embedding AM9 X.
. . *Operations*
7A . . . Enumeration of graphs and maps
7P . . . Factorization
. . *Relations*
9T . . . Packing & covering
. . *Elements*
DF . . . Boundaries
. . . . Demonstrations
DF3 I . . . . . Four colour problem, chromatic theory
. . *Parts special to graphs*
GC . . . Nodes, vertices
GE . . . Edges, faces of graphs
GH . . . Paths & circuits
GM . . . Extremities of graphs
. . . . Problems
GM3 KP . . . . . Extremal problems
. . *Types of graphs*
ARH C . . . Connected graphs (general)
E . . . . Trees
G . . . Directed graphs (general), digraphs (general)
* For networks, see ARH N.
H . . . Undirected graphs (general)
L . . . Planar graphs
M . . . . Maps as graphs
* Finite, connected, planar graphs.

Mathematical systems

Mathematics AM
Mathematical systems AR5
Mathematical structures in general ARA
. . . . . Planar graphs ARH L
. . . . . Maps as graphs ARH M

ARH N . . . . . Networks
* Directed graphs whose elements are expressed as activities and events.
P . . . . . Multigraphs
Q . . . . . Transversable multigraphs
* Bridges of Konigsberg, etc.

ARI Arithmetic
* For arithmetic structures in general, see Sets ARB FRI.
. *For particular kinds of users*
23C . . Rapid calculation arithmetic
23C T . . Business arithmetic
. *Methods*
62 . . Elementary arithmetic
6B . . Formal arithmetic
. . *Types by property*
* For modular arithmetic, see ARI QX.
6MQ G . . . Non-standard arithmetic
. *Operations*
. . Computation
7H . . . Numerical computation
7J . . Addition
7L . . Multiplication
7M . . . Complex multiplication
7N . . Division
. *Relations*
9QY . . Proportion
* For fractions, see ARK I.
. *Elements*
DN . . Powers
DNM U . . . Simple powers
DT . . Roots
DTR KF . . . Integral roots
. *Entities*
EP . . Progressions
. . . *Types by systems*
EPR I . . . . Arithmetic progressions
EPT S . . . . Geometric progressions
. *Parts special to arithmetic*
GC . . Numbers (general)
* For number theory, see ARJ.
GE . . . Numeration systems, digital representations
* For number systems, see ARK B.
. . . . *By property*
GG . . . . . Binary systems
GH . . . . . Octal systems
GJ . . . . . Decimal systems
GK . . . . . Duodecimal systems
GL . . . . . Hexadecimal systems
GM . . . . . Other systems

Mathematics AM
Mathematical systems AR5
Arithmetic ARI
. Parts special to arithmetic
. . . . . Other systems ARI GM

. *Types of arithmetic*
. . *By entity*
ARI QX . . . Modular arithmetic

ARJ Number theory, higher arithmetic, arithmetica
. *Methods*
* In this context, most of these are more helpfully regarded as specifying types of number theory - see ARL.
. *Processes*
8A . . Distribution
8BQ X . . . Distribution modulo one
. *Relations*
8L . . Functions
8MC . . . Automorphic functions
. . . . *Operations*
8MC 7M . . . . . Complex multiplication
. . . . *Properties*
8MC BH . . . . . Galois properties
. . . *By property*
8P2 . . . . Dirichlet functions in number theory
. . . *By entity*
8QX . . . . Modular functions
8YG . . . Zeta function
93 . . Forms
. . . *Properties*
93B G . . . . P-adic
93B GA3 . . . . . P-adic theory
. . . *Subsystems*
93F SM . . . . Rings
93F SMN I . . . . . Forms over global rings & fields
93F SV . . . . Fields
93F SVN F . . . . . Forms over local fields
. . . *Types*
93M C . . . . Automorphic forms
93N C . . . . Quadratic forms
93N DL . . . . . Binary forms
93N DLN C . . . . . Binary quadratic forms
93N DP . . . . Bilinear forms
93Q X . . . . Modular forms
9I . . Congruences in number theory
. *Elements*
DK . . Sums
DKP N . . . Exponential sums
. *Entities*
EP . . Progressions
EP8 A . . . Distribution in progressions
EQ . . Series
EQP 2 . . . Dirichlet series

Number systems

Mathematics AM
Mathematical systems AR5
Number theory ARJ
Entities
. . Dirichlet series ARJ EQP 2

ARJ F *Subsystems*
* For number fields, see ARN RKV.
FTS . *Geometry*
* For geometry of numbers use ARJ X.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at ARJ Y.
X . Geometry of numbers
* See also Convex bodies theory, AUC 3A
. . *Relations*
X93 . . . Forms
X93 NA . . . . Linear forms
. . . . . *Elements*
X93 NAD M . . . . . Products of linear forms
X93 NC . . . . Quadratic forms
X9T . . . Packing & covering
X9T RR . . . . Lattice packing & covering
X9T RRE B . . . . . *Points*
X9T RRE B8A . . . . . Lattice points distribution
. . *Subsystems of geometry of numbers*
XFR R . . . Lattices
XFR RFS A . . . . *Groups*
. . . . . Automorphism
XFR RFS CMC . . . . . Automorphism groups of lattices
Y *Other subsystems of number theory*
* Normal synthesis is resumed here after interruption at ARJ FTS
* Add to ARJ Y letters TT/W following A in ATT/AW.
YX . *Special subsytems*
* For subsystems special to number theory, use ARK.
* Normal synthesis is interrupted here and is resumed at ARK Y.
* For numeration systems (binary, decimal, etc.), see ARI GE.

ARK B . . Number systems
* For numeration systems (binary, decimal, etc.), see ARI GE.
C . . . Cardinal numbers
D . . . Ordinal numbers
* For recursive ordinals, see Mathematical logic - Algorithms AM4 H9R KD
E . . . Natural numbers, counting numbers, whole numbers

Mathematics AM
Mathematical systems AR5
Number theory ARJ
Number systems ARK B
Natural numbers ARK E

ARK F Integers
. *Operations*
F7J . . Addition of integers
F7N . . Division of integers
. *Relations*
F9I . . Congruences
. *Elements & entities*
FDQ . . Residues
FDQ NC . . . Quadratic residues
FEJ K . . Characters
FEP . . Sequence of integers
FEP 7J . . . Addition of sequences
. . . *Relations*
FEP 8JX . . . . Analogues
FEP 9R . . . . Generalizations
. . Bases
FEW JJ . . . Additive bases
. *Special types*
G . . Prime numbers
. . . *Processes*
G8A . . . . Distribution of primes
G8A 3A . . . . . Distribution theory of primes
. . . *Types*
GLR . . . . Generalized primes
H Rational numbers
I . Fractions
J . . Proper fractions
K . . Improper fractions
L . . Continued fractions
M Irrational numbers
N . Algebraic irrational numbers
O . Transcendental numbers
P Real numbers
Q Complex numbers
QXN . Imaginary numbers, purely imaginary numbers
QXR . Algebraic numbers
* For algebraic number theory, see ARM.
R . Quaternions
Other number systems
* Some numbers do not fit readily into the above 'evolutionary' order. These are accommodated here by drawing on the order of other facets.
S . Normal numbers
T . P-adic numbers
* See also Algebraic number theory ARM
V . Number fields, number domains
* General works only; most of the literature relates relates to algebraic number fields and some writers treat the latter as synonymous with number fields in general.
* See also Algebraic number fields ARN RKV

Number theory

Mathematics AM
Mathematical systems AR5
Number theory ARJ
Other subsystems of number theory ARJ Y
. . . . Number fields ARK V

ARK Y *Types of number theory*
* Normal synthesis is resumed here after its interruption at ARJ YX.
* Add to ARK Y letter H from Auxiliary Schedule AM1.

YI . *By method*
* Use ARL for types defined by methods used.
* Normal synthesis is interrupted here; it is resumed at ARO Y.

ARL . *By method*
* Add to ARL numbers and letters 2/9, A/Y following AM6.

2 . . Elementary number theory
. . . *Operations*
27W . . . . Partition
. . . *Relations*
29I . . . . Congruences
29S . . . . Representations
B . . Formal number theory
JJ . . Additive number theory
. . . *Relations*
JJ9 3 . . . . Forms
. . . . . *Methods*
JJ9 36T S . . . . . Geometry of forms
. . . . . *Types*
JJ9 3NA . . . . . Linear forms
JJ9 3NC . . . . . Quadratic forms
JJ9 3ND H . . . . . Higher degree forms
JJ9 3ND LNC . . . . . Binary quadratic forms
JJ9 3ND N . . . . . Forms in several variables
. . . *Subsystems*
. . . . Primes
JJF RKG . . . . . Additive problems with primes
JL . . *Multiplicative number theory*
* See Analytical number theory, ARO.

N2 . . Diophantine methods in number theory
. . . *Processes*
N28 6 . . . . Diophantine approximations
. . . . . *Subsystems*
. . . . . Local fields
N28 6FS VNF . . . . . Diophantine approximation in local fields
. . . . . Fixed fields
N28 6FS VNF X . . . . . Approximation by numbers from fixed fields
N28 6N7 . . . . . Approximation to one number
. . . . . *Types*
N28 6NA . . . . . Linear Diophantine approximations

Mathematics AM
Mathematical systems AR5
Number theory ARJ
Diophantine methods in number theory ARL N2
. Processes
. . . . Linear Diophantine approximations ARL N28 6NA

. *Relations*
ARL N29 L . . Diophantine equations
N29 LJL . . . Multiplicative equations
N29 MNA . . . Linear equations
N29 MNC . . . Quadratic equations
N29 MND A . . . Cubic equations
N29 MND C . . . Quartic equations
N29 MND P . . . Bilinear equations
N29 MND X . . . Exponential equations
. . Inequalities
N29 N . . . Diophantine inequalities
RS *Algebraic*
* For algebraic number theory, use ARM.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at ARN Y.

ARM Algebraic number theory
. *Relations*
8L . . Functions
8YG . . . Zeta functions
9E . . Extensions
. *Properties*
BF3 A . . Local number theory
. *Entities*
EL . . Polynomials
. *Subsystems*
FRK T . . P-adic numbers
FSV . . *Fields*
* For Fields in algebraic number theory use ARN.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at ARN X.

ARN . . Fields in algebraic number theory
3A . . . General field theory
* See also Class field theory ARN DJ3 A
. . . *Operations*
7X3 A . . . . Ramification theory
. . . *Elements*
DJ . . . . Classes
DJ3 A . . . . . Class field theory
DJ3 COA . . . . . Non-Abelian class field theory

Number theory

Mathematics AM
Mathematical systems AR5
Number theory ARJ
Fields in algebraic number theory ARN
Elements
. . . Non-Abelian class field theory ARN DJ3 COA

Types
. *By relation*
ARN KL . . Function fields
. . . Theory
KL3 CRI . . . . Arithmetic theory of algebraic function fields
. *By property*
N3 . . Real fields
. . . Forms
N39 3 . . . . Forms over real fields
NC . . Quadratic fields
NDC . . Quartic fields
NF . . Local fields
. . . *Properties*
NFB H . . . . Galois properties
. . . . . Cohomology
NFB HAK . . . . . Galois cohomology
NI . . Global fields
NIB H . . . Galois properties
. . . . Cohomology
NIB HAK . . . . . Galois cohomology
NJ . . Finite fields
. . . *Elements*
NJD K . . . . Sums
NJD KND X . . . . . Exponential sums
. *By structure*
RKV . . Algebraic number fields
* See note at ARK V Number fields in general.
. . . *Processes*
RKV 8A . . . . Distribution in number fields
* See also Distribution of primes ARK G8A.
. . . *Relations*
RKV 8JX . . . . Analogues in number fields
RKV 8YG . . . . Zeta functions of number fields
. . . . Forms
RKV 93 . . . . . Forms over number fields
. . . *Elements*
RKV DO . . . . Divisors
RKV DPY . . . . Completions
. . . *Subsystems*
RKV FPS . . . . Primes
. . . . . Distribution
RKV FPS 8A . . . . . Distribution of primes in number field
. . . *Types of algebraic number fields*
RKV NDA . . . . Cubic fields
RKV NXQ . . . . Cyclic fields, cyclic number fields

Mathematics AM
Mathematical systems AR5
Number theory ARJ
By method ARL
. . Subsystems
. . . . . Cyclic fields, cyclic number fields ARN RKV NXQ

ARN XF . . *Other subsystems in algebraic number theory*
* Normal synthesis is resumed here after interrruption at ARM FSV.
* Add to ARN XF (for Subsystems) letters SW/W following A in ASW/AW.
XH . . *Types of algebraic number theory*
* Add to ARN X letters H/W in Auxiliary Schedule AM1.
Y *Types of number theory by other methods*
* Normal synthesis is resumed here after its interruption at ARL RS.
* Add to ARN Y letters RT/W in Auxiliary Schedule AM1.
YW . *Analytic*
* Use ARO for Analytic number theory.
* Normal synthesis is interrupted here; the array of methods defined by mathematical systems is concluded at ARO X and normal synthesis is resumed at ARO Y.
ARO . Analytic number theory, multiplicative number theory
. . *Operations*
7W . . . Partition
. . *Relations*
8L . . . Functions
8ND X . . . . Exponential functions
8P2 . . . . Dirichlet functions in analytic number theory
8RJ . . . . Number theoretic functions
8RJ EJK . . . . . Characters
8YG . . . . Zeta functions
93 . . . Forms
93N C . . . . Quadratic forms
93Q X . . . . Modular forms
. . *Elements*
DQ . . . Residues
DQD J8A . . . . Distribution of residue classes
. . *Entities*
EO . . . Series & progressions
EO8 A . . . . Distribution in series and progressions
EQ . . . . Series
EQP 2 . . . . . Dirichlet series in analytic number theory
. . *Subsystems*
FRK G . . . Primes
FRK GLR . . . . Generalized primes
FRK O . . . Transcendental numbers in analytic number theory
WX . Probabilistic number theory
. . *Relations*
WX8 L . . . Functions
WX8 RI . . . . Arithmetic functions

Algebra

Mathematics AM
Mathematical systems AR5
Number theory ARJ
. . Types of number theory by other methods ARN Y
. . . . . Arithmetic functions ARO WX8 RI

ARO Y . . *Other types of number theory*
* Normal synthesis is resumed here after its interruption at ARK YI.
* Add to ARO Y letters J/W from Auxiliary Schedule AM1.

ARQ B Ordered structures
* See also individual systems, e.g. ordered semigroups ARY NP.

D . Ordered spaces
. . *Types by property*
DNA . . . Ordered linear spaces
F . Semilattices
. . *Types by system*
FVJ . . . Topological semilattices

ARR . Lattices
. . *Mathematical presentation*
3KR . . . Word problems
. . *Relations*
9R . . . Generalizations of lattices
9S . . . Representations of lattices
. . *Properties*
AN . . . Lattice properties
AN8 A . . . . Distributivity
AN8 ANT N . . . . . Complete distributivity
. . *Entities*
EB . . . Lattice points
EBA N8A . . . . Distributivity of lattice points
. . *Subsystems*
FRB . . . Sets
FRC NQB . . . . Partially ordered sets
FSM . . . Rings
FSS . . . . Ideals
FTL . . . . Varieties of lattices
. . *Types of lattices*
. . . *By relation*
L9 . . . . Projective lattices
. . . *By property*
NS . . . . Free lattices
NTJ . . . . Complemented lattices
NTN . . . . Complete lattices
OA . . . . Non-commutative lattices
P2 . . . . Dedekind lattices
. . . *By entity*
QX . . . . Modular lattices
QXN TJ . . . . . Complemented modular lattices
. . . *By system*
TS . . . . Geometric lattices
VJ . . . . Topological lattices
X . Partially ordered systems, posets

Mathematics AM
Mathematical systems AR5
Ordered structures ARQ B
. Partially ordered systems ARR X

ARS Algebra
* Regarded primarily as a mathematical method.
* For algebras as mathematical structures see ARX.
. *Types by method*
I2 . . *Elementary*
* For elementary algebra, use ART.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at ART Y.

ART . . Elementary algebra
74P . . . *Algebraic operations*
7J . . . . Addition
7N . . . . Division
. . . *Relations*
8L . . . . Functions
8MY . . . . . Rational functions
8YD . . . . . Determinants
9L . . . . Equations
9L3 A . . . . . Theory of equations
. . . . . *Elements*
9L3 ADT . . . . . Radical theory
. . . . . *Subsystems*
9L3 AFT B . . . . . Matrices in theory of equations
9QY . . . . Proportion
Y . *Types of algebra by other methods*
* Normal synthesis is resumed here after its interruption at ARS I2.
* For differential algebra, see ARW JR.
* Add to ART Y numbers and letters 3/Q following AM6 so far as applicable.
. *Types by methods derived from Systems*
* Add to ART Y letters R/RU following A in AR/ARU.
YRU . . Homological methods
* For homological algebra use ARU.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at ARW J.

ARU . . Homological algebra, homology (algebraic methods)
. . . *Elements*
DJ . . . . Classes
DJL 9 . . . . . Projective classes
E7X . . . . Chain complexes
E7X O2H . . . . . Exact couples
EDY . . . . Projectives
. . . *Entities*
EV . . . . Functors
EVL D . . . . . Derived functors
. . . *Types by relation*
* For Cohomology, Homotopy, etc. see ARV.
. . . *Types by property*
OA . . . . Non-Abelian homological algebra

Semigroups

Mathematics AM
Mathematical systems AR5
Algebra ARS
. Types by methods derived from Systems
. . . Types by property
. . . . Non-Abelian homological algebra ARU OA

. . . *Special types of homological algebra*
* Add to ARV letters K/L following AM in AMK/AML.

ARV K . . . . Cohomology (homological algebra)
K3B . . . . . K-theory (homological algebra)
L . . . . Homotopy (homological algebra)
. . . . . *Elements*
LE7 X . . . . . Chain complexes
LE7 X3A . . . . . Homotopy theory of chain complexes
RX . *Types of algebra by methods from other systems*
* Add to ARV letters RX/W following A in ARX/AW.

ARW J . *Types of algebra by other characteristics*
* Normal synthesis using Auxiliary Schedule is resumed here after its interrruption at ART YRU.
* Add to ARW letters J/W from Auxiliary Schedule AM1 so far as applicable.

JR . . Differential algebra
JR9 ME . . . Differential equations
JR9 MEN G . . . . P-adic differential equations
PL . . Difference algebra

ARX Algebraic systems & structures
ARY . Semigroups
. . *Processes*
8GJ . . . Semigroups with involution
. . *Relations*
8K . . . Mappings of semigroups
9I . . . Congruences of semigroups, congruences on semigroups
9J . . . Equivalence
9S . . . Representations of semigroups
9X . . . Embedding of semigroups
AB . . . Homomorphisms of semigroups
AD . . . . Endomorphisms
. . *Elements*
DM . . . Products
DMN XS . . . . Subdirect product
DQ . . . Residues
DQA N . . . . Residual properties of semigroups
DT . . . Radicals
DT3 A . . . . Radical theory
. . . *Elements resulting from operations etc*
DX9 5 . . . . Semigroups of transformations
. . *Subsystems*
FRB . . . Sets
FRC KF . . . . Generating sets & relations on semigroups

Mathematical systems AR5
Algebraic systems & structures ARX
Semigroups ARY
Subsystems
. Sets ARY FRB
. . Generating sets & relations on semigroups ARY FRC KF

ARY FSB . Subgroups of semigroups
FSS . Ideals of semigroups
. . *By property*
FSS NXY . . . Semigroups with minimal ideals
FTL . Varieties
Types of semigroups
. *By operation*
JL . . Multiplicative semigroups
. *By relation*
LP . . Inverse semigroups, generalized groups
. . . *Relations*
LP9 S . . . . Representations of inverse semigroups
LPA B . . . . Homomorphisms of inverse semigroups
LPA F . . . . . Complexes in inverse semigroups
. . . *Elements resulting from operations etc*
LPD X95 . . . . Inverse semigroups of transformations
LPX . . . Generalized heaps
. *By property*
NA . . Linear semigroups
. . Finite semigroups
NJ . . . Semigroups with finiteness condition
NN . . Regular semigroups
NP . . Ordered semigroups
. . . *Types by property*
NPN A . . . . Linearly ordered semigroups
NPR R . . . . Lattice ordered semigroups
NS . . Free semigroups
. . . *Subsytems*
NSF RCX . . . . Subsets of free semigroups
NUF RCX FRY . . . . . Semigroups of subsets of free semigroups
NXF . . Periodic semigroups
O5 . . Nilpotent semigroups
O6C . . Nil semigroups
O6E . . Idempotent semigroups
O9 . . Commutative semigroups
. *By system*
TB . . Matrix semigroups
VJ . . Topological semigroups
. . . *Elements resulting from operations etc*
. . . . Transformations
VJD X95 . . . . . Topological semigroups of transformations
* See also Topological semigroups of topological spaces AVK VJF RYV J.

Groups

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Semigroups ARY
. . By system
. . . . . Topological semigroups of transformations ARY VJD X95

. . *Special types of semigroups*
ARY X . . . Subsemigroups
. . . . *Subsystems*
XFR R . . . . . Lattices of subsemigroups

ASA Groups
. *Mathematical presentation*
3KR . . Word problems
. *Methods*
68 . . Algorithmic methods in group theory
6RU . . Homological methods in group theory
. *Operations*
7P . . Factorization
7W . . Partition
. *Processes*
8GP . . Splitting of groups
. *Relations*
9K . . Identity relations in groups
9L . . Equations in groups
9R . . Generalizations of groups
9S . . Representation of groups
9S3 A . . . Representation theory of groups
9SL 9 . . . Projective representations
9SQ X . . . Modular representations
9X . . Embedding
9X3 F . . . Embedding theorems in group theory
AC . . Automorphisms
. *Properties*
* For lattice properties, see ASA FRR AN.
BF . . Local properties of groups
BJ . . Finiteness conditions
. *Elements*
DM . . Products
. . . *Types*
DMN N . . . . Regular products
DMN S . . . . Free products
DMN XR . . . . Direct products
DMN XRN TN . . . . . Complete direct products
DX . . *Elements resulting from operations etc*
DXA J . . . Homology of groups
. *Entities*
. . Characters
EJK . . . Group characters
EQ . . Series
EQL D . . . Derived series

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Groups ASA
Entities
. . Derived series ASA EQL D

Subsytems
ASA FRR . Lattices
. . *Properties*
FRR AN . . . Lattice properties
FTL . Varieties of groups
G . *Special subsystems*
* For subgroups, use ASB.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at ASC.
ASB . . Subgroups
. . . *Processes*
86 . . . . Approximation of groups
. . . *Relations*
8J . . . . Relations between subgroups
AD . . . . Endomorphisms
. . . *Elements*
E5 . . . . Conditions for subgroups
E5E 3 . . . . . Maximal conditions for subgroups
E5E 4 . . . . . Minimal conditions
. . . *Entities*
EQM R . . . . Normal series
. . . *Subsystems*
FRR . . . . Lattices of subgroups
FRR ABY . . . . . Lattice isomorphisms
. . . *Types of subgroups*
. . . . *By relation*
LI . . . . . Congruence subgroups
. . . . *By property*
MV . . . . . Semi-simple subgroups
N4H . . . . . Discrete subgroups
NR . . . . . Compact subgroups
NV . . . . . Continuous subgroups
NXX . . . . . Maximal subgroups
O3 . . . . . Solvable subgroups
. . . . *By entities*
QX . . . . . Modular subgroups

Groups

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Groups ASA
Subsytems
. . . . . Modular subgroups ASB QX

ASC *Types of groups*
* Normal synthesis resumed here after its interruption at ASA G.
* Add H/NJ from Auxiliary Schedule AM1.
. *By methods*
I4 . . Classical groups
. *By operations*
JL . . Multiplicative groups
. *By relations*
MC . . Automorphism groups
. . . *Subsystems*
MCF RR . . . . Automorphism groups of lattices
MCF SA . . . . Automorphism group of groups
. . . *Types by property*
MCN K . . . . Infinite automorphism groups
MI . . Holonomy groups
MJ . . Homology groups
MK . . Cohomology groups
ML . . Homotopy groups
. *By property*
MQP . . Fundamental groups
MTP . . Primitive groups
MU . . Simple groups
NJ . . *Finite*
* For finite groups, use ASD
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at ASE.
ASD . . Finite groups
. . . *Operations*
7P . . . . Factorization
. . . *Relations*
9E . . . . Extensions of finite groups
9Q . . . . Complement
9QM R . . . . . Normal complements
9S . . . . Representations of finite groups
9SJ V . . . . . Integral representations
9SN G . . . . . P-adic representations
AC . . . . Automorphisms
AK . . . . Cohomology
. . . *Elements & Entities*
DY . . . . Structure
DYM R . . . . . Normal structure
. . . . Series
EQM R . . . . . Normal series
. . . *Subsystems*
FRI . . . . Arithmetic structures

Mathematical systems AR5
Algebraic systems & structures ARX
Groups ASA
By property
. . Subsystems
. . . Arithmetic structures ASD FRI

. . *Types of finite groups*
. . . *By relation*
ASD MC . . . . Finite automorphism groups
. . . *By property*
MO . . . . Abstract finite groups
. . . . . *Relations*
MO9 S . . . . . Representations
MO9 SNA . . . . . Linear representations
MOA C . . . . . Automorphisms
. . . . . *Subsytems*
MOF SB . . . . . Subgroups
. . . . . *Elements*
MOF SBD M . . . . . Products of subgroups
. . . *By system*
RED . . . . Permutation groups
RED 6RD . . . . . Combinatorial methods
. . . *Special types*
X . . . . Finite P-groups
ASE *Types of groups by other properties*
* Normal synthesis is resumed here after interruption at ASC NJ.
* Add to ASE letters NK/O9 from Auxiliary Schedule AM1.
NK . Infinite groups
. . *Relations*
NK9 S . . . Representations
NK9 SJV . . . . Integral representations
NOJ . Symmetric groups
. . *Subsystem*
NOJ FSB . . . Subgroups of symmetric groups
NP . Ordered groups
. . *Types*
NQB . . . Partially ordered groups
NQL . . . Linearly ordered groups
. . . . *By system*
NQL RR . . . . . Lattice ordered groups
NS . Free groups
NTN . Complete groups
NXF . Periodic groups
NXQ . Cyclic groups
O3 . Solvable groups
. . *Types*
O3L R . . . Generalized solvable groups
. . . . *Elements*
O3L RDT . . . . . Radicals
O3N J . . . Finite solvable groups
O4 . Non-solvable groups
. . *Subsystems*
O4F SB . . . Subgroups of non-solvable groups
O5 . Nilpotent groups

Groups

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Groups ASA
Types of groups by other properties ASE
. Nilpotent groups ASE O5

ASE O9 . Commutative
* For commutative groups use ASF.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at ASG.

ASF . Commutative groups, abelian groups
. . *Methods*
6RU . . . Homological methods
. . *Operations*
7P . . . Factorization
. . *Relations*
8K . . . Mappings of Abelian groups
9E . . . Extensions
AC . . . Automorphisms
AD . . . Endomorphisms
. . *Elements*
DK . . . Sums
DKN XS . . . . Subdirect sums
. . . *Elements resulting from operations etc*
DX9 E . . . . Group of extensions
DXA C . . . . Group of automorphisms
. . *Types of Abelian groups*
. . . *By relation*
L8 . . . . Torsion groups
. . . *By property*
NDT . . . . Mixed Abelian groups
. . . . . *Processes*
NDT 8GP . . . . . Splitting of mixed Abelian groups
NJ . . . . Finite Abelian groups
NR . . . . Compact Abelian groups
NRN F . . . . . Locally compact Abelian groups

ASG *Types of groups by other properties etc*
* Normal synthesis is resumed here after interruption at ASE O9.
* Add to ASG letters OA/VJ from Auxiliary Schedule AM1.

By property
P2 . Grothendieck groups
By system
* For Algebraic groups, see Algebraic geometry ATH

RI . Arithmetic groups
TB . Matrix groups
. . *Subsystems*
TBF SB . . . Subgroups of matrix groups
. . . . *Types*
TBF SBL I . . . . . Congruence subgroups
TS . Geometric groups
VJ . Topology
* For Topological groups, use ASH.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at ASI.

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Groups ASA
Topology ASG VJ

ASH Topological groups
* Groups (e.g. the set of real numbers) which constitute a topological space in which multiplication and inversion are continuous operations.

3A . Topological group theory
. *Relations*
9S . . Representations of topological groups
9X . . Embedding
9X3 F . . . Embedding theorems for topological groups
AB . . Homomorphisms
. *Properties*
BF . . Local properties of topological groups
BJ . . Finiteness
* Including related conditions.
. *Elements*
DM . . Products
. *Subsystems*
FSB . . Subgroups
. *Types of topological groups*
. . *By property*
NR . . . Compact topological groups
NRN F . . . . Locally compact topological groups
. . . . . *Relations*
NRN F9S . . . . . Representations of locally compact topological groups
. . . . . *Properties*
NRN FBX D . . . . . Duality
NRN FBX D3F . . . . . Duality theorems
. . . . . *Elements resulting from operations etc*
NRN FDX AC . . . . . Automorphism groups of locally compact topological groups
. . . . . *Subsystems*
. . . . . Algebras
NRN FFR X . . . . . Group algebras of locally compact topological groups
. . . . . *Relations*
NRN FFR X9S . . . . . Representations
O3 . . . Solvable topological groups
O3L R . . . . Generalized solvable topological groups
O5 . . . Nilpotent topological groups
O5L R . . . . Generalized nilpotent topological groups
O9 . . . Abelian topological groups

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Groups ASA
By system
. . . . Abelian topological groups ASH O9

ASI *Types of groups by other systems*
* Normal synthesis is resumed here after interruption at ASG VJ.
* Add to ASI letters VK/W from Auxiliary Schedule AM1.

Special types of groups
Y . Pseudo-groups
. . *Types of pseudo-groups by property*
YNV . . . Continuous
* For Continuous pseudogroups (Lie groups) use ASJ.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed as ASK Y.
* See also Topological groups ASH.

ASJ . . . Lie groups, continuous pseudo-groups
. . . . *Methods*
6B . . . . . Formal Lie group methods
. . . . *Relations*
8K . . . . . Mappings
. . . . . *Types by element*
8KP N . . . . . Exponential mappings
9S . . . . . Representations
9SN A . . . . . Linear representations
9SN ANJ Y . . . . . Finite dimensional linear representations
AK . . . . . Cohomology
AKN V . . . . . Continuous cohomology
. . . . *Properties*
BXD . . . . . Duality
BXD 3F . . . . . Theorems
. . . . *Subsystems*
FSB . . . . . Subgroups
FSB N4H . . . . . Discrete subgroups
FSB N4H 97 . . . . . Deformations of discrete subgroups
FSB NV . . . . . Continuous subgroups
FTA . . . . . Algebras
FTC . . . . . Lie algebras of Lie groups
. . . . *Types of Lie groups*
. . . . . *By relation*
L5 . . . . . Transformation
* For transformation groups use ASK.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at ASK X.

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Groups ASA
By relation
. Transformation ASJ L5

ASK . Lie transformation groups
. . *Elements & entities*
DP . . . Quotients
ES . . . Invariants
ES7 V . . . . Invariant integration
. . . *Subsytems*
FUA NOG . . . . Homogeneous spaces
FUA NOG NDV . . . . . Symmetric homogeneous spaces
. . *Types of Lie transformation groups*
. . . *By property*
MV . . . . Semisimple Lie groups
. . . . . *Subsystems*
MVF SB . . . . . Subgroups
MVF SBN 4H . . . . . Discrete subgroups of semisimple Lie groups
MVF UAN OG . . . . . Homogeneous spaces of semisimple Lie groups
MVF UAN OGN OJ . . . . . Symmetric homogeneous spaces
N4H . . . . Discrete transformation groups
. . . . . Linear
N4H NA . . . . . Discrete groups of linear fractional transformations
O3 . . . . Solvable Lie groups
. . . . . *Subsystems*
O3F SB . . . . . Subgroups
O3F SBN 4H . . . . . Discrete subgroups of solvable Lie groups
O3F UAN OG . . . . . Homogeneous spaces
O5 . . . . Nilpotent Lie groups
. . . . . *Subsystems*
O5F UAN OG . . . . . Homogeneous spaces of nilpotent Lie groups
X *Lie groups by other relations etc*
* Normal synthesis by Auxiliary Schedule AM1 is resumed here after its interruption at ASJ L5.
* Add to ASK X letters L6/W from Auxiliary Schedule AM1.

By property
XMW . Complex Lie groups
XN3 . Real Lie groups
XNA . Linear Lie groups
XNF . Local Lie groups
XNG . P-adic Lie groups

Rings

Mathematical systems AR5
Algebraic systems & structures ARX
Groups ASA
. . . Pseudo-groups ASI Y
. . . . Types of pseudo-groups by property
. . . . . P-adic Lie groups ASK XNG

ASK XNK . . . . . Infinite Lie groups
XNK FSB . . . . . Subgroups
XNK FSB P2 . . . . . Cartan subgroups
XNR . . . . . Compact Lie groups
XP2 . . . . . Cartan pseudogroups
Y . . . . *Pseudogroups by other properties etc*
* Normal synthesis by Auxiliary Schedule AM1 is resumed here after its interruption at ASI YNV.
* Add to ASK Y letters NW/W from Auxiliary Schedule AM1.

ASL G . . . Groupoids
. . . . *Relations*
G8K . . . . . Mappings of groupoids
. . . . *Types*
GQ8 . . . . . Groupoids with additional structure
Q . . . Quasi-groups
. . . . *Methods*
Q6R UML . . . . . Homotopy of quasi-groups
. . . . *Entities*
QEU Y . . . . . Identities on quasi-groups
S . . . Loops
. . . . *Relations*
S8K . . . . . Mappings of loops

ASM Rings
. *Operations*
7C . . Classification
. . . *Methods*
7C6 RU . . . . Homological classification of rings
. *Processes*
8GJ . . Rings with involution
. *Relations*
9E . . Extensions
9E3 A . . . Extension theory
9K . . Identity relations in rings
9R . . Generalizations of rings
AC . . . Automorphisms of rings
. *Elements*
DXA D . . Rings of endomorphisms
E6 . . Rings with chain conditions
. *Subsystems*
. . Subsets
FRC X . . . Subrings
FRY . . Semigroups
FRY JL . . . Multiplicative semigroups of rings
FTT . . Geometries over rings

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Rings ASM
Subsystems
. Geometries over rings ASM FTT

Types of rings
. *By operation*
ASM JN . . Division rings

. *By property*
MTP . . Primitive rings
N9 . . Polynomial rings
NP . . Ordered rings
NQL . . . Linearly ordered rings
NR . . Compact rings
NRN F . . . Locally compact rings
NUY . . Perfect rings
O7 . . Associative
* For Associative rings, use ASN.
* Normal synthesis by Auxiliary Schedule AM1 is interrrupted here. It is resumed at ASR.

ASN . . Associative rings
. . . *Methods*
6RU . . . . Homological methods
. . . *Relations*
97 . . . . Deformation
973 A . . . . . Deformation theory
9D . . . . Derivation of rings
9E . . . . Extension of rings
9S . . . . Representations of rings
9X . . . . Embedding of rings
AC . . . . Automorphisms
AD . . . . Endomorphisms
AK . . . . Cohomology
AK3 B . . . . . K-theory
. . . *Properties*
BXD . . . . Duality
. . . *Elements*
DC . . . . Domains
. . . . . *Types by element*
DCP RY . . . . . Unique factorization domains
DT . . . . Radicals
E8 . . . . Additional structures
. . . . . *By property*
E8P 2 . . . . . Lie structures on associative rings
E8P 3 . . . . . Jordan structures on associative rings
. . . *Subsystems*
FSA . . . . Groups of rings
FSG P2 . . . . . Grothendieck groups of rings

Rings

Mathematical systems AR5
Algebraic systems & structures ARX
Rings ASM
Associative rings ASN
. Subsystems
. . . Grothendieck groups of rings ASN FSG P2

. *Types of associative rings*
. . *By properties*
ASN MU . . . Simple rings
MUB H . . . . Galois theory of simple rings
N4D . . . Ideal rings
N4D MTL . . . . Principal ideal rings
NJ . . . Finite rings
NJY . . . . Finite dimensional rings
NN . . . Regular rings
NSN 4D . . . Free ideal rings
O5 . . . Nilpotent rings
O6C . . . Nil rings
. . *By elements*
PP . . . Quotient rings
PR . . . Factor rings
PS . . . Prime rings
PSX . . . . Semiprime rings
Q6 . . . *By chain conditions*
Q6P 2 . . . . Artinian rings
Q6P 3 . . . . Non-Artinian rings
Q6P 3MU . . . . . Simple non-Artinian rings
Q6P 4N . . . . Noetherian rings
. . . . . *Subsystems*
Q6P 4NF SS . . . . . Ideals in Noetherian rings
. . *By systems*
RBX . . . *Boolean rings*
* See ARB XFS M
RY . . . Semigroup rings
SA . . . Group rings
SAN J . . . . Group rings of finite groups
SAN K . . . . Group rings of infinite groups
SX . . . Categorical rings
. . . Theory
SX3 A . . . . Categorical ring theory
TB . . . Matrix rings
TBS W . . . . Matrix rings over skew fields
ASO Non-associative rings
. *Elements*
DT3 C . . Radical theory
. *Types by property*
P2 . . Lie rings
P3 . . Jordan rings
P4M . . Mal'cev rings
. *Types by elements*
PN . . Power associative rings

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Rings ASM
Non-associative rings ASO
. . Power associative rings ASO PN

ASP Commutative rings
. *Methods*
6RU . . Homological methods
. *Processes*
8GV . . Valuations on commutative rings
. *Relations*
97 . . Deformations
9E . . Ring extensions
9E3 A . . . Extension theory
. . . . *Operations*
9E7 X . . . . . Ramification
. . . . *Elements*
9ED P . . . . . Quotients
AK . . Cohomology of commutative rings
AK3 B . . . K-theory
. *Properties*
. . *Galois properties*
BH . . . Galois theory
BJ . . . Finiteness
. *Elements*
DT . . Radicals
DT3 A . . . Radical theory
E6 . . Chain conditions
EL . . Polynomials over commutative rings
. *Subsystems*
FRW JR . . Differential algebra
. *Types of commutative rings*
. . *By property*
MN9 K . . . With identity
MN9 KX . . . . Zero rings
MN9 KY . . . . Non-zero rings, integral domains
* See also Division rings, ASM JN
NF . . . Local commutative rings
NJ . . . Finite commutative rings
NN . . . Regular commutative rings
NNN F . . . . Regular local rings
O7 . . . Associative commutative rings
P2 . . . Dedekind rings
. . *By elements*
PN . . . Powers
PNO 7 . . . . Power associative commutative rings
. . *By system*
RI . . . Arithmetic rings
. . . . *By process*
RIK GV . . . . . Valuation rings
. . . . *By property*
RIK GVN 4H . . . . . Discrete valuation rings
. . . . *By entity*
RIQ QPN . . . . . Power series rings
RIQ QPN IB . . . . . Formal power series rings

Algebraic systems & structures

Mathematical systems AR5
Algebraic systems & structures ARX
Rings ASM
By property
. Commutative rings ASP
. . . . . Formal power series rings
ASP RIQ QPN IB

ASQ . Non-commutative rings
. . *By property*
N4D . . . Non-commutative ideal rings
N4D MTL . . . . Non-commutative principal ideal rings
NF . . . Non-commutative local rings
ASR *Types of rings by other properties etc*
* Normal synthesis by Auxiliary Schedule AM1 is resumed here after its interruption at ASM O7.
* Add to ASR letters OB/W from Auxiliary Schedule AM1.
. *By element*
PRY . . Unique factorization rings
ASS . Ideals
. . *Properties*
BJ . . . Finiteness
. . *Types by property*
NS . . . Free ideals
P2 . . . Lie ideals
. . *Types by elements*
PS . . . Prime ideals
AST . Modules
. . Theory
3B . . . Algebraic K-theory
. . *Property*
BXD . . . Duality
. . *Elements*
DT . . . Radicals in modules
. . *Subsystems*
FSP . . . Modules over commutative rings
. . *Types of modules*
. . . *By relations*
L8 . . . . Torsion modules
L9 . . . . Projective modules
LAI . . . . Injective modules
. . . *By property*
NP . . . . Ordered modules
NS . . . . Free modules
NUY . . . . Perfect modules
O7 . . . . Associative modules
. . . . . *Properties*
O7B XD . . . . . Duality
. . . *By elements*
PP . . . . Quotient modules
. . . *By system*
VJ . . . . Topological modules
. . . *Special types of modules*
X . . . . Injective hull
Y . Orders

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Rings ASM
. . . Orders AST Y

ASU S Semifields
. *Types by systems*
SVJ . . Topological semifields

ASV Fields
. *Methods*
6RU . . Homological methods
. *Processes*
8GV . . Valuations
. *Relations*
93 . . Forms
9D . . Derivations in fields
9E . . Extensions
9E8 GV . . . Extensions of valuations to a field extension
. . . *Types of field extensions*
9EM R . . . . Normal extensions
9EN 4F . . . . Transcendental extensions
9EO 2S . . . . Separable extensions
9R . . Generalizations
9R8 GV . . . Generalizations of valuations
9X . . Embedding
. *Properties*
BH . . Galois properties and theory
. . . *Relations*
BH9 E . . . . Galois extensions
BHA K . . . . Galois cohomology
. *Elements*
DJ . . Classes
DJ3 A . . . Class field theory
DJN F3A . . . Local class field theory
DJO A3A . . . Non-Abelian class field theory
EL . . Polynomials
. *Subsystems*
FRW JR . . Differential algebra in fields
FRW PL . . Difference algebra in fields
. *Types of fields*
. . *By properties*
N3 . . . Real fields
N3Y . . . . Formally real fields
NF . . . Local fields
. . . . *Operations*
NF7 X3A . . . . . Ramification theory
. . . . *Relations*
NF9 3 . . . . . Forms over local fields
NF9 E . . . . . Extensions of local fields
. . . . *Properties*
NFB G . . . . . P-adic analysis
NFX . . . Fixed fields
NI . . . Global fields

Categories

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Fields ASV
By properties
. Global fields ASV NI

ASV NJ . Finite fields
. . *Relations*
NJ9 L . . . Equations over a finite field
. . *Properties*
. . *Entities*
NJE L . . . Polynomials over finite field
NJE P . . . Sequences over a finite field
NJE QNA . . . . Linear sequences over a finite field
. . *Subsystems*
NJF RB . . . Sets
NJF RCP L . . . . Difference sets
NJF RCP LNU Y . . . . . Perfect difference sets
NP . Ordered fields
OA . Non-commutative fields
* See Skew fields ASW
By systems
VJ . Topological fields
. . *Processes*
VJ8 GV3 A . . . Valuation theory
. . *Types*
VJN P . . . Ordered topological fields
Special types
. *Number fields*
* See Number theory, ARN RKV
ASW . Skew fields, non-commutative fields
. . *Relations*
9X . . . Embeddings in skew fields
. . . . *Types of embeddings by system*
9XS M . . . . . Rings
9XS MO7 . . . . . Embeddings of associative rings
9XT A . . . . . Algebras
9XT AO7 . . . . . Embeddings of associative algebras
. . *Properties*
BH . . . Galois theory of skew fields
. . *Subsystems*
FSA . . . Groups of a skew field
FSC JL . . . . Multiplicative groups of a skew field
. . *Types by property*
NJY . . . Finite dimensional skew fields

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Fields ASV
. . . . . Finite dimensional skew fields ASW NJY

ASX Categories
3A . Category theory
. *Methods*
6RS . . Categories & algebraic theory
6RU . . . Homological algebra
6RU OA . . . . Non-Abelian homological algebra
6RV L . . . Homotopical algebra
6RV LOA . . . . Non-Abelian homotopical algebra
6TS . . Categories & geometric theory
. *Operations*
7P . . Factorization
. *Relations*
8JT S . . Categories & geometry
9S . . Representations of categories
. *Elements*
DT . . Radicals
E8Y . . Adjunctions
. . . *Types by property*
E8Y NLN . . . . Strong adjunctions
. *Entities*
EV . . Functors
. . . *Properties*
EVB XD . . . . Duality of functors
. . . . *Types by property*
EVN LN . . . . . Strong functors
. *Subsystems*
. . Groups
FSC ML . . . Homotopy groups in categories
. . *Elements special to categories*
G . . . Objects of categories
. . . . *Elements*
GE8 . . . . . Additional structures
GE8 JL . . . . . Multiplicative structures on the objects of categories
. . . . *Types*
GOP . . . . . Simplicial objects
. *Types of categories*
. . *By method*
HXT . . . Inductive categories
. . *By operation*
JJ . . . Additive categories
. . . . *Relations*
JJ8 J . . . . . Additive relations
KJ . . . Categories of relations
KK . . . . Mappings
KKN V . . . . . Categories of continuous mappings
LL . . . . Equational categories

Algebras

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Categories ASX
. . By operation
. . . . Equational categories ASX LL

. . *By property*
ASX NF . . . Local categories
NI . . . Universal categories
O9 . . . Abelian categories
. . . . *Methods*
O96 RU . . . . . Homological algebra in Abelian categories
. . . . *Relations*
O99 S . . . . . Representations
. . . . *Elements*
O9D T . . . . . Radicals in Abelian categories
. . . . *Types by relation*
O9L D . . . . . Derived categories
. . . . *Types by property*
O9O 2H . . . . . Exact categories
P2 . . . . . Grothendieck categories
. . . . *Types by element*
QDV J . . . . . Categories of topological spaces
. . . . . *Subsystems*
QDV JFR B . . . . . Sets
QDV JFR BB5 X . . . . . Baire categories
* Measure of sets in topological space.
Y Vector spaces
* For topological vector spaces, see AWP.
. *Subsystems*
. . Skew fields
YFS W . . . Vector spaces over skew fields
. *Types*
YN8 VB . . Normed spaces

ATA Algebras, linear algebras
* Deal with linear equations, matrices, determinants and other algebraic structures.
* See also Vector spaces ASX Y
. *Methods*
6RI . . Arithmetic in algebras
6RU . . Homological methods
6RV K . . Cohomology of algebras
. . . *Types by property*
6RV KNF . . . . Local cohomology of algebras
6RV L . . Homotopy
. . . *Subsystems*
6RV LFS A . . . . Homotopy groups
. *Relations*
8K . . Linear mappings
95 . . Linear transformations
9L . . Linear equations

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Algebras ATA
Relations
. Linear equations ATA 9L

Elements
ATA DJ . Classes of algebras
. . *Types by property*
DJH L . . . Model classes of algebras
DJM TP . . . Primitive classes of algebras
Entities
ES . Invariants
ES3 A . . Invariant theory
Subsystems
FRI . Arithmetic of algebras
FSX . Categories of algebras
FTL . Varieties of algebras
. *Special to algebras*
G . . Subalgebras

Types of algebras
. *By operation*
JN . . Division algebras
JNP 2 . . . Cayley algebras
. *By property*
MV . . Semi-simple algebras
. . . *Properties*
MVB 9Y . . . . Orders in semisimple algebras
. . . . . *Subsystems*
MVB 9YF RI . . . . . Arithmetic problems of orders
N8H . . Multidimensional algebras
NDQ . . Multilinear algebras
. . . *Relations*
NDQ 93 . . . . Forms
NDQ 93N C . . . . . Quadratic forms
NDQ 93N DP . . . . . Bilinear forms
NI . . Universal algebras
. . . *Mathematical presentation*
NI3 KR . . . . Word problems
. . . *Relations*
NIA C . . . . Automorphism
NIA D . . . . Endomorphisms
. . . *Properties*
NIB R . . . . Compactness
NIB RLL . . . . . Equational compactness
. . . *Entities*
NIE L . . . . Polynomials
. . . *Subsystems*
NIF RR . . . . Lattices related to universal algebras
. . . *Types by property*
NIN LF . . . . Infinitary algebras
NIP 82 . . . . Universal enveloping algebras
NOJ . . Symmetric algebras
NS . . Free algebras

Algebras

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Algebras ATA
By property
. Free algebras ATA NS

ATA O7 . Associative algebras
. . *Relations*
O79 7 . . . Deformation
O79 73A . . . . Deformation theory
. . *Subsystems*
O7F SS . . . Ideals
O7F SSP 2 . . . . Lie ideals of associative algebras
. . *Types by property*
O7N JY . . . Finite dimensional algebras
O7N QR . . . Graded algebras
O7N S . . . Free algebras
O7O 2S . . . Separable algebras
O8 . Non-associative algebras
. . *Types by operation*
O8J N . . . Non-associative division algebras
. . *Types by property*
O8N JY . . . Finite dimensional non-associative algebras
O9 . Commutative algebras
. . *Properties*
O9B J . . . Finiteness conditions
. . *Elements*
O9E 6 . . . Chain conditions in commutative algebras
OCN . Exterior algebras
OCN P2 . . Gassman algebra
P2 . *By named mathematician*
* For Boolean algebra, see ARB X
* For Lie algebras, see ATC
* For Banach algebras, see ATD B
* For Jordan algebras, see ATD J
P4C . . Clifford algebra
P5R . Factor algebras
* See also Factor spaces, AUA PA; Clifford algebra, ATA P4C
Algebras by element
PL . Difference algebras
QH . Vector algebras
QI . Tensor algebras
QU . Operator algebras
* For C* algebra, see ATD BKG J.
QUP 2 . . Neumann algebra, W* algebra
Algebras by system
TS . Geometric algebras
VJ . Topological algebras
VJP 2 . . Hopf algebras
. . . *Methods*
VJP 26R U . . . . Homology of Hopf algebras
VJP 4F . . Frechet algebras

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Algebras ATA
Algebras by system
. . Frechet algebras ATA VJP 4F

Special types of algebras
ATB . Matrix algebras, matrices
3A . . Matrix theory
. . . *Methods*
6E . . . . Iterative analysis
. . *Relations*
. . . Linear mappings
8KN A . . . . Linear mappings & matrices
8YD . . . Determinants
8YD 9R . . . . Generalizations of determinants
. . . Equations
9L . . . . Matrix equations
9N . . . Inequalities
. . . Inversions
9P . . . . Matrix inversion
. . *Subsystems*
FRK F . . . Matrices of integers
FSM . . . Matrices over rings
FSM KL . . . Matrices over function rings
FSR X . . . Matrices over special rings
. . *Types*
OTY . . . Square matrices
. . . . *Other properties*
OTY D8E . . . . . Trace (square matrices)
ATC . Lie algebras
. . *Methods*
6RU . . . Homological methods
. . *Relations*
9D . . . Derivations of Lie algebras
9R . . . Generalizations
9S . . . Representations
. . . . *Types by properties*
9SN JY . . . . . Finite dimensional linear representation of Lie algebras
9X . . . Embeddings of Lie algebras
AC . . . Automorphisms of Lie algebras
AD . . . Endomorphisms of Lie algebras
AJ . . . Homology of Lie algebras
AK . . . Cohomology of Lie algebras
. . *Elements*
DT . . . Radicals of Lie algebras
DX9 D . . . Lie algebras of derivations
. . *Types of Lie algebras*
. . . *By operation*
JN . . . . Division algebras (Lie algebras)
. . . *By property*
MU . . . . Simple Lie algebras
NDL . . . . Binary Lie algebras
NJY . . . . Finite dimensional Lie algebras
NLD . . . . Infinite-dimensional Lie algebras
NQR . . . . Graded Lie algebras

Mathematical systems AR5
Algebraic systems & structures ARX
Algebras ATA
. . . Lie algebras ATC
. . . . . By property
. . . . . Graded Lie algebras ATC NQR

ATC NR . . . . . Compact Lie algebras
O3 . . . . . Solvable Lie algebras
O5 . . . . . Nilpotent Lie algebras
. . . . . *By entities*
QX . . . . . Modular Lie algebras
ATD B . . . Banach algebras
. . . . *Types*
. . . . . With involution
BKG J . . . . . B* algebra, C* algebra
J . . . Jordan algebras
. . . . *Relations*
J9S . . . . . Representations
JAC . . . . . Automorphisms
. . . . *Elements & entities*
JDC . . . . . Domains
. . . . . *Types by property*
JDC N3Y . . . . . Formally real domains
JEU Y . . . . . Identities
. . . . *Types by property*
JMT E . . . . . Exceptional Jordan algebras
JMU . . . . . Simple Jordan algebras
JNL D . . . . . Infinite-dimensional Jordan algebras
JOA . . . . . Non-commutative Jordan algebras

ATG Algebraic geometry
* Alternative (not recommended) is to locate with geometry at AUI TG.
. *Relations*
8YG . . Zeta functions
9V . . Coverings
AK . . Cohomology
. . . *Types by property*
AKM W . . . . Complex cohomology
AKN F . . . . Local cohomology
AKN G . . . . P-adic cohomology
. *Properties*
BF . . Local algebra
BF3 A . . . Local theory
. . . *Relations*
BF9 7 . . . . Deformation
BF9 73A . . . . . Local deformation theory
. *Elements*
E9 . . Connections
ECG . . . Singularities
ECG 97 . . . . Deformations of singularities

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
Algebraic geometry ATG
Elements
. . . Deformations of singularities ATG ECG 97

Types of algebraic geometry
. *By relation*
ATG L9 . . Projective algebraic geometry
. . . *Methods*
L96 . . . . Projective techniques
. *By property*
N2Y . . Birational geometry
. . . *Relations*
N2Y 8K . . . . Mappings
N2Y 8KM Y . . . . . Rational mappings
N2Y 95 . . . . Transformations
N2Y 953 L . . . . Models
N2Y 953 LNX Y . . . . . Birational transformation of minimal models
. . . *Elements*
N2Y ECG . . . . Singularities
. . . . . *Operations*
N2Y ECG 7C . . . . . Classification
. *By system*
RY . . *Semi-groups*
* For algebraic semigroups, use ATG Y
* Normal synthesis by Auxiliary Schedule AM is interrupted here; it is resumed at ATI.
Y . . Algebraic semi-groups in algebraic geometry
ATH . . Algebraic groups in algebraic geometry
. . . *Types*
. . . . *By method*
IB . . . . . Formal groups
. . . . . *Types by property*
IBN G . . . . . P-adic analytic groups
. . . . *By property*
NA . . . . . Linear algebraic groups
. . . . . *Processes*
NA8 6 . . . . . Approximation
NA8 63F . . . . . Approximation theorems
. . . . . *Relations*
. . . . . Representations
NA9 S . . . . . Linear representations
. . . . . *Elements*
NAD X . . . . . *By relation*
. . . . . Transformations
NAD X95 . . . . . Algebraic groups of transformations
. . . . . *Elements*
NAD X95 ES . . . . . Invariants
NAD X95 ES3 A . . . . . Geometric theory of invariants

Algebraic geometry

Algebraic geometry ATG
By system
. Algebraic groups in algebraic geometry ATH
. . . . Linear algebraic groups ATH NA
. . . . . Elements
. . . . . Geometric theory of invariants ATH NAD X95 ES3 A

. . . . . *Subsystems*
ATH NAF SV . . . . . Fields
NAF SVN F . . . . . Algebraic groups over local fields
NAF SVN I . . . . . Algebraic groups over global fields
NAF SVN J . . . . . Algebraic groups over finite fields
NG . . . . P-adic groups
NGN A . . . . . Linear P-adic groups
NLD . . . . Infinite-dimensional algebraic groups
O9 . . . . Commutative algebraic groups
. . . . . *Types by method*
O9I B . . . . . Commutative formal algebraic groups
OA . . . . Non-commutative algebraic groups
. . . . . *Types by method*
OAI B . . . . . Non-commutative formal groups
ATI . *Other algebraic structures*
* Normal synthesis is resumed here after its interruption at ATG RY.
* Add to ATI letters IY/X following AS.
ATJ *By geometric structure*
* Add to ATJ letters T/Y following AT.
* Add to ATK letters A/H following AU.
UU . Algebraic curves
. . *Relations*
UU9 V . . . Coverings
. . *Elements & entities*
UUE CG . . . Singular points of algebraic curves
UUE X . . . Moduli of algebraic curves
. . *Subsystems*
UUF RI . . . Arithmetic problems of algebraic curves
VS . Algebraic surfaces
. . *Elements & entities*
VSD J . . . Classes of algebraic surfaces
VSD J7C . . . . Classification
VSE CG . . . Singular points of algebraic surfaces
VSE X . . . Moduli of algebraic surfaces
. . *Subsystems*
VSF RI . . . Arithmetic problems of algebraic surfaces
VSF SGP 3 . . . Picard groups
. . *Types by property*
VSM Y . . . Rational surfaces
ATK EN Families in algebraic geometry
. *Relations*
EN9 7 . . Deformations
. *Elements*
END Y . . Structure
. *Entities*
ENE S . . Invariants
ENE STS . . . Geometric invariants

Mathematical systems AR5
Algebraic systems & structures ARX
Algebraic geometry ATG
Families in algebraic geometry ATK EN
. Entities
. . . Geometric invariants ATK ENE STS

. *Subsystems*
ATK ENF UA . . Spaces
ENF UAQ X . . . Moduli spaces
. *Types of families by system*
ENT UU . . Families of curves
FF Fibrations in algebraic geometry, algebraic fibrations
FFU EN . Families of fibrations
ATL Varieties, algebraic varieties
. *Methods*
4RL L . . Equational logic
. *Relations*
8YG . . Zeta functions
9I . . Congruence
9IA N8A . . . Distributivity
9ID 6X . . . Modularity
AK . . Cohomology of algebraic varieties
AK3 B . . . K-theory
AKP 2 . . . Grothendiek cohomology
. *Elements*
DMN TE . . Amalgamated product
EB . . . Points
EBM Y . . . . Rational points on algebraic varieties
ECG . . . . Singular points of algebraic varieties
EDY . . Projectives
. *Entities*
EX . . Moduli of algebraic varieties
. *Subsystems*
FRI . . Arithmetic problems of varieties
FRR . . . Lattices of varieties
. *Types of varieties*
MY . . Rational varieties
. . *By named mathematician*
P2 . . . Abelian varieties
* For Abelian varieties, use ATM.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at ATN.
ATM . . . Abelian varieties & schemes
. . . . *Operations*
7M . . . . . Complex multiplication
. . . . *Entities*
EX . . . . . Moduli
. . . . *Subsystems*
FRI . . . . . Arithmetic in Abelian varieties
FSM . . . . . Rings
. . . . . *Elements by relation*
FSM DXA D . . . . . Rings of endomorphisms of Abelian varieties

Algebraic systems & structures ARX
Algebraic geometry ATG
Varieties ATL
. Types of varieties
. . . . . Rings ATM FSM
. . . . . Rings of endomorphisms of Abelian varieties ATM FSM DXA D

ATM FTT . . . . . Geometric structures
FTU UOV . . . . . Elliptic curves in Abelian varieties
. . . . . *Subsystems*
FTU UOV FRI . . . . . Arithmetic in elliptic curves
FUA . . . . . Spaces
FUA NOG . . . . . Homogeneous spaces of Abelian varieties
FUA NOG MTL . . . . . Principal homogeneous spaces of Abelian varieties
ATN . *Other types of varieties*
* Normal synthesis using Auxiliary Schedule AM1 is resumed here, after its interruption at ATL P2.
* Add to ATN letters P3/W in Auxiliary Schedule AM1.
P3 . . Picard varieties
SA . . Group varieties
. *Special types*
ATO B . . Subvarieties
D . . Intersections
. . . *Types by property*
DNT N . . . . Complete intersections
F . . Schemes
. . . *Types by system*
FSA . . . . Group schemes
FSA NJ . . . . . Finite group schemes
ATP . . Cycles & subschemes
. . . *Relations*
9J . . . . Equivalence
9JM Y . . . . . Rational equivalence in cycles
. . . *Elements*
DO . . . . Divisors
. . . *Subsystems*
FSG P3 . . . . Picard groups in cycles
. . . *Types by property*
NA . . . . Linear systems of cycles
. . . . . *Relations*
NA8 K . . . . . Mappings
NA8 KMY . . . . . Linear systems & rational mappings
ATQ Ground fields
. *Types by property*
N3 . . Real ground fields
NF . . Local ground fields
NG . . . P-adic ground fields
NI . . Global ground fields
NJ . . Finite ground fields
. *Types by system*
RI . . Arithmetic ground fields

Mathematics AM
Mathematical systems AR5
Algebraic systems & structures ARX
. . . Ground fields ATQ
. . . . . Arithmetic ground fields ATQ RI

ATQ Y . . . Injectives

ATS Geometry
. *Methods*
62 . . Elementary geometry
* Alternative (not recommended) to locating at AUI 2 (where there is an explanatory note).
6RS . . Algebraic methods in geometry
6RU . . Homological methods
6RV L . . . Homotopy
6RV L3A . . . . Abstract homotopy theory
6W . . Analytic methods in geometry
. *Relations*
9N . . Geometric inequalities
9WI . . Incidence geometry
AC . . Automorphisms
. *Properties*
BOG . . Homogeneous systems
BOJ . . Symmetry
. . *Special properties*
D9H G . . . Similarity in geometry
D9H G3F . . . . Interception theorem
. *Elements*
* For geometric objects and special structures (lines, planes, etc.) see ATT.
DF . . Boundaries
. . *Elements resulting from relations*
. . . Inequalities
DX9 N . . . . Geometry of inequalities
DY . . Structure
* For special structures and subsystems see ATT/AUH.
E9 . . Connections
. . . *By spatial property*
E9O L . . . . Affine connections
E9O M . . . . Conformal connections
. *Subsystems*
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here. Subsystem classmarks (H/W) are added directly to ATS, not to ATS F. Special (enumerated) subsystems follow at ATT. Types of geometry begin at AUH Y. Direct application of Auxiliary Schedule AM1 resumes at AUL.
RB . . Sets (geometry)
* For convex sets, see AUC RB.
. . Groups
SA . . Geometries over groups
SCI 4 . . . Classical groups
SCL WI . . . Incidence groups
SCL WIL 9 . . . . Projective incidence groups
. . Rings

Geometry

Mathematics AM
Mathematical systems AR5
Geometry ATS
Subsystems
. Rings

ATS SM . Geometries over rings
ST . . Modular geometry
. Algebras
TA . Geometries over algebras
. . *Subsystems*
TAF UA . . . Spaces in geometries over algebras
TAF UAN C . . . . Quadratic spaces
TAF UAN CMW . . . . . Complex quadratic spaces
TAF UAP 2 . . . . Hermitian spaces
. . . Manifolds
TAF UG . . . . Geometries with algebraic manifold structure

Special subsystems

ATT . Geometric structures & figures, geometric objects
OP . . Simplicial figures
* The most elementary figure of a given dimension.
. *By dimension*
ATU E . . Points in geometry
F . . . Geometric loci
J . . *One dimensional*
L . . . Lines
M . . . . Straight lines & planes (together)
* For planes alone, see ATV B.
N . . . . . Straight lines
P . . . . . Tangents
R . . . . Geodesics
T . . . . Curves & surfaces
* Treated together.
* For surfaces alone, see ATV S.
TNC . . . . . Second order curves & surfaces
U . . . . . Curves
. . . . . Projection
U99 . . . . . Trace (curve projections)
. . . . . *Types*
. . . . . Generating
UKF . . . . . Peano curves
UW . . . . . Analytic curves
. . . . . *Conics, conic sections*
* See ATV K
W . . . Angles, goniometry
* See also Trigonometry AVE

Mathematics AM
Mathematical systems AR5
Geometry ATS
One dimensional ATU J
. Angles ATU W

ATU Y *Two dimensional*
ATV B . Plane, planes
. . *Types*
. . . *By relation*
BL9 . . . . Projective plane
. . . . . *Subsystems*
BL9 FTU U . . . . . Curves on projective plane
. . . *By property*
BOL . . . . Affine planes, euclidean planes
BOL FTU U . . . . . Curves on affine plane
. . . *By system*
BTT . . . . Plane figures (general)
. . . *Special figures*
D . . . . Faces
F . . . . Polygons
G . . . . . Quadrilaterals
J . . . . Circles & spheres
* For spheres alone, see ATW T.
K . . . . . Conic sections, conics
* Plane sections of a circular surface.
* For cones as solids, see ATW R.
L . . . . . Ellipse
M . . . . . Parabola
N . . . . . Hyperbola
Q . . . . . Circle
R . . . . . Disc
* Area bounded by circumference.
S . Surfaces
* See also Curves and surfaces treated together, ATU T.
. . *Types by property*
SNR . . . Compact surfaces
. . *Types by system*
SW . . . Analytic surfaces
T . . Surface strips
Y *Three dimensional*
ATW B . Solids, bodies
C . . Polyhedra (general)
* See also Polytopes ATY C
COC T . . . Concave polyhedra
COD . . . Convex polyhedra
* Use ATW E.
E . . . Regular polyhedra, platonic solids, convex polyhedra
* See also Convex bodies AUC TWB
F . . . . Tetrahedra
G . . . . Hexahedra, cubes, cuboids
H . . . . Dodecahedra
I . . . . Octahedra
J . . . . Icosahedra

Mathematical systems AR5
Geometry ATS
By dimension
. Three dimensional ATV Y
. . . . Regular polyhedra ATW E
. . . . . Icosahedra ATW J

. . . . *Special types*
* Reflecting a mixture of characteristics of division.
* Documents dealing jointly with any two types should be classed under the first one appearing, e.g. pyramids and cones would go under pyramids.

ATW P . . . . . Prisms
Q . . . . . Pyramids
R . . . . . Cones
S . . . . . Cylinders
T . . . . . Spheres, balls
V . . . . . Others (A/Z)
* E.g. solids of rotation.
. . . . . *Polytopes*
* See ATY C

ATX . Four dimensional structures, n-dimensional structures, multidimensional structures
MW . . Complexes
MWO P . . . Simplicial complexes
MWX . . . Cell complexes
MWY . . . . CW-complexes
MX . . Almost complex structures
ATY C . . Polytopes
V Neighbourhoods

AUA Spaces in geometry
* These normally imply 3-dimensional or higher dimensional entities, but not necessarily (e.g. in topology).
. *Types*
. . *By method*
I4 . . . Classical spaces
. . *By operation*
JC . . . Classifying spaces
. . *By relation*
L9 . . . Projective spaces
* See also Affine and projective spaces together AUA OKY.
. . *By property*
MR . . . Normal spaces
N4Q . . . Absolute spaces
N6Y . . . Spaces of dimension less than or equal to one
N8H . . . N-dimensional spaces, multidimensional spaces
NC . . . Quadratic spaces
NOG . . . Homogeneous spaces
OEP . . . Spaces with parallelism
OEP N4Q . . . . Spaces with absolute parallelism
OF . . . Biaxial spaces
OJ . . . Non-Euclidean spaces

Mathematics AM
Mathematical systems AR5
Geometry ATS
Spaces in geometry AUA
. . By property
. . . Non-Euclidean spaces AUA OJ

AUA OKY . . . Affine & projective spaces
. . . . *Relations*
OKY 8K . . . . . Mappings of affine & projective spaces
. . . . *Subsystems*
OKY FTA . . . . . Affine & projective spaces over algebras
OL . . . . Affine spaces
OM . . . Conformal spaces
OMX . . . . Pseudo-conformal spaces
OS . . . Kinematic spaces
P2 . . . Eilenberg-Maclane spaces
. . *By element*
PA . . . Spaces with elements, factor spaces
PAN A . . . . Spaces of linear elements
PP . . . . Quotient spaces
Q9 . . . . Spaces with a connection
Q9O I . . . . . Spaces with a Euclidean connection
Q9O M . . . . . Spaces with a conformal connection
QH . . . . Vector spaces
* Use ASX Y.
. . *By system*
SLS . . . Loop spaces
SW . . . *Analytic spaces*
* See Topology AVL
. . *Special types*
AUB A . . . Retract spaces
B . . . . Neighbourhood retract spaces
C . . . Extensor spaces
D . . . . Neighbouring extensor spaces
DN4 Q . . . . . Absolute neighbouring extensor spaces
E . . . H-spaces
F Subspaces
. *Subsystems*
FFR R . . Lattices of subspaces
H *Geometric structures by other characteristics*
* For structures by dimension, see ATU.
* Add to AUB letters H/OD from Auxiliary Schedule AM1.
NLH . Infinitesimal structures
NP . Ordered structures
OCT . Concave structures
. . *Types by system*
OCT TYC . . . Concave polytopes
OD . *Convex*
* For convex structure, use AUC.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AUD OE.

Geometry

Mathematics AM
Mathematical systems AR5
Geometry ATS
Geometric structures by other characteristics AUB H
. Convex AUB OD

AUC . Convex structures
3A . . Convex structures theory
. . *Relations*
9N . . . Inequalities
* See also Extremum problems AUC E2.
9V . . . Covering
. . *Properties*
CD . . . Convexity
CDO X . . . . Hyperbolic convexity
. . *Elements*
DF . . . Boundary
* For Convex surfaces see AUC TVS.
E2 . . . Extrema
. . *Types of convex structures by system*
. . . Sets
RB . . . . Convex sets
RBE S . . . . . Invariants of convex sets
. . . Geometry
TUU . . . . Convex curves
TVF . . . . Convex polygons
TVS . . . . Convex surfaces
TWB . . . . Convex bodies
* See also Solid bodies ATW B; Solid geometry AUI 2FT WB
. . . . . *Subsystems*
TWB FRR . . . . . Lattices & convex bodies
TYC . . . . Convex polytopes
AUD OE *Geometric structures by other characteristics*
* Normal synthesis is resumed here after its interruption at AUB OD.
* Add to AUD letters OE/W form Auxiliary Sxhedule AM1.
OEP . Structures with parallelism
RD . Combinatorial structures in geometry
AUE G G-structures
. *Types by element/entity*
GPM . . Product G-structures
GPM X . . Almost product G-structures
. *Types by system*
GRK R . . Quaternion G-structures
GRK RX . . Almost quaternion G-structures

Mathematics AM
Mathematical systems AR5
Geometry ATS
G-structures AUE G
. . Almost quaternion G-structures
AUE GRK RX

Associations of structures
* For loops, see Groups, ASL S.
AUE J . Configurations
K . . Figure arrangements
L . . Blocks
N . Families
P . Bundles
* For Fibre and block bundles, see Fibre bundles AUF D.
Q . . Microbundles
S . Sheaves
AUF B . Fibres
C . . Fibre spaces
D . . Fibre bundles
. . . *By entity*
DQH . . . . Vector bundles
E . . . Block bundles
F . Fibrations
H . Foliations
J . Maps
. . *Types by property*
JNL RMX . . . Almost open maps
M . Nets & webs together
N . . Nets
P . . Webs
. . . *Methods*
P6R S . . . . Algebraic questions
Q . Knots & links

AUG . Manifolds
* See also Topology of manifolds AVO G.
. . *Types*
. . . *By operation*
JS . . . . Differentiable manifolds
. . . *By relations*
LR . . . . Generalized manifolds
. . . *By property*
OQB . . . . Riemannian spaces
. . . . . *Relations*
OQB 8KO M . . . . . Conformal mappings
. . . . . *Subsystems*
OQB FUA PA . . . . . Spaces with elements
OQB FUA PAN A . . . . . Spaces with linear elements
. . . . . *Types by elements*
OQB FUA PAN AQ9 . . . . . Spaces with linear elements with a connection

Geometries

Geometry ATS
Special subsystems
. . Manifolds AUG
. . . . By property
. . . . . Subsystems
. . . . . Spaces with linear elements with a connection
AUG OQB FUA PAN AQ9

. . . . . *Types of Riemannian spaces*
AUG OQB NTN . . . . . Complete Riemannian spaces
. . . . *By system*
TX . . . . . Complex structures
TXM W . . . . . Manifolds with complex structures
. . . . . *Elements*
TXM WE9 . . . . . Connections on manifolds with complex structures
UEG . . . . . Manifolds with G-structures
. . . . . *Relations*
UEG AC . . . . . Automorphisms of manifolds with G-structures
AUH B . . . . Submanifolds
. . . . . *Types by property*
BQC R . . . . . Critical submanifolds
S . . Spectral sequences
. . . *Types by property*
SP2 . . . . Eilenberg-Maclane spectral sequences
Types of geometry

Y Geometries
* The interruption of normal synthesis which began at ATS F is continued here. Synthesis by Auxiliary Schedule AM1 is resumed at AUL.
* Add to AUH Y numbers and letters following H in Auxiliary Schedule AM1 (introducing classes AM3/AM5).
AUI . *By method*
* Add to AUI numbers and letters 2/W following I in Auxiliary Schedule AM1 (introducing classes AM6 2/AM6 W).
2 . . Elementary geometry
* Theoretically, all the special structures, etc. at ATT/AUH could appear here, qualifying elementary geometry by normal retroactive synthesis. But in pratice most of them are seldom, if ever, considered at this level. Class here only those works which reflect truly elementary geometry in method.
* An alternative (not recommended) is to locate only general works on elementary geometry at ATS 62 and distribute the subclasses under the objects, etc. concerned (e.g. plane geometry under Planes).
. . . *Operations*
27D . . . . Constructions
27D 3A . . . . . Theory of geometric constructions

Mathematical systems AR5
Geometry ATS
Geometries AUH Y
Elementary geometry AUI 2
. Operations
. . . Theory of geometric constructions AUI 27D 3A

. *Subsystems*
AUI 2FT UW . . Angles
* For Trigonometry, see AVE.
. . Planes
2FT VB . . . Plane geometry
2FT VQ . . . . Circle geometry
. . Solids
2FT WB . . . Solid geometry
. . . . Spheres
2FT WT . . . . . Spherical geometry
2FU A . . Spaces
2FU AN8 H . . . Elementary geometry in multidimensional spaces
4 Classical geometry, euclidean geometry
* For Non-Euclidean geometries, see AVB OJ.
. *Relations*
49I . . Congruence
. *Subsystems*
4FU AOI . . Euclidean spaces
. . . *Relations*
4FU AOI 9X . . . . Embedding
. *Types*
4OI . . Euclidean geometries
4OK . . Pseudo-Euclidean geometries
. . . *Subsystems*
4OK FUA . . . . Pseudo-Euclidean spaces
5 Non-classical geometry (general)
6 Descriptive geometry
. *Subsystems*
6FT UT . . Descriptive geometry of curves & surfaces
. . . *Processes*
6FT UT8 F . . . . Generation
. . . . . *Types by property*
6FT UT8 FOS . . . . . Kinematic generation
6FU AOJ . . Descriptive geometry of Non-Euclidean spaces
. *Types of descriptive geometry*
. . *By property*
6MO . . . Abstract descriptive geometry
6N8 H . . . Multidimensional descriptive geometry
6NB . . . Non-linear descriptive geometry
6OK Y . . . Affine & projective descriptive geometry
QX Modular geometry
RD Combinatorial geometry
TG Algebraic geometry
* Alternative (not recommended) for libraries wishing to locate this under geometry. It is preferred under algebra, at ATG.
* If this option is taken, proceed as follows: Add to AUI T letters G/Q following AT at ATG/ATQ.

Geometries

Mathematics AM
Mathematical systems AR5
Geometry ATS
Geometries AUH Y
By method AUI
. Algebraic geometry AUI TG

AUI W . Analytic methods
* For Analytic geometry, use AUJ. Normal synthesis is interruptedd here; it is resumed at AUL.

AUJ . Analytic geometry
. . *Subsystems*
FTL . . . Analytic geometry of algebraic varieties
FTL NA . . . . Analytic geometry of linear varieties
FTU T . . . Analytic geometry of curves & surfaces
FTU UNC . . . . Curves of second order
FTU URX . . . Algebraic curves
FTU URX NDH . . . . Algebraic curves of higher order
FTV B . . . Planes
FTV BOI . . . . Analytic geometry in the Euclidean plane
FUA . . . Space
FUA OI . . . . Euclidean
* For Euclidean spaces, use AUK. Normal synthesis is interrupted here; it is resumed at AUK X.

AUK . . . . Euclidean spaces
. . . . . *Subsystems*
FTU N . . . . . Analytic geometry of straight lines
. . . . . *Types of Euclidean spaces*
N8F . . . . . Three dimensional Euclidean spaces
. . . . . *Subsystems*
N8F FTU N . . . . . Straight lines
N8F FTV B . . . . . Planes
N8F FTV S . . . . . Surfaces
N8F FTV SNC . . . . . Surfaces of second order
N8H . . . . . Analytic geometry of multidimensional Euclidean spaces
X . . *Other subsystems in analytic spaces*
* Normal synthesis is resumed here after its interruption at AUJ FUA OI.
* Add to AUK X letters UAO J/W in Auxiliary Schedule AM1.
Y . . *Types of analytic geometry*
. . . *By system*
YTV B . . . . Plane analytic geometries
YTW B . . . . Solid analytic geometries

AUL *Geometries by other methods, operations*
* Normal synthesis is resumed here after its original interruption at ATS F and continued interruption at AUH Y/AUK.

Mathematics AM
Mathematical systems AR5
Geometry ATS
Geometries AUH Y
Geometries by other methods, operations AUL

* Add to AUL letters J7/JR from Auxiliary Schedule AM1.

AUL JR . Differentiation
* For differential geometry, use AUM.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AUW.

AUM . Differential geometry
. . *Methods*
64 . . . Classical differential geometry
. . . . *Subsystems*
64F TUL . . . . . Differential line geometry
6RS . . . Algebraic methods
6RS EI . . . . Tensor algebra
. . . . . *Elements*
6RS EIE S . . . . . Invariants & concomitants of tensors
6W . . . Analytic methods
* See also Vector analysis AUM EH; Tensor analysis AUM EI.
. . *Relations*
8K . . . Mappings
93 . . . Forms
93O CN . . . . Exterior forms
. . . . . *Methods*
93O CN6 W . . . . . Calculus of exterior forms
. . . . . *Relations*
93O CN6 W9M E . . . . . Differential equations
. . . . . *Relations*
93O CN6 W9M E9E . . . . . Extensions of systems of differential equations
. . . . . *Subsystems*
93O CN6 WFT A . . . . . Differential algebras
. . . . . *Types*
93O CNJ R . . . . . Exterior differential forms
. . *Entities*
EH . . . Vectors & vector analysis
. . . . *Subsystems*
EHF UA . . . . . Spaces
EHF UAQ 9 . . . . . Spaces with a connection
EHY . . . Spinors, spinor analysis
. . . . *By system*
EHY RS . . . . . Spinor algebra
. . . Tensors
EI . . . . Tensor analysis, absolute differential calculus
* See also Differential calculus AW7 2.

Differential geometry

Mathematical systems AR5
Geometry ATS
Geometries AUH Y
Differential geometry AUM
Entities
. . Tensor analysis, absolute differential calculus AUM EI

. . . *Entities*
. . . . Invariants
AUM EIE S . . . . . Differential invariants & concomitants of tensors
. . . *By system*
EIR S . . . . Tensor algebra

Subsystems of differential geometry
FTA . Differential algebras

FTT . Geometric structures
. . *Relations*
FTT 9E . . . Extensions of geometric objects
. . . *Types by operation*
FTT JR . . . . Differential geometric objects
. . . . . *Relations*
FTT JR9 S . . . . . Representions of differential geometric objects
FTU U . . Curves in differential geometry
FTV S . . Surfaces
FTV SNX Y . . . Minimal surfaces
FUA . . Spaces
* For spaces in differential geometry, use AUN
* Normal synthesis using Auxiliary Schedule AM1 is interrupted here; it is resumed at AUO.

AUN . . Spaces in differential geometry
. . . *Types by property*
NA . . . . Linear spaces
. . . . . *Subsystems*
NAF SA . . . . . Groups
NAF SCM QP . . . . . Linear spaces with fundamental groups
OF . . . . Biaxial spaces
* Differential geometry in biaxial spaces.
. . . . . *Subsystems*
OFF TUM . . . . . Straight lines & planes
OFF TUM UEN . . . . . Families of straight lines & planes
OFF TUM UEN 3A . . . . . Theory of families of straight lines & planes
OFF TUU . . . . . Curves
OFF TVS . . . . . Surfaces

Geometry ATS
Geometries AUH Y
Differential geometry AUM
Spaces in differential geometry AUN
Biaxial spaces AUN OF
. . Surfaces AUN OFF TVS

AUN OI Euclidean spaces
. *Relations*
OI8 K . . Mappings
OI8 KQB . . . Pointwise mappings of Euclidean spaces
. *Subsystems*
OIF TUM . . Straight lines & planes
OIF TUM UEN . . . Families of straight lines & planes
OIF TUT . . Curves & surfaces
. . . *Types by property*
OIF TUT NN . . . . Regular curves & surfaces
OIF TUT NOB . . . . . Non-regular curves & surfaces
OIF TUT UEN . . . . . Families of curves & surfaces
OIF TUU . . . . . Curves
OIF TUU N8D . . . . . Plane curves
OIF TVS . . . . . Surfaces
OIF TVT . . . . . Surface strips
OIF UFM . . Nets & webs
. . . Surfaces
OIF UFM FTV S . . . . Nets & webs on surfaces in Euclidean space
. *Types*
OIN 8H . . Euclidean N-space
. . . *Subsystems*
OIN 8HF TVS . . . . Surfaces
OIN 8HF TVS N8H . . . . . Higher dimension surfaces in Euclidean space
OJ Non-Euclidean spaces
. *Subsystems*
OJF TUM . . Straight lines & planes
OJF TUM UEN . . . Families of straight lines & planes
OJF TUT . . Curves & surfaces
OJF TUT UEN . . . Families of curves & surfaces
OJF TUU . . Curves
OJF TVT . . Surface strips
OK Pseudo-Euclidean spaces
. *Relations*
OK8 K . . Mappings
OK8 KQB . . . Pointwise mappings of pseudo-Euclidean space
. *Subsystems*
OKF TUU . . Curves
OM Conformal spaces in differential geometry
. *Relations*
OM8 K . . Mappings
OM8 KQB . . . Pointwise mappings of conformal spaces
OM8 KQB NXD . . . . Dual pointwise mappings of conformal spaces

Differential geometry

Differential geometry AUM

Subsystems of differential geometry
. . . Types by property
. . . . Conformal spaces in differential geometry AUN OM
. . . . . Relations
. . . . Dual pointwise mappings of conformal spaces AUN OM8 KQB NXD

. . . . . *Subsystems*
AUN OMF TUU . . . . . Curves
OMF TUU 3A . . . . . Conformal theory of curves
OMF TVJ . . . . . Circles & spheres
OMF TVJ UEN . . . . . Families of circles & spheres
OMF TVT . . . . . Surface strips
OMF TVT 3A . . . . . Conformal theory of surface strips
OP . . . . Symplectic spaces
. . . . . *Subsystems*
OPF TUM . . . . . Straight lines & planes
OPF TUM UEN . . . . . Families of straight lines & planes
OPF TUM UEN 3A . . . . . Symplectic theory of families of straight lines & planes
OPF TUU . . . . . Curves
OPF TUU 3A . . . . . Symplectic theory of curves
OPF TVS . . . . . Surfaces
OPF TVS 3A . . . . . Symplectic theory of surfaces
. . . *Types of spaces by elements & systems*
PA . . . . Spaces of elements
PAN A . . . . . Spaces of linear elements
SA . . . . . Groups
SCM QP . . . . . Spaces with fundamental groups

AUO *Other subsystems in differential geometry*
* Normal synthesis resumed after interruption at AUM FUA.
* Add to AUO letters B/G following AU in AUB/AUG.
. Webs
FP . . Geometry of webs
. . . *Subsystems*
FPF SH . . . . Topological groups
FPF SHJ R . . . . . Differential topological groups

Mathematical systems AR5
Geometry ATS
Geometries AUH Y
Differential geometry AUM
Webs
. . . . Differential topological groups AUO FPF SHJ R

AUO G Manifolds in differential geometry
* See also Differential topology of manifolds AVQ.

. *Types by operation*
GJS . . Differentiable
* For Differentiable manifolds use AUP.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AUT (for other types of manifolds) and at AUU Y (for other subsystems in differential geometry).

AUP . . Differentiable manifolds in differential geometry, smooth manifolds in differential geometry
* See also Lie groups, ASJ; Smooth manifolds, AVO GNM Riemannian geometries AVD ONJ RP2.
. . . *Methods*
6Y . . . . Calculus of variations
. . . *Relations*
93 . . . . Forms
93O CN . . . . . Exterior differential forms on manifolds
9L . . . . Equations
9MG . . . . . Geometry of partial differential equations
. . . *Properties*
BF . . . . Local properties
. . . *Elements*
DW . . . . Geometry of the integral
. . . *Subsystems*
FSV . . . . Fields on manifolds
FSV 9E . . . . . Extensions of fields on manifolds
. . . . Spaces
FUA . . . . Manifolds by underlying spaces
. . . . . *Types by method*
FUA I4 . . . . . *Classical*
* For classical spaces, use AUQ.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AUR I5 (for other underlying spaces) and at AUS (for other subsystems in differentiable manifolds).
AUQ . . . . . Classical spaces (manifolds)
. . . . . *Types by relation*
L9 . . . . . Projective Euclidean spaces
. . . . . *Types by property*
OQB . . . . . Riemannian spaces
. . . . . *Relations*
OQB 8K . . . . . Mappings of Riemannian spaces

Differential geometry AUM
Manifolds in differential geometry AUO G
Types by method
. . Types by property
. . . . Relations
. . . . . Mappings of Riemannian spaces AUQ OQB 8K

. . . . *Subsystems*
AUQ OQB FSC MI . . . . . Holonomy groups of Riemannian spaces
OQB FTT . . . . . Objects in Riemannian spaces
OQB FTT O2J . . . . . Invariant objects in Riemannian spaces
OQB FUG . . . . . Riemannian manifolds
OQB FUH B . . . . . Submanifolds of Riemannian spaces
OQB FUH BFT UU . . . . . Curves
OQB FUH BP2 . . . . . Einstein spaces
. . . . *Types of Riemannian spaces*
OQB NOJ . . . . . Symmetric Riemannian spaces
OQD . . . . . Pseudo-Riemannian spaces
. . *Types of classical spaces by element*
Q9 . . . Classical spaces with connections
Q9L 9 . . . . Spaces with a projective connection
Q9O K . . . . Spaces with a pseudo-Euclidean connection
Q9O L . . . . Spaces with an affine connection
. . . . . *Relations*
Q9O L8K . . . . . Mappings
Q9O L8K OCP . . . . . Geodesic mappings
. . . . . *Types by property*
Q9O LNO J . . . . . Symmetric classical spaces with affine connection
Q9O P . . . . Spaces with a symplectic connection

AUR I5 *Underlying spaces by other methods operations etc*
* Normal synthesis is resumed here after interruption at AUP FUA I4.
* Add to AUR letters I5/Q from Auxiliary Schedule AM1 and R/W following A in AR/AW.

NOG . Homogeneous spaces
. . *Elements*
NOG E9 . . . Connections in homogeneous space
NOG E9O 2J . . . . Invariant connections in homogeneous spaces
. . *Subsystems*
NOG FSC MI . . . Holonomy groups of homogeneous spaces
NOG FUB NLH . . . Infinitesimal structure
NOG FUB NLH O2J . . . . Invariant infinitesimal structures in homogeneous spaces

Differential geometry AUM
Manifolds in differential geometry AUO G
Subsystems
. . Underlying spaces by other methods operations etc AUR I5
. . . . Subsystems
. . . . . Invariant infinitesimal structures in homogeneous spaces AUR NOG FUB NLH O2J

. . . . *Types by relation*
AUR NOG LWM . . . . . Manifolds immersed in homogeneous spaces
. . *By elements*
. . . Linear elements
PAN A . . . . Differentiable manifolds in spaces with linear elements
. . . . . *Elements*
PAN AE8 . . . . . Additional structures in general
. . . . . *Subsystems*
PAN AFU BNL H . . . . . Infinitesimal structures in a space of linear elements
PAN AFU HB . . . . . Submanifolds in spaces of linear elements

AUS *Other subsystems of differentiable manifolds*
* Normal synthesis is resumed after interruption at AUP FUA I4.
* Add to AUS letters BA/L following AU and letters UM/W following A.

EG . G-structures on differentiable manifolds
. . *Types by property*
EGO P . . . Symplectic G-structures
EP . Bundles
EPT UP . . Tangent bundles
FC . Fibre spaces
. . *Elements*
FCE 9 . . . Connections in fibre spaces
. . . . *Types by operation*
FCE 9L9 . . . . . Projective connections
FCE 9NA . . . . . Linear connections
FCE 9NB . . . . . Non-linear connections
. . *Subsystems*
FCF SA . . . Groups
FCF SCM I . . . . Holonomy groups of fibre spaces
FCF TT . . . Geometric objects
FCF TTF SV . . . . Fields of geometric objects in fibre spaces
FCF UHB . . . Submanifolds in fibre spaces
FF . Fibrations on manifolds
FH . Foliations on manifolds
. . *Subsytems*
FHF UA . . . Spaces
FHF UA7 C . . . . Classifying spaces for foliations on manifolds

Differential geometry

Geometries AUH Y
Differential geometry AUM
Manifolds in differential geometry AUO G
Types by operation
. . Other subsystems of differentiable manifolds AUS
. . . . . Classifying spaces for foliations on manifolds AUS FHF UA7 C

AUS X . . *Types of differentiable manifolds*
* Normal synthesis resumed here after interruptions beginning at AUP FUA I4.
* Add to AUS X letters H/W from Auxiliary Schedule AM1.

AUT *Types of manifolds by other operations etc*
* Other than differentiable.
* Normal synthesis is resumed here after interruption at AUO GJU.
* Add to AUT letters JV/Q from Auxiliary Schedule AM1 and R/W following A in AR/AW.

MIX . Non-holonomic manifolds
. . *Subsystems*
MIX FUA OI . . . Euclidean space
MIX FUA OJ . . . Non-Euclidean space
MIX FUA OK . . . Pseudo-Euclidean space
Types of manifolds by system
TXM W . Complex structures
* For manifolds with complex structures, use AUU. Normal synthesis is interrupted here; it is resumed at AUU X.

AUU . Manifolds with complex structures
LWM . . Immersed manifolds
. . . *Subsystems*
LWM FTT . . . . Geometric objects
LWM FTT MQP . . . . . Fundamental objects
LWM FTT OCH . . . . . Geometric objects invariantly connected to immersed manifold
OO . . Metrizable manifolds
. . . *Subsystems*
OOF TUR . . . . Geodesics
OOF UHY . . . . Geometries
OOF UIP 2 . . . . . Minkowski geometries
P2 . . Hermitian manifolds
P3 . . Kahler manifolds
X *Types of manifolds by other characteristics*
* Normal synthesis is resumed here after its interruption at AUT TXM W.
* Add to AUU X letters TYF/W in Auxiliary Schedule AM1.

XUH B . Submanifolds in differential geometry
. . *Subsystems*
XUH BFT UT . . . Curves & surfaces
. . *Types by property*
XUH BNO B . . . Non-regular submanifolds

Mathematical systems AR5
Geometry ATS
Geometries AUH Y
Geometries by other methods, operations AUL
. . Other subsystems in differential geometry AUO
. . . . . Non-regular submanifolds AUU XUH BNO B

AUU Y . . *Other subsystems in differential geometry*
* Normal synthesis is resumed here after interruption at AUP.
* Add to AUV letters UH/W following A.

AUV . . *Types of differential geometry*
* See also Projective differential geometry AUX JR; % Intrinsic differential geometry AVB MS; Affine differential geometry AVC OL; Metric differential geometry AVD ON.
. . . *By operation*
J7 . . . . Synthetic differential geometry
. . . *By property*
NF . . . . Local differential geometry
. . . . . *Properties*
NFC CR . . . . . Curvature
NFC N . . . . . Metrics
NFC NP2 . . . . . Lorentz metrics
. . . . . *Subsystem*
NFF UHB . . . . . Local submanifolds
NI . . . . Global differential geometry, integral geometry
. . . . . *Properties*
NIC CR . . . . . Curvature
. . . . . *Subsystems*
NIF TUR . . . . . Geodesics
NIF TUU . . . . . Curves
NIF TUU NXY . . . . . Minimal curves
NIF UA . . . . . Spaces
NIF UAN OJ . . . . . Symmetric spaces
NIF UFC . . . . . Fibre spaces
NIF UG . . . . . Manifolds
NIF UGP 2 . . . . . Lorentz manifolds
NIF UHB . . . . . Submanifolds in the large

AUW *Types of geometries by other operations etc*
* Normal synthesis is resumed here after interruption at AUL JR.
* Add to AUW letters JV/L8 from Auxiliary Schedule AM1 (i.e. specifiers drawn from AM7V/98).

JV . Integration
* For Integral geometry, see Global differential geometry AUV NI.

L9 . Projection
* For Projective geometry, use AUX.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AUY.

Geometries

Mathematics AM
Mathematical systems AR5
Geometry ATS
Geometries AUH Y
Types of geometries by other operations etc AUW
. Projection AUW L9

AUX . Projective geometry
. . *Methods*
6RS . . . Algebraic theory of projective geometries
. . *Relations*
9HE . . . Geometry of projective correspondences
. . *Subsystems*
FRR . . . Lattices
FRR 3A . . . . Lattice theory
FTL . . . Algebraic varieties
FTL NA . . . . Geometry of linear varieties
. . . Spaces
FUA . . . . Projective spaces
. . . . . *Subsystems*
FUA FTO B . . . . . Algebraic subvarieties
. . . . . Geometries
FUA FUJ . . . . . Analytic geometry in projective spaces
FUA FUL J7 . . . . . Synthetic geometry in projective spaces
. . . . . *Types of projective spaces*
FUA NJ . . . . . Finite projective spaces
. . . . . *Subsystems*
FUA NJF RD . . . . . Combinatorial structures in finite projective spaces
FUE J . . . . Configurations
. . *Types of projective geometry by method*
IW . . . Analytic projective geometry
. . *Types by operation*
JR . . . Differential projective geometry
. . . . *Subsystems*
JRF TUM . . . . . Straight lines & planes
JRF TUM UEN . . . . . Families of straight lines & planes
JRF TUT . . . . . Curves & surfaces
JRF TUT UEN . . . . . Families of curves & surfaces
JRF TUU . . . . . Curves
JRF TVS . . . . . Surfaces
JRF TVT . . . . . Surface strips
JRF UG . . . . . Manifolds
JRF UGM IX . . . . . Non-holonomic manifolds

AUY *Types of geometries by other relations*
* Normal synthesis by Auxiliary Schedule AM1 is resumed here after its interruption at AUW L9.
* Add to AUY letters LAD/NA from Auxiliary Schedule AM1 (i.e. specifiers drawn from 9AD/ANA).

Mathematics AM
Mathematical systems AR5
Geometry ATS
Geometries AUH Y
Types of geometries by other relations AUY

Types by property
AUY MO . Abstract geometries
MOO EP . . Abstract geometries with parallelism
MS . Intrinsic geometry
. . *Subsystems*
MSF TVS . . . Intrinsic geometry of surfaces
. . *Types by operation*
MSJ R . . . Intrinsic differential geometry
NA . Linear geometry
. . *Types by relation*
NAL WI . . . *Incidence*
* For linear incidence geometry, use AVA.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AVA X.

AVA . . . Linear incidence geometry
. . . . *Relations*
AC . . . . . Automorphism in linear incidence geometry
. . . . *Properties*
BXD . . . . . Duality
. . . . *Subsystems*
FUD OEP . . . . . Structures with parallelism
FUE J . . . . . Configurations
FUE J3F . . . . . Configuration theorems
. . . *Types by property*
P2 . . . . Lie geometries
. . . . . *Subsystems*
P2F TWT . . . . . Lie geometries of spheres
X . . *Other types of linear geometry*
* This resumes normal synthesis after the interruption at AUY NAL WI.
* Add to AVA X letters LWM/W from Auxiliary Schedule AM1.

AVB *Types of geometries by other properties etc*
* This resumes normal synthesis after the interruption at AUY NAL W and partial resumption at AVA X.
* Add to AVB letters NB/OK from Auxiliary Schedule AM1.

NB . Non-linear geometry
. . *Types by relation*
NBL WI . . . Non-linear incidence geometry
NJ . Finite geometry
. . *Subsystems*
NJF TVB . . . Plane
NJF TVB L9 . . . . Projective plane
NJF UEL . . . Block designs
. . *Types by property*
NJN B . . . Finite non-linear geometries
NP . Ordered geometries
NV . Continuous geometries
NXD . Dual geometries

Geometries

Mathematics AM
Mathematical systems AR5
Geometry ATS
Geometries AUH Y
Dual geometries AVB NXD

AVB OF Biaxial geometries
. *Types by property*
OFO V . . Elliptic biaxial geometry
OFO X . . Hyperbolic biaxial geometry
OI Euclidean geometries
OJ Non-Euclidean geometries
. *Subsystems*
. . Spaces
OJF UA . . . Non-Euclidean spaces
. . . *Relations*
OJF UA9 X . . . . Embedding
OK Pseudo-Euclidean geometry
. *Subsystems*
OKF UA . . Pseudo-Euclidean spaces
OL *Affine*
* For Affine geometry, use AVC.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AVD.

AVC Affine geometry
. *Methods*
6RS 3A . . Algebraic theory of affine geometry
. *Properties*
CS . . Affine kinematics
. *Subsytems*
FTL . . Varieties
FTL NA . . . Geometry of linear varieties
FTT . . Geometric structures
FTU T . . . Curves & surfaces
FTU TNC . . . . Second order curves & surfaces
FUA . . . Affine spaces
. . . . *Subsystems*
FUA FUJ . . . . . Analytic geometry in affine spaces
FUA FUL J7 . . . . . Synthetic geometry in affine spaces
. . . . *Types*
FUA Q9 . . . . . Spaces with affine connection
. *Types by method*
IW . . Analytic affine geometry
. *Types by operation*
JR . . Differential affine geometry
. . . *Subsystems*
JRF TUM . . . . Straight lines & planes
JRF TUM UEN . . . . . Families of straight lines & planes
JRF TUT . . . . Curves & surfaces
JRF TUT UEN . . . . . Families of curves & surfaces
JRF TUU . . . . . Curves
JRF TVS . . . . . Surfaces
JRF TVT . . . . . Surface strips
JRF UG . . . . Manifolds
JRF UGM IX . . . . . Non-holonomic manifolds

Mathematics AM
Mathematical systems AR5
Geometry ATS
Geometries AUH Y
Types of geometries by other properties etc AVB
. . . . . Non-holonomic manifolds
AVC JRF UGM IX

AVD *Types of geometries by other properties etc*
* Normal synthesis resumed here after interruption at AVB OL.
* Add to AVD letters OM/W in Auxiliary Schedule AM1.
Types of geometries by property
OM . Conformal geometry
ON . Metric geometry
. . *Relations*
ON9 I . . . Congruence
. . *Types by operation*
ONJ R . . . Metric differential geometry
ONJ RP2 . . . . Riemannian geometries
ONJ RP3 . . . . Minkowski geometries
ONO IJR . . . . Euclidean metric differential geometry
ONO J . . . . Non-Euclidean metric geometries
OP . Symplectic geometry
. . *Subsystems*
OPF UA . . . Symplectics spaces
. . *Types*
OPL 9 . . . Projective symplectic geometry
OPO L . . . Affine symplectic geometry
OS . Kinematic geometry
. . *Relations*
OS8 K . . . Kinematic mappings
. . *Subsystems*
OSF TVB . . . Kinematic geometry on a plane
OSF UA . . . Kinematic geometry in space
OSF UAN 8H . . . . Multidimensional spaces
OSF UAO J . . . . Non-Euclidean spaces
OV . Elliptic geometries
* For Riemannian geometries, see AVD ONJ RP2.
OX . Hyperbolic geometries
TUW . *By angles*
* For trigonometry use AVE.
* Normal synthesis using Auxiliary Schedule AM1 is interrupted here; it is resumed at AVE Y

Topology

Mathematics AM
Mathematical systems AR5
Geometry ATS
. . Types of geometries by property
. . . By angles AVD TUW

AVE . . . Trigonometry
. . . . *Relations*
8L . . . . . Trigonometric functions
. . . . *Systems by geometric structure*
TVB . . . . . Plane trigonometry
TVB W . . . . . Plane analytic trigonometry
TWB . . . . . Solid trigonometry
TWB W . . . . . Solid analytic trigonometry
TWT . . . . . Spherical trigonometry
Y . . *Geometries by other systems*
* Normal synthesis is resumed after interruption at AVD TUW.
* Add to AVE Y letters UY/W from Auxiliary Schedule AM1 so far as applicable.

AVJ Topology
. *Methods*
6RS . . Algebraic techniques
. *Processes*
8GS . . Separation
8GS 3D . . . Separation axioms
. *Relations*
8K . . Mappings
8KN V . . . Continuous mappings
8KN V9R . . . . Generalizations of continuous mappings
9V . . Coverings
. *Properties*
. . Dimensions
B4V . . Topological dimensions
* See also Hausdorff dimension, AWR YN5 B8U
B4V 3A . . . Dimension theory
BLD . . . Infinite dimensions
BLD 3A . . . . Theory of infinite dimensions
BR . . Compactness
BRN F . . . Local compactness
CCH . . Connectedness
CCH NF . . . Local connectedness
CCH NFN 8H . . . . Higher dimensional local connectedness
CCJ . . Shape
CCJ 3A . . . Shape theory
. *Elements*
ECN . . Fixed points
ECP . . Coincidence points
. *Entities*
ES . . Invariants
ESN 4V . . . Dimension type invariants

Mathematics AM
Mathematical systems AR5
Topology AVJ
Entities
. . Dimension type invariants AVJ ESN 4V

Subsystems
AVJ FRX . Algebraic systems
. . *Relations*
FRX 9S . . . Topological representations
FSX . . Categories
FSX MQP . . . Fundamental categories
FSX TWC . . . Polyhedral categories
FSX TXM WY . . . . CW-complexes
. . . . . *Operation*
FSX TXM WY7 D . . . . . Construction over CW-complexes

FTT . Geometric structures
FUA . . Spaces
* For Topology of spaces use AVK.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AVO.

AVK . . Topology of spaces, point set topology
. . . *Properties*
CCH . . . . Connectedness
CCH X . . . . . Path connected, pathwise connected, path spaces
. . . *Types by relation*
LD . . . . Derived spaces
. . . *Types by property*
N6Y . . . . Spaces of dimension less than or equal to one
. . . . . *Subsytems*
N6Y FTU U . . . . . Curves
NOD . . . . . Uniform spaces
NOD 3D . . . . . Axioms of uniform spaces
NQB . . . . Partially ordered spaces
NR . . . . Compact spaces
. . . . . *Properties*
NRB 4V . . . . . Dimension
NRB 4V3 A . . . . . Dimension theory of compact spaces
OB . . . . Proximity spaces, proximity topology
OB3 D . . . . . Axioms of uniform & proximity spaces
. . . . . *Relations*
OB9 E . . . . . Extensions
OB9 ENR . . . . . Compact extensions
OI . . . . Euclidean spaces
. . . . . *Entities*
OIE LY . . . . . Continua
OIE LYO T . . . . . Plane continua

Mathematical systems AR5
Topology AVJ
Topology of spaces AVK
Types by property
. Euclidean spaces AVK OI
. . . . Plane continua AVK OIE LYO T

AVK ON . Metric spaces
ON3 D . . Axioms of metric spaces
. . *Properties*
ONA N . . . Metric properties of metric spaces
. . *Types by property*
ONN R . . . Compact metric spaces
. . . . *Entities*
ONN REL Y . . . . . Continua
ONN TN . . . Complete metric spaces, complete spaces
OO . . . Metrizable spaces
Types of spaces by element
PYX . Spaces with richer structures
PYX B5 . . Measures
PYX B5X . . . Baire categories
PYX X . . Sigma spaces

Types of spaces by system
SLS . Loop spaces
. . *Relations*
SLS 9WS . . . Suspensions over loop spaces
VJ . Topological spaces
. . *Operations*
VJ7 D . . . Construction of topological spaces
. . *Relations*
VJ9 B . . . Compactification
VJ9 E . . . . Extensions
VJ9 ENR . . . . . Compact extensions
. . *Subsystems*
VJF RB . . . Sets
. . . . *Methods*
VJF RB6 6 . . . . . Descriptive set theory of topological spaces
VJF RY . . . Semigroups
VJF RYD X . . . . *Relations as elements*
VJF RYD X95 . . . . . Topological semigroups of transformations of topological spaces
. . *Types of topological spaces by property*
VJN P . . . Ordered topological spaces
W . Analysis
* For analytic spaces, use AVL.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AVO.

Mathematics AM
Mathematical systems AR5
Topology AVJ
Geometric structures AVJ FTT
Topology of spaces AVK
Analysis AVK W

AVL Analytic spaces
. *Processes*
87 . . Analytic continuation
. *Relations*
8K . . Mappings
8KM G . . . Holomorphic mappings
8KM GAK . . . . Cohomology of holomorphic mappings
8L . . Functions
. . . *Types by operation*
8LJ S . . . . Differentiable functions on analytic spaces
. . . *Types by relation*
8MC . . . . Automorphic functions
. . . . . *Properties*
8MC BEC . . . . . Automorphic functions with complex variables
8MC BEE . . . . . Automorphic functions with one complex variable
. . . . . *Elements*
8MC DC . . . . . Domains
8MC DCN OJ . . . . . Symmetric domains
. . . . . *Subsystems*
8MC FTT . . . . . Geometric structures
8MC FTV R . . . . . Automorphic functions in the disc
8MG . . . . Holomorphic functions
. . . . . *Processes*
8MG 86 . . . . . Approximation of holomorphic functions
8MG 863 F . . . . . Approximation theorems for holomorphic functions
. . . . . *Elements*
8MG DF . . . . . Boundaries
8MG DFN I . . . . . Global boundaries
. . . . . *Subsystems*
8MG FRX . . . . . Algebras of holomorphic functions
. . . . . *Types by Property*
8MG NEC . . . . . Complex variables
8MG NEH . . . . . Holomorphic functions of several complex variables
. . . . . *Relations*
8MG NEH 9S . . . . . Representation
8MG NEH 9SJ V . . . . . Integral representation
. . . . . *Elements*
8MG NEH DQ . . . . . Residues
8MG NEH DQN F . . . . . Local theory

Topology of spaces

Topology of spaces AVK
Relations
. Functions AVL 8L
. . Types by relation
. . . Holomorphic functions AVL 8MG
. . . . . Elements
. . . . . Local theory AVL 8MG NEH DQN F

. . . . . *Subsystems*
AVL 8MG NEH FUE N . . . . . Families
8MG NEH FUE NMR . . . . . Normal families
8MH . . . Meromorphic functions
. . . . *Subsystems*
8MH FSV . . . . . Fields of meromorphic functions
. . *Types by property etc*
8OV . . . Elliptic functions
8P3 . . . Non-Archimedean functions
8QX . . . Modular functions
93 . Forms
93M C . . Automorphic forms
. Deformations
97 . . Deformations of structures
9R . Generalizations of analytic spaces
AK . Cohomology
. . *Relations*
AK9 3MC . . . Automorphic forms & cohomology
. . *Types by property*
AKN F . . . Local cohomology
Properties of analytic spaces
BF . Local
BF3 A . . Local theory
BXD . Duality
BXD 3F . . Duality theorems
CD . Convexity
CDM G . . Holomorphic convexity
CDT T . . Geometric convexity
Elements
DC . Domains
. . *Types by property*
DCO CV . . . Pseudo-concave domains
DCO EC . . . Pseudo-convex domains
ECG . Singularities
. . *Relations*
ECG 97 . . . Deformation of singularities
. . *Types by property*
ECG NF . . . Local singularities

Mathematics AM
Mathematical systems AR5
Topology AVJ
Topology of spaces AVK
Elements
. . . Local singularities AVL ECG NF

Subsystems of analytic spaces
. Sets
AVL FRB . . Analytic sets
FRX . . Algebraic structures
. . . *Relations*
FRX 97 . . . . Deformations of algebraic structures
FRX 973 A . . . . . Analytic theory of deformations of algebraic structures
FSI Y . Pseudo-groups
FSI YAK . . Cohomology
FTT . Geometric structures
FUB F . . Subspaces
FUE G . . G-structures
FUE G97 . . . Deformations of G-structures
FUE P . . Bundles
FUE PQH . . . Vector bundles
FUE PQH MG . . . . Holomorphic vector bundles
FUF C . . Fibre spaces
. . . *Relations*
FUF C97 . . . . Deformations of fibre spaces
. . . *Types by property*
FUF CMG . . . . Holomorphic fibre spaces
. . . . . *Elements*
FUF CMG E9 . . . . . Holomorphic connections in fibre spaces
FUF D . . . Fibre bundles
FUF DMG . . . . Holomorphic fibre bundles
FUG . . Manifolds
. . . *Types by property*
FUG MW . . . . Complex manifolds
. . . . . *Subsystems*
FUG MWF UHB . . . . . Submanifolds
FUG MWF UHB N3 . . . . . Real submanifolds in complex manifolds
FUG MX . . . . Almost complex manifolds
. . . . . *Methods*
FUG MX6 W . . . . . Analytic study of almost complex manifolds
FUG NOG . . . . Homogeneous manifolds
FUG NOG MW . . . . . Homogeneous complex manifolds
FUG OEC . . . . Pseudo-convex manifolds
. . Submanifolds
FUH B . . . Analytic submanifolds
. . . . *Relations*
FUH B97 . . . . . Deformations of submanifolds

Topology of spaces

Mathematics AM
Mathematical systems AR5
Topology AVJ
Topology of spaces AVK
Subsystems of analytic spaces
. . . . . Deformations of submanifolds
AVL FUH B97

Types of analytic spaces
. By operation
AVL JS . . Differentiable spaces
. By property
MW . . Complex
* For Complex spaces use AVM. Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AVN.
AVM . . Complex spaces
. . . Operations
7V . . . . Integration on analytic spaces
. . . Relations
8K . . . . Mappings
8KM G . . . . . Holomorphic mappings
97 . . . . Deformation of complex spaces
. . . Subsystems
FSA . . . . Groups
FSC MC . . . . . Automorphism groups
FSC MCD X . . . . . *Elements by relation*
FSC MCD XAC . . . . . Complex spaces with a group of automorphisms
FSC MCD XAC P2 . . . . . Hermitian symmetric spaces
FSC MCD XAC PP . . . . . Quotient spaces
FSJ . . . . . Lie groups
. . . . . Transformations
FSJ L5 . . . . . Complex Lie transformational groups
. . . . Varieties
FTL . . . . . Complex spaces close to algebraic varieties
. . . . Geometric structures
FTV S . . . . . Complex surfaces
. . . . . *Elements*
FTV SEC G . . . . . Singular points
. . . *Types of complex spaces*
MP . . . . Concrete complex spaces
N4V . . . . Complex spaces of one or two or three dimensions
N4V FTV S . . . . . Complex surfaces
NOG . . . . Complex homogeneous spaces
. . . . . *Subsystems*
NOG FUE P . . . . . Homogeneous bundles
NOG FUE PQH . . . . . Homogeneous vector bundles
. . . . . *Types by property*
NOG P2 . . . . . Kahler homogeneous spaces

Topology AVJ
Topology of spaces AVK
Types of spaces by system
. . . By property
. . . . . Complex homogeneous spaces
AVM NOG
. . . . . Kahler homogeneous spaces
AVM NOG P2

AVM NTN . . . . . Complete analytic spaces
NTN MG . . . . . Holomorphically complete spaces
OD . . . . . Convex analytic spaces
ODM G . . . . . Holomorphically convex spaces
AVN . . . *Analytic spaces by other characteristics*
* Normal synthesis by Auxiliary Schedule AM1 is resumed here after its interruption at AVL MW.
* Add to AVN letters MX/WT in Auxiliary Schedule AM1.
N3 . . . . Real analytic spaces
. . . . . *Properties*
N3B F . . . . . Local properties of real analytic spaces
N3B I . . . . . Global properties of real analytic spaces
NR . . . . Compact analytic spaces
. . . . . *Relations*
NR9 B . . . . . Compactification
. . . . . *Subsystems*
NRF TVS . . . . . Compact surfaces
. . . . . *Types*
NRN OG . . . . . Homogeneous
NRN OGM W . . . . . Compact complex homogeneous spaces
NTL . . . . Partially analytic spaces
P3 . . . . Non-Archimedean analytic spaces
P4S . . . . Serre analytic spaces
Other types of spaces in topology
WX . Probabilistic spaces
X . *Special types*
* Add to AVN X letters A/F following AUB, e.g. Extensor spaces AVN XC.

Topology

Mathematics AM
Mathematical systems AR5
Topology AVJ
Subsystems
. . . . Special types AVN X

AVO *Other topological subsytems & structures*
* Normal synthesis is resumed here (in modified form) after its interruption at AVJ FUA and AVK W. It is continued in completely normal form (using Auxiliary Schedule AM1) at AVP (Types of topology).
* Add to AVO letters BH/H following AU in AUB H/AUH and letters UI/W following A in AUI/AW.

BNA . Linear structures (topology)
BNA LWI . . Linear incidence structures
ES . Sheaves (topology)
FJ . Maps (topology)
. . *Relations*
FJ8 L . . . Functions
FJ8 N3 . . . . Real valued functions
FJ9 X . . . Embedding
. . *Properties*
FJC CJ . . . Shape
FJC CJ3 A . . . . Shape theory
. . *Subsystems*
FJF RB . . . Sets
FJF RCP 2 . . . . Baire sets & functions
. Manifolds

G . Topology of manifolds
. . Theorems
G3F P2 . . . Poincare conjecture
. . *Relations*
GAL Y . . . Isotopy
. . *Elements*
GEU . . . Operators
. . . . *Types by operation*
GEU JR . . . . . Differential operators on manifolds
GEU JV . . . . . Integral operators on manifolds
. . . . . *Subsystems*
GEU JVF SV . . . . . Fields
GEU JVF SVQ H . . . . . Vector fields
GEU JVF SVQ H7V . . . . . Integration
GEU JVF SVQ I . . . . . Tensor fields
GEU JVF SVQ I7V . . . . . Integration
. . . . *Types by property*
GEU OV . . . . . Elliptic operators on manifolds
. . *Subsystems*
GFS A . . . Groups
GFS CMQ P . . . . Fundamental groups

Mathematical systems AR5
Topology AVJ
Topology of manifolds AVO G
Subsystems
. Groups AVO GFS A
. . Fundamental groups AVO GFS CMQ P

AVO GFU A . Spaces
. . *Types by relation*
GFU ALV . . . Covering spaces
GFU ANX D . . . Duality spaces
GFU ANX DP2 . . . . Poincare duality spaces
Types of manifold
. *By property*
GMT C . . Characteristic manifolds
GNL D . . Infinite-dimensional manifolds
GNM . . Smooth manifolds
* See also Differentiable manifolds (differential geometry) AUP; Piecewise linear manifolds AVO GRD
. . . *Operations*
GNM 7C . . . . Classification
* See also Equivalence of polyhedra AVO GNM FTW C9J RD
. . . *Relations*
. . . . Mappings
GNM 8K . . . . . Smooth mappings
. . . . . *Relations*
GNM 8K9 3 . . . . . Forms
GNM 8K9 3JR . . . . . Differential forms on smooth mappings
. . . . . *Elements*
GNM 8KE CG . . . . . Singularities of smooth mappings
GNM 8KE CR . . . . . Critical points of smooth mappings
. . . *Subsystems*
. . . . Groups
GNM FSA . . . . . Groups acting on smooth manifolds
. . . . Geometric structures
GNM FTW C . . . . . Polyhedra
. . . . . *Relations*
GNM FTW C9J . . . . . Equivalence
GNM FTW C9J RD . . . . . Combinatorial equivalence of polyhedra
. . . . . Spheres
GNM FTW T . . . . . Smooth structures on balls & spheres
GNM FUE Q . . . . . Microbundles
. . . . . Fibre bundles
GNM FUF D . . . . . Fibre bundles with smooth manifolds as bases
GNM FUF F . . . . . Fibrations of smooth surfaces

Topologies

Topology AVJ
Other topological subsytems & structures AVO
. . . By property
. . . . Smooth manifolds AVO GNM
. . . . . Subsystems
. . . . Fibrations of smooth surfaces AVO GNM FUF F

. . . . . *Types of smooth manifolds*
. . . . . *By property*
AVO GNM MW . . . . . Complex smooth manifolds
GNM MX . . . . . Almost complex smooth manifolds
GNM NLD . . . . . Manifolds of infinite dimension
GNM P2 . . . . . Kahler topology, kahlerian manifolds
. . . . . *By elements*
GNM Q8 . . . . . Smooth manifolds with additional structure
GOX . . . . Hyperbolic manifolds
GOX MW . . . . . Hyperbolic complex manifolds
* See also Smooth manifolds AVO GNM; PL manifolds AVO GRD
GP2 . . . . Riemannian manifolds
. . . *By system*
. . . . Combinatorics
GRD . . . . Combinatorial manifolds, piecewise linear topology, PL manifolds
. . . . . *Operation*
GRD 7C . . . . . Classification
. . . . . *Processes*
GRD 86 . . . . . Approximation
. . . . . *Relations*
GRD ALY . . . . . Isotopy
. . . . . *Subsystems*
GRD FSA . . . . . Groups acting on combinatorial manifolds
GRD FTY V . . . . . Neighbourhoods
GRD FTY VNN . . . . . Regular neighbourhoods
GRD FUF Q . . . . . Knots & links
GVJ . . . . Topological manifolds
. . . . . *Subsystems*
GVJ FUE P . . . . . Bundles of topological manifolds
GVJ FUE Q . . . . . Microbundles
GVJ FUF E . . . . . Block bundles
GVJ FUH Y . . . . . Geometries on topological manifolds
Types of topology

Mathematics AM
Mathematical systems AR5
Topology AVJ
Types of topology

AVP Topologies
* Concepts from facets other than the Types facet (H/W in Auxiliary Schedule AM1) should not normally be applied to AVP, but to Topology AVJ as the general class. But very occasionally a concept relates to the notion of a topological system per se, when it may be used to qualify AVP, as in the example below (AVP 74).
74P . Operations on topologies

. *Types of topology by method*
IRD . . Combinatorial topology
. . . *Elements*
IRD DA . . . . Combinatorial elements
. . . *Subsystems*
IRD FUE S . . . . Sheaves
IRD FUF D . . . . Fibre bundles
IRD FUF Q . . . . Knots
IRS . . Algebra
* For Algebraic topology, use AVQ. Normal synthesis by by Auxiliary Schedule AM1 is interrupted here; it is resumed at AVU.

AVQ . . Algebraic topology, analysis situ
. . . *Methods*
6RU . . . . Applied homological algebra
. . . . . *Properties*
6RU BXD . . . . . Duality
. . . *Relations*
8K . . . . Mappings
. . . . . *Operations*
8K7 C . . . . . Classification of mappings
. . . . . *Relations*
8K9 AP . . . . . Compression of mappings
8K9 E . . . . . Extension of mappings
8KA K . . . . . Cohomology
8KA K3B . . . . . K-theory
8KA LY3 A . . . . . Isotopy theory
AK . . . . Cohomology
AK3 B . . . . . K-theory cohomology
. . . . . *Operations*
AK8 4 . . . . . Stable operations
. . . . . *Properties*
AKB 4V . . . . . Dimension
AKB 4V3 A . . . . . Dimension theory
AKB XD . . . . . Duality
AKB XD3 F . . . . . Duality theorems
. . . . . *Subsystems*
AKF UES . . . . . Sheaf cohomology
. . . . . *Types by property*
AKO 2L . . . . . Equivariant cohomology

Topologies

Topology AVJ
Topologies AVP
Algebraic topology, analysis situ AVQ
Relations
. Cohomology AVQ AK
. . . Equivariant cohomology AVQ AKO 2L

AVQ AL . Homotopy
AL3 A . . Homotopy theory
. . *Operations*
AL7 9 . . . Homotopy resolutions
AL7 D . . . Construction
AL7 DNX D . . . . Dual constructions
. . *Relations*
AL9 E . . . Homotopy extension properties
AL9 J . . . Homotopy equivalence
. . *Entities*
ALE V . . . Homotopy functors
. . *Subsystems*
ALF UA . . . Spaces
ALF UAP 2 . . . . Eilenberg-Maclane spaces
ALF UAS LS . . . . Loop spaces
ALF UAS LSN K . . . . . Infinite loop spaces
. . *Types by property*
ALN Y . . . Stable homotopy
ALN Y3A . . . . Stable homotopy theory
Elements in algebraic topology
DM . Product
. . *Relations*
DMA J . . . Homology of a product
ECN . Fixed points
ECP . Coincidence points
ECR . Critical points
ECR 3A . . Critical point theory
Subsystems
FRB . Sets
. . *Types by property*
FRC MW . . . Complex sets, complexes
FRC OP . . . Simplicial sets
. . . . *Operations*
FRC OP7 4P . . . . . Operations over simplicial sets
. . . . *Subsystems*
FRC OPF SCM L . . . . . Homotopy groups of simplicial sets
. . . . *Types by property*
. . . . . Complexes
FRC OPM W . . . . . Simplicial complexes
. . *Types by entity*
FRC QN . . . Spectrum
FRC QNO P . . . . Simplicial spectra
FSA . Groups

* For Groups in algebraic topology, use AVR.
* Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AVR Y.

Mathematics AM
Mathematical systems AR5
Topology AVJ
Topologies AVP
Algebraic topology, analysis situ AVQ
Groups AVQ FSA

AVR Groups in algebraic topology
. *Types by method*
I4 . . Classical groups
. . . *Subsystems*
I4F SA . . . . Groups
I4F SCM J . . . . . Homology & cohomology groups of classical groups
. *Types by relations*
MJ . . Homology & cohomology groups
. . . *Subsystems*
MJF UAP 2 . . . . Eilenberg-Maclane spaces
. . . *Types by property*
MJN 7 . . . . Singular homology & cohomology groups
ML . . Homotopy groups
. . . *Operations*
ML7 4P . . . . Operations in homotopy groups
. . . *Relations*
ML9 R . . . . Generalizations of homotopy groups
. . . *Entities*
MLE SP2 . . . . Hopf invariants
. . . *Subsystems*
MLF TWT . . . . Homotopy group of spheres
. . . *Types by properties*
MLN Y . . . . Stable homotopy groups
. . . . . *Subsystems*
MLN YFT WT . . . . . Stable homotopy groups of spheres
. *Types of groups by property*
NJ . . Finite groups
. . . *Elements derived from relations*
NJD XL5 . . . . Finite groups of transformations
OP . . Simplicial groups & semigroups
. *Types of groups by system*
VJ . . Topological groups
. . . *Operations*
VJ7 4P . . . . Operations on topological groups
. . . *Relations*
VJA J . . . . Homology groups
VJA L . . . . Homotopy groups
. . . *Elements*
VJE V . . . . Functors
VJE VMP . . . . . Concrete functors
. . . *Subsystems*
VJF SA . . . . Groups
VJF SCM L . . . . . Homotopy groups of topological groups
VJF SGO CJ . . . . . Shape groups
VJF TA . . . . Algebras
VJF TAP 2 . . . . . Hopf algebras

Topologies

Topology AVJ
Topologies AVP
Algebraic topology, analysis situ AVQ
Subsystems
. . . . Subsystems
. . . . . Hopf algebras
AVR VJF TAP 2

. . . . *Types of topological groups by relation*

AVR VJL 5 . . . . . Topological transformation groups, groups of homeomorphisms

. . . . . *Types by operation*

VJL 5JS . . . . . Groups of differentiable transformations

. . . . . *Types by property*

VJL 5NJ . . . . . Finite transformation groups

VJL 5NR . . . . . Compact groups of homeomorphisms

. . . . . *By system*

VJL 5SJ . . . . . Lie groups (topological groups)

VJL 5SJ NR . . . . . Compact Lie groups

VJL 5SJ NRJ S . . . . . Compact Lie groups of differentiable transformations

Y *Other subsystems in algebraic topology*

* Normal synthesis by Auxiliary Schedule AM1 is resumed here after its interrruption at AVQ FSA.
* Add to AVR Y letters SB/UA following A in ASB/AUA.

YSX . Categories

YSX MQP . . Fundamental categories

. . . *Types by system*

YSX MQP TWC . . . . Polyhedral categories

YSX MQP TXM WY . . . . CW-complexes

. . . . . *Subsystems*

YSX MQP TXM WY1 . . . . . Groups

* Full classmark is % AVR YSX MQP TXM WYF SA.

YSX MQP TXM WY2 . . . . . Homology groups

* Full classmark is % AVR YSX MQP TXM WYF SCM J.

YSX MQP TXM WY3 . . . . . Cohomology groups

* Full classmark is % AVR YSX MQP TXM WYF SCM K.

YSX MQP TXM WY4 . . . . . Homotopy groups

* Full classmark is % AVR YSX MQP TYXM WYF SCM L.

Mathematical systems AR5
Topology AVJ
Topologies AVP
Algebraic topology, analysis situ AVQ
Categories AVR YSX
. . . . . Homotopy groups
AVR YSX MQP TXM WY4

AVR YUA Spaces

* For spaces in algebraic topology, use AVS. Normal synthesis by Auxiliary Schedue AM1 is interrupted here; it is resumed at AVT.

AVS Spaces in algebraic topology

. *Subsystems*

FSA . . Groups

FSC MJ . . . Homology & cohomology groups of spaces

FSC MJ9 3 . . . . Forms

FSC MJ9 33D . . . . . Axioms of spaces

. *Types by operation*

JL . . Spaces with multiplication, H-spaces in algebraic topology

. . . *Relations*

JLA J . . . . Homology & Cohomology

JLA L . . . . Homotopy

JLA L3A . . . . . Homotopy theory

. . . *Subsystems*

JLF TAP 2 . . . . Hopf algebras in H-spaces

. *Types by property*

MP . . Concrete spaces

. . . *Subsystems*

MPF SA . . . . Groups

MPF SCM J . . . . . Homology & cohomology groups in concrete spaces

. . . . . *Operations*

MPF SCM J7H . . . . . Computation of homology & cohomology groups

OI . . Euclidean spaces

. . . *Relations*

OI9 X . . . . Embedding

. . . *Subsystems*

OIF TXM WOP . . . . Simplicial complexes

OIF TXM WOP 9X . . . . . Embedding of simplicial complexes

. *Types by elements*

QU . . Spaces with operators

. . . *Elements*

QUD M . . . . Product

QUD MNO J . . . . . Symmetric product

. . . *Subsystems*

QUF SA . . . . Groups

QUF SCM J . . . . . Homology & cohomology groups in spaces with operators

Mathematical systems AR5
Topology AVJ
Topologies AVP
Types of topology by method
. . Other subsystems in algebraic topology AVR Y
. . . . . Homology & cohomology groups in spaces with operators AVS QUF SCM J

AVT . . *Other subsystems in algebraic topolopy*
* Normal synthesis by Auxiliary Schedule AM1 is resumed here after its interrruption at AVR YUA.
* Add to AVT letters UB/W following A in AUB/AW.

UEQ . . . Microbundles
UFC . . . Fibre spaces
. . . . *Relations*
UFC 9R . . . . . Generalizations of fibre spaces
UFC AJ . . . . . Homology & Cohomology of fibre spaces
UFC AJ3 B . . . . . K-theory (fibre spaces)
. . . . *Subsystems*
UFC FRC OP . . . . . Simplicial sets
UFC FRC OP3 A . . . . . Theory
UFD . . . Fibre bundles
. . . . *Relations*
UFD AL . . . . . Homotopy
. . . . *Types by entity*
UFD QH . . . . . Vector space bundles
UFD QHD J . . . . . Classes
UFD QHD JNY . . . . . Stable classes
. . . . *Types by system*
UFD TWT . . . . . Sphere bundles
UG . . . Manifolds
UGM J . . . . Homological manifolds
UHS . . . Spectral sequences
. . . . *Relations*
UHS AK . . . . . Cohomology
UHS AKL R . . . . . Generalized cohomology
UHS DX . . . . *Elements derived from relations*
UHS DX8 K . . . . . Mappings
UHS DX8 KNV . . . . . Spectral sequence of a continuous mapping
. . . . *Types by property*
UHS P2 . . . . . Eilenberg-Maclane spectral sequences
UHS P3 . . . . . Serre spectral sequences
X . . *Types of algebraic topology*
* Add to AVT X letters H/W in Auxiliary Schedule AM1.

AVU *Types of topology by other methods*
* Normal synthesis is resumed here after its interruption at AVP IRS.
* Add to AVU letters RT/W in Auxiliary Schedule AM1.

W . Analytic topologies
. . *Types by property*
WNI . . . Global analysis (topologies)

Mathematics AM
Mathematical systems AR5
Topology AVJ
Topologies AVP
Types of topology by other methods AVU
. . . Global analysis AVU WNI

AVU Y *Types of topology by operation*
* Add to AVU Y numbers and letters 4P/9, A/R following J in Auxiliary Schedule AM1 (representing classes AM7 4 /AM7R).

YJR . Differential topology
. . *Subsystem*
YJR FUG . . . Manifolds
* For differential topology of manifolds, use AVV. Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AVW.

AVV . . . Differential topology of manifolds
. . . . *Operations*
832 . . . . . Surgery
832 DX . . . . . Obstructions
833 . . . . . Cobordism
833 MW . . . . . Complex cobordism
. . . . *Processes*
86 . . . . . Approximations
86N M . . . . . Smooth approximations
. . . . *Relations*
8K . . . . . Mappings
8KJ S . . . . . Differentiable mappings
8KJ SEC G . . . . . Singularities of differentiable mappings
ALY . . . . . Isotopy
. . . . *Elements*
DY . . . . . Structures
DYJ R . . . . . Differential structures
ECG . . . . . Singularities
ECR . . . . . Critical points
. . . . *Subsystems*
FUF D . . . . . Fibre bundles

AVW . . *Other subsystems of differential topology*
* Normal synthesis by Auxiliary Schedule AM1 is resumed here after its interruption at AVU YJR FUG.
* Add to AVW letters UH/W following A in AUH/AW.

X . . *Types of differential topology*
* Add to AVW X letters H/W in Auxiliary Schedule AM1.

AVX *Types of topologies by other characteristics*
* Normal synthesis is resumed here after the first interruption of division into types at AVP IRS and later at AVU YJR FUG.
* Add to AVX letters JS/W in Auxiliary Schedule AM1.

Mathematics AM
Mathematical systems AR5
Topology AVJ
. . Types of topologies by other characteristics AVX

AVX N6 . . . Low dimension topology
. . . . *Subsystems*
N6F SLS . . . . . Loops
N6F SLS 3F . . . . . Loop theorems
N6F TWT . . . . . Spheres
N6F TWT 3F . . . . . Sphere theorem
. . . . . Manifolds
N6F UG . . . . . Low dimension topology of manifolds
. . . . . *Relations*
N6F UG9 WM . . . . . Immersions in low dimensions
N6F UG9 X . . . . . Embeddings in low dimensions
. . . . . *Subsystems*
N6F UGF SCM QP . . . . . Fundamental groups
N6F UGF UFQ . . . . . Knots
. . . . *Types of low dimension topology*
ON . . . . . Metric topology

AW Analysis
AW3 H . Formulae
HX . . Asymptotic formulae & expressions
. *Methods special to analysis*
AW6 X . . Calculus, infinitesimal calculus
Y . . . Calculus of variations, variational calculus
. . . . Special theories
Y3C C . . . . . Catastrophe theory
* See also Discontinuities AW6 YEC G
. . . . *Methods*
Y6V J . . . . . Topological methods
Y6W O . . . . . Functional analytic methods
. . . . . *Elements*
Y6W OE7 G . . . . . Necessary conditions
. . . . *Relations*
Y9L . . . . . Equations of the calculus of variations
. . . . *Properties*
Y9P . . . . . Inverse problems
. . . . *Elements*
YDG . . . . . Solutions of variational problems
. . . . . *Properties*
YDG ANT . . . . . Existence
. . . . *Entities*
. . . . . Singularities
YEC G . . . . . Discontinuities
* See also Catastrophe theory, AW6 Y3C C

Mathematics AM
Mathematical systems AR5
Analysis AW
Methods special to analysis
. . Calculus of variations AW6 Y
. . . . . Discontinuities AW6 YEC G

AW6 YY . . Operational calculus
. . . *Elements*
YYD G . . . . Solutions
YYD GDI . . . . . Moment problems
. . . *Types by property*
YYI 4 . . . . Classical operational calculus
YYP 2 . . . . Mikusinski's calculus
AW7 2 . . Differential calculus
. . . *Relations*
28L . . . . Functions
. . . . . *Processes*
28L 88 . . . . . Variation of functions
. . . . . *Relations*
28L 888 K . . . . . Mappings
. . . *Elements*
2DU . . . . Derivatives
2DV . . . . Differentials
. . . *Types*
* For absolute differential calculus, see Tensor analysis AUM EI.
3 . . Integral calculus
. . . *Elements*
3DW . . . . Integrals
. . . . . *Subsystems*
3DW FUG . . . . . Manifolds
3DW FUG OCR . . . . . Integrals over curved manifolds
. . . . . *Types*
3DW N8H . . . . . Multiple integrals
44 . . Vector calculus
. . . *Entities*
44E U . . . . Operators of vector calculus
45 . . *Other analytical methods*
* Numbers 45/49 following AW7 may be used for special not otherwise given. See introduction, section 13.35, title 5 for an example.
Operations in analysis
R . Differentiation
. . *Types*
RMO . . . Abstract differentiation
RMO 3A . . . . Abstract differentiation theory
V . Integration
Processes
AW8 7 . Continuation
* For analytic continuations, see under analytic functions, AWD W87.

Mathematics AM
Mathematical systems AR5
Analysis AW
Processes
. Continuation AW8 7

Relations

AW8 K . Analytic mappings

L . Functions
L3A . . Theory of functions
L3C ON . . Metric theory of functions
* Many of the operations below usually imply the use of metric theory.
. . *Operations*
L7R . . . Differentiation
L7R 3A . . . . Theory of differentiation
L7V . . . Integration
L7V 3A . . . . Theory of integration
. . *Processes*
L86 . . . Approximation
. . . . *Types by entity*
L86 QL . . . . . Approximation by polynomials
. . . . . *Elements*
L86 QLD I . . . . . Moments
L86 QLD I3A . . . . . Theory of moments
L86 QLD U . . . . . Derivatives
. . . . . *Relations*
L86 QLD U9N . . . . . Inequalities for derivatives of polynomials
. . . . . Extrema
L86 QLE 2 . . . . . Extremal properties of polynomials
L89 . . . Growth
L89 CQR . . . . Rate of growth of functions
L8E . . . Interpolation
. . *Relations*
L8K . . . Mappings
. . *Properties*
LB5 . . . Measure
. . *Elements & Entities*
LDF . . . Boundary
LDF AN . . . . Boundary properties of functions
LDU . . . Derivatives
LDU NOJ . . . . Symmetric derivatives
LDW . . . Integrals
. . . . *Types by property*
LDW N7 . . . . . Singular integrals
LDW P2 . . . . . Fourier integral
. . . . . *Properties*
LDW P2C 4Y . . . . . Summability
LDW P3 . . . . . Lebesgue integral
LDW P4R . . . . . Riemann integral
. . . . *Types by system*
. . . . . Harmonic functions
LDW WB . . . . . Integrals of potential type

Mathematical systems AR5
Analysis AW
Functions AW8 L
Elements & Entities
. Integrals AW8 LDW
. . . . Integrals of potential type AW8 LDW WB

AW8 LEO . Series & sequences
LEO C4Y . . Summability
Subsystems
LFT VS . Surfaces
LFT VSO CR . . Curved surfaces

Types of functions
. *By method*
LIR S . . Algebraic & algebroid functions
LIW . . Analytic functions (+general+), real analytic functions
* Analytical functions should not be divided by Auxiliary Schedule AM1. The divisions of Analytical functions (AW8 LIW) are the same as those of analysis itself (AW) between AW3 and AWT, including the various interruptions of normal synthesis within Analysis.
. . . *Forms of presentation*
LIW 3FP 3 . . . . Picard theorem
. . . *Processes*
LIW 87 . . . . Analytic continuation
LIW 8E . . . . Interpolation
. . . *Relations*
LIW J9R . . . . Generalizations of analytic functions
. . . . . *Subsystems*
LIW J9R FTB . . . . . Analytic matrices
LIW L . . . *Other properties & elements*
LIW LDF AN . . . . Boundary properties of analytic functions
LIW LDW . . . . Integrals
LIW LDW P2 . . . . . Cauchy-type integrals
. . . *Entities*
LIW LEQ PN . . . . Power series
LIW N . . . *Subsytems*
LIW NUA . . . . Spaces of a function
LIW NY . . . *Types of analytic functions*
LIW RY . . . *Types by other relations*
LIW RYM C . . . . Automorphic functions
LIW RYM H . . . . Meromorphic functions
LIW RYN 4H . . . . Discrete analytic functions
LIW RYN U . . . . Entire functions
. . . . . *Relations*
LIW RYN U9S . . . . . Representations
LIW RYN U9S QQP W . . . . . Representations by series of integrals

Functions

Analysis AW
Functions AW8 L
Types of functions
By method
. . Types by other relations AW8 LIW RY
. . . . . Representations by series of integrals AW8 LIW RYN U9S QQP W

AW8 LIW SY . . *Types by other properties*
LIW SYP 5F . . . Bounded functions
LIW TY . . *Types by other properties other elements etc*
. . *Special types of analytic functions*
LIW U . . . Systems of functions
. . . . *Properties*
LIW UBL T . . . . . Closedness
LIW UBT N . . . . . Completeness problems
. . . . *Entities*
LIW UEW . . . . . Bases of systems of functions
. . . . *Subsystems*
LIW UFU EN . . . . . Families of functions
LIW UFU ENN R . . . . . Compact families of functions
. . . . *Types by property*
LIW UOU . . . . . Orthogonal systems of functions
. . . . . *Entities*
LIW UOU EQ . . . . . Orthogonal series
. . . . . *Processes*
LIW UOU EQ8 B . . . . . Convergence
. . . . . *Properties*
LIW UOU EQC 4Y . . . . . Summability
LIW V . . . Quasi-analytic functions & pseudo-analytic functions
Types of functions by operation
LJS . Differentiable functions
. . *Elements*
LJS DU . . . Derivatives
LJS DUX . . . . Partial derivatives
. . . . . *Relations*
LJS DUX 9N . . . . . Inequalities between partial derivatives
Types of functions by relation
LLR . Generalized functions
. . *Methods*
LLR 6RS . . . Algebraic theory of generalized functions

Mathematical systems AR5
Analysis AW
Functions AW8 L
Types of functions
Types of functions by relation
. . . Algebraic theory of generalized functions AW8 LLR 6RS

Types of functions by property
AW8 MB . Homomorphic functions
MG . Holomorphic functions
* For Special functions, see AWD X.
MH . Meromorphic functions
MQG . Non-standard functions
MQG 3A . . Non-standard function theory
MR . Normal functions
MY . Rational functions
N3 . Real functions
. . *Elements*
N3D W . . . Integrals
N3D W3H . . . . Integral formulae
. . *Subsystems*
N3F UA . . . Spaces
N3F UAN LD . . . . Functions on infinite-dimensional spaces
N3F UAN LD6 W . . . . . Calculus of functions on infinite-dimensional spaces
N3F UEN . . . Families of functions
N3F UEN MR . . . . Normal families
. . *Types by method*
N3I VE . . . Trigonometric functions
. . . . *Relations*
N3I VE9 N . . . . . Inequalities
N3I W . . . Analytic functions
* See AW8 LIW
. . *Types by property*
N3M Y . . . Rational functions
N3N 7 . . . Singular functions
N3N DN . . . Functions of several variables
. . . . *Properties*
N3N DNB V . . . . . Continuity
. . *Types by entity*
N3Q H . . . Vector functions
. . . . *Methods*
N3Q H6W . . . . . Calculus of vector functions
N4F . Transcendental functions
* See also Special functions (higher transcendental functions) AWD XE.
N9 . Polynomial functions
N9N DN . . Polynomial functions with several variables
N9O U . . Orthogonal polynomial functions
* See also Hypergeometric functions, AWD XKY H
N9O UP4 C . . . Chebyshev functions
N9O UP4 H . . . Hermite functions
N9O UP4 J . . . Jacobi functions
N9O UP4 LC . . . Laguerre functions

Mathematical systems AR5
Analysis AW
Functions AW8 L
Types of functions
Polynomial functions AW8 N9
. . Laguerre functions AW8 N9O UP4 LC

AW8 N9O UP4 LF . . Legendre functions
N9O UP4 LH . . Legrange functions
NEC With complex variables
* For Functions of a complex variable, use AW9. Normal synthesis by Auxiliary Schedule AM1 is interrupted here. Specification by other properties is resumed at AWA; normal synthesis by Auxiliary Schedule AM1 is resumed at AWD.
* For functions of several complex variables see AW9 YH.

AW9 Functions of a complex variable, complex analysis
. Theory
3CV J . . Topological function theory
. *Relations*
8K . . Mappings
. . . *Properties*
8KD 7TS . . . . Geometric properties of mappings
8KO M . . . Conformal mappings
. *Elements*
DC . . Domain
. . . *Types by property*
DCM W . . . . Complex domains
. . . . . *Processes*
DCM W86 . . . . . Approximation
. . . . . *Relations*
DCM W9N . . . . . Inequalities in the complex domain
DCM W9S . . . . . Representation in the complex domain
DCM W9S OG . . . . . Asymptotic representation
DCX . . . Special domains
DCX 8KO M . . . . Conformal mappings of special domains
DFD D . . Boundary values
DV . . Differentials
. . . *Subsystems*
DVF TVS . . . . Surfaces
DVF TVS P2 . . . . . Differentials on Riemann surfaces
E2 . . Extrema
. *Entities*
EQ . . Series
EQP 2 . . . Dirichlet series
EQP N . . . Power series
. . . . *Elements*
EQP NDF AN . . . . . Boundary properties
. *Subsystems*
FRI . . Arithmetic
FRK L . . . Continued fractions

Functions AW8 L
Types of functions
Types of functions by property
. . Subsystems
. . . Arithmetic AW9 FRI
. . . . Continued fractions AW9 FRK L

AW9 FTV S . . . Surfaces
FTV SP2 . . . . Riemannian surfaces of functions of a complex variable
. . *Types*
MH . . . Meromorphic functions of a complex variable
MR . . . Normal functions of a complex variable
NU . . . Entire functions of a complex variable
. . *Special types*
XB . . . Systems of functions of a complex variable
XD . . . . Univalent functions
XE . . . . Multivalent functions
Y *Functions by other variables*
* Add to AW9 Y letters E/R following ANE.
YH . Functions of several complex variables
. . *Processes*
YH8 6 . . . Approximation of functions
YH8 6MG . . . . Holomorphic approximation
. . *Relations*
YH9 3 . . . Forms
YH9 3MC . . . . Automorphic forms
YH9 S . . . Representations
YH9 SJV . . . . Integral representations
. . *Properties*
YHC D . . . Convexity
YHC DMG . . . . Holomorphic convexity
YHC DN9 . . . . Polynomial convexity
. . *Elements*
YHD C . . . Domains
YHD CW . . . . Domains of analyticity
. . *Types by relation*
YHM C . . . Automorphic functions of several complex variables
. . . . Elements
YHM CDC . . . . . Domains
YHM CDC NOJ . . . . . Symmetric domains
YHM G . . . Holomorphic functions of several complex variables
. . . . *Elements*
YHM GDF AN . . . . . Boundary properties
. . . . *Entities*
YHM GEQ PN . . . . . Power series
. . *Types by property*
YHN U . . . Entire functions of several complex variables
YR . Functions of a real variable
YR6 RI . . Numerical methods

Functions

Mathematical systems AR5
Analysis AW
Functions AW8 L
Types of functions
Functions by other variables AW9 Y
. . Numerical methods AW9 YR6 RI

Types of functions by other properties
* Add to AWA letters F/XH following AN in ANF/ANX H.

AWA XG . Almost periodic functions
. . *Processes*
XG8 6 . . . Approximations of almost periodic functions
XG8 E . . . Interpolation
. . *Properties*
XGD 5Y . . . Structural properties of almost periodic functions
. . *Entities*
XGE Q . . . Series of almost periodic functions
XGE QP2 . . . . Fourier series of almost periodic functions
. . . . . *Processes*
XGE QP2 8B . . . . . Convergence of Fourier series of almost periodic functions
. . *Types by property*
XGM O . . . Abstract almost periodic functions
XH . Harmonic
* For harmonic functions, use AWB. Normal synthesis is interrupted here; it is resumed at AWD.

AWB . Harmonic functions, potential functions
3A . . Potential theory
3CN 4H . . . Discrete potential theory
3CN 4Q . . . Absolute potential theory
3CN 8D . . . Two dimensional potential theory
3CN 8H . . . Higher dimensional theory
. . *Relations*
9R . . . Generalizations of harmonic functions
9S . . . Representation of harmonic functions
9SJ V . . . . Integral representations
9SJ V3C N8D . . . . . Two dimensional theory
9SJ V3C N8H . . . . . Higher dimensional theory
. . *Properties*
B5 . . . Harmonic measure
B8L . . . . Length
B8L Q2 . . . . . Extremal length
B8L Q23 CN8 D . . . . . Two dimensional theory
B8L Q23 CN8 H . . . . . Higher dimensional theory
. . *Elements*
DF8 5 . . . Boundary behaviour
DF8 53C N8D . . . . Two dimensional theory
DFD D . . . Boundary value problems
DFD D3C N8H . . . . Higher dimensional theory
. . *Subsystems*
FUA . . . Spaces
FUA P3 . . . . Dirichlet spaces

Functions AW8 L
Types of functions
Types of functions by other properties
. . Subsystems
. . . Spaces AWB FUA
. . . . Dirichlet spaces AWB FUA P3

AWB FUG . . . Manifolds
FUG OQB . . . . Harmonic functions on Riemannian manifolds
. . *Types of harmonic functions by property*
* The interruption in normal synthesis at AWA XH is continued here; normal synthesis is resumed at AWD.
NXK . . . Subharmonic
* Use AWC K.
NXM . . . Biharmonic
* Use AWC M.
NXP . . . Polyharmonic
* Use AWC P.

AWC . . *Special types*
* Add to AWC letters K/P following ANX.
K . . . Subharmonic functions
K3C N8D . . . . Two dimensional theory
M . . . Biharmonic functions & equations
M3C N8D . . . . Two dimensional theory
M3C N8H . . . . Higher dimensional theory
P . . . Polyharmonic & plurisubharmonic functions
P3C N8D . . . . Two dimensional theory
P3C N8H . . . . Higher dimensional theory
Q *Types of functions by other properties etc*
* Add to AWC letters Q/Y following ANX.

AWD *Other types of functions*
* Normal synthesis is resumed here after its initial interruption at AW8 NEC and its final interruption at AWB NXK.
* Add to AWD X letters NY/W from Auxiliary Schedule AM1.
OD . Convex functions
OV . Elliptic functions
OYB . Spherical functions
Types of functions by element
P82 . Kernel functions
. . *Entities*
P82 EQ . . . Series
P82 EQQ L . . . . Series of polynomials
XE Special functions, higher transcendental functions
* A number of special functions often considered together as a body in the mathematical literature and closely related to the special functions of mathematical physics.
* The provision for functions in general at AM8L and the use of these to qualify specific subjects (e.g. Othogonal polynomials AW8 N9O U) means that many of these are distributed under these specific subjects.

Mathematics AM
Mathematical systems AR5
Analysis AW
Relations
. Functions AW8 L
. . . Special functions AWD XE

* An alternative is provided below for libraries wishing to collect these special functions in one location. But a number of them are best located here in any case, and these are enumerated below.

AWD XF . . . . *By individual name other than a mathematician*
XFB . . . . . Beta functions
XFC . . . . . Gamma functions
XFG . . . . . Zeta functions
* For general works this is an alternative to locating at AM8 YG.
XFI . . . . . Theta functions
XG . . . . *By name of mathematician*
* Alternative to locating general works on each of these at AM8 P2.
XGB . . . . . Bessel function
XGG . . . . . Gegenbauer function
XGH . . . . . Hankel function
XGM . . . . . Mathieu function
XGN . . . . . Neumann function
XH . . . . *By method by operation by property etc*
* Alternative to locating general works on the function under the subject.
* Add to AWD letters H/W from Auxiliary Schedule AM1. For example:
XKY H . . . . . Hypergeometric functions
XOV . . . . . Elliptic functions
XX . Functionals
. . *Types by system*
XXW . . . Analytic functionals
YD . Determinants
YDK L . . Functional determinants

AWE *Other relations in analysis*
* Normal synthesis is resumed here after its interruption at AW8 NEC.
* Add to AWE numbers and letters 3/ME following AM9 in AM93/AM9ME.
4 . Transforms
. . *Types*
4JV . . . Integral transforms
4JV N7 . . . . Singular integrals
4JV N8H . . . . Multiple transforms
4JV P2 . . . . Laplace transforms

Mathematics AM
Mathematical systems AR5
Analysis AW
Transforms AWE 4
. . . Laplace transforms AWE 4JV P2

AWE L Equations in analysis
. *Types by operation*
ME . . Differential equations
. . . Special theories
ME3 CC . . . . Chaos theory
. . . *Elements*
MED L . . . . Differences
MED LNJ . . . . . Finite differences
. . . *Types by relation*
MEK L . . . . Functional differential equations
MEK L3A . . . . . Theory
MEK L3C NXT . . . . . Qualitative theory
MEK L3C NY . . . . . Stability theory
MEK L3C OG . . . . . Asymptotic theory
. . . . . *Elements*
MEK LDF DD . . . . . Boundary values
. . . *Types by property*
MEN G . . . . P-adic differential equations
MEN TL . . . . Partial differential equations
* For partial differential equations, use AWG. Normal synthesis is interrupted here; it is resumed at AWI.
MF . . . . Ordinary differential equations
* For ordinary differential equations, use AWF. Normal synthesis is interrupted here; it is resumed at AWI (for other equations) and AWJ (for other relations).
AWF . . . . Ordinary differential equations
3CW . . . . . Analytic theory
. . . . . *Methods*
6OG . . . . . Asymptotic methods
. . . . . *Relations*
9N . . . . . Differential inequalities
. . . . . *Properties*
ANU . . . . . Uniqueness
ANU 3F . . . . . Uniqueness theorems
BXT . . . . . Qualitative
BXT 3A . . . . . Qualitative theory
. . . . . *Elements*
BXT 3AE CG . . . . . Singular points
BY . . . . . Stability
. . . . . *Processes*
BY8 GE . . . . . Pertubations
BY8 GEN 7 . . . . . Singular perturbations
. . . . . *Types by property*
BYP Y . . . . . Structural stability

Differential equations

Analysis AW
Equations in analysis AWE L
Differential equations AWE ME
Properties
. Stability AWF BY
. . . Structural stability AWF BYP Y

AWF CG . Asymptotic properties
CG8 GE . . Perturbutations
CG8 GEN 7 . . . Singular perturbations
Elements
DE . Initial value
DFD D . Boundary value problems
DFD DEN . . Spectra
DFD DEN 3C . . . Spectral theory
DG . Solutions
. . *Processes*
DG8 6 . . . Approximation of solutions
DG8 6RI . . . . Numerical approximations
. . *Elements & entities*
DGD HY . . . Limit cycles
DGE R . . . Expansions of solutions
DW . Integrals
DWX . . First integrals
Entities
ER . Expansions
ERO G . . Asymptotic expansions
Subsystems
FUA . Spaces
FUA P2 . . Differential equations in Banach spaces
FUG . Manifolds
FUG 9L . . Equations on manifolds
FUG DG . . Manifolds of solutions
. . . *Properties*
FUG DGB Y . . . . Stability of manifolds
Types of ordinary differential equations
. *By property*
NA . . Linear ordinary differential equations
. . . *Properties*
NAA NT . . . . Existence
NAA NT3 F . . . . . Existence theorems
. . . *Entities*
NAE G . . . . Eigenvalues
. . . *Types by system*
NAT B . . . . Matrix linear ordinary differential equations
NB . . Non-linear ordinary differential equations
. . . *Elements*
NBD FDD . . . . Boundary value problems
NDI . . Differential equations of infinite order
. *By element*
PCM W . . Equations in the complex domain
. . . *Elements*
PCM WEC G . . . . Singular points

Mathematical systems AR5
Analysis AW
Equations in analysis AWE L
Differential equations AWE ME
Ordinary differential equations AWF
. . . . . Singular points AWF PCM WEC G

AWG Partial differential equations
. Theory
3CT S . . Geometric theory
3FP 2 . . Cauchy-Kowalewski theorems
. *Methods*
6W . . Analytic methods
6Y . . Variational methods
. *Processes*
8GE . . Perturbations
. *Relations*
. . Functions
8P2 . . . Hamiltonians
9N . . Differential inequalities
9P . . Inverse problems
. *Properties*
ANT . . Existence properties
ANU . . Uniqueness properties
BY . . Stability
. *Elements*
DFD D . . Boundary value problems
DG . . Solutions
. . . *Processes*
DG8 6 . . . . Approximations of solutions
DG8 6RI . . . . . Numerical approximations
. . . *Relations*
DG9 S . . . . Representations of solutions
DG9 SJV . . . . . Integral representations
. . . *Properties*
DGC G . . . . Asymptotic behaviour
DGD 2 . . . . Cauchy problem
. . . . . *Subsystems*
DGD 2FR Y . . . . . Semi-groups related to the Cauchy problem
. . . *Types by relation*
DGL R . . . . Generalized solutions
. . . . . *Properties*
DGL RAN T . . . . . Existence
. . . *Types by property*
DGN XF . . . . Periodic solutions
DGN XG . . . . . Almost periodic solutions
. . . *Types by entity*
DGQ Q . . . . Series solutions
. *Entities*
EG . . Eigenfunctions
. . . *Processes*
EG8 A . . . . Distribution of eigenvalues
EG8 AOG . . . . . Asymptotic distribution of eigenvalues
. . . *Properties*
EGB TN . . . . Completeness of eigenvalues

Differential equations

Analysis AW
Equations in analysis AWE L
Differential equations AWE ME
Entities
. Eigenfunctions AWG EG
. . . Completeness of eigenvalues AWG EGB TN

AWG EN3 A . Spectral theory
EN3 B . . Scattering theory
EU . Operators
EUJ U . . Pseudo-differential operators
. . . *Elements*
EUJ UDE . . . . Initial value problems
EUJ UDF DD . . . . Boundary value problems
Subsystems
FUA . Spaces
FUA KL . . Function spaces
FUA KL9 L . . . Equations on function spaces
Types of partial differential equations
. *By relations*
KL . . Functional differential equations
. *By property*
NA . . Linear partial differential equations, first order partial differential equations
. . . *Elements*
NAD E . . . . Initial value problems
NAD FDD . . . . Boundary value problems
NB . . Non-linear partial differential equations
. . . *Elements*
NBD E . . . . Initial value problems
NBD FDD . . . . Boundary value problems
NC . . Second order partial differential equations
NDH . . Higher order partial differential equations
OV . . Elliptic-type equations
. . . Theory
OV3 CWB . . . . Potential theory
. . . *Elements*
OVD FDD . . . . Boundary value problems
OVD G . . . . Solutions
OVD GDF DD . . . . Boundary values of solution
. . . *Entities*
OVE N3A . . . . Spectral theory
. . . *Types by property*
OVN B . . . . Non-linear elliptic-type equations
OVN C . . . . Second order elliptic-type equations
. . . . . *Methods*
OVN C6Y . . . . . Variational methods
OVP 2 . . . . Laplace equations
OVP 3 . . . . Poisson equations
OW . . Parabolic equations
OWN B . . . Non-linear parabolic equations
OWN C . . . Second order parabolic equations
. . . . *Elements*
OWN CDE . . . . . Initial value problems
OWN CDF DD . . . . . Boundary value problems

Equations in analysis AWE L
Differential equations AWE ME
. Types by property
. . . . By property
. . . . . Parabolic equations AWG OW
. . . . . Second order parabolic equations AWG OWN C
. . . . . Boundary value problems AWG OWN CDF DD

AWG OWN DH . . . . . Higher order parabolic equations
. . . . . *Elements*
OWN DHD E . . . . . Initial value problems
OWN DHD FDD . . . . . Boundary value problems
OX . . . . . Hyperbolic equations
OXN A . . . . . First order hyperbolic equations
OXN C . . . . . Second order hyperbolic equations
. . . . . *Elements*
OXN CDE . . . . . Initial value problems
OXN CDF DD . . . . . Boundary value problem
OXN DH . . . . . Higher order hyperbolic equations
. . . . . *Elements*
OXN DHD E . . . . . Initial value problems
OXN DHD FDD . . . . . Boundary value problems
. . . . *Types by element or entity*
PL . . . . . *Difference equations*
* For difference-partial differential equations see Difference equations, AWI PLJ S.
. . . . . Coefficients
QK . . . . . Equations with constant coefficients
. . . . . *Elements*
QKD E . . . . . Initial value
. . . . . Operators
QU . . . . . Operator differential equations
Y . *Other types of differential equations*
* Add to AWG Y letters T/U following AM7.

AWH Integral equations
. *Properties*
BXT . . Qualitative behaviour
BY . . Stability
BY3 A . . . Stability theory
CG . . Asymptotics
. *Elements*
DG . . Solutions
. . . *Processes*
DG8 6 . . . . Approximation of solutions
DG8 6RI . . . . . Numerical approximations
. *Entities*
EG . . Eigenvalue problems

Mathematical systems AR5
Analysis AW
Equations in analysis AWE L
Types by operation
. . Entities
. . . Eigenvalue problems AWH EG

. . *Types by operation*
AWH JR . . . Integro-differential equations
JRN 7 . . . . Singular integro-differential equations
JRN A . . . . Linear integro-differential equations
JRN B . . . . Non-linear integro-differential equations
. . *Types by property*
MO . . . Abstract integral equations
NA . . . Linear integral equations
NAN 7 . . . . Singular integral equations
. . . . . *Elements*
NAN 7DF . . . . . Boundary problems
NAP 2 . . . . Volterra integral equations
NB . . . . Non-linear integral equations
NBN 7 . . . . . Singular non-linear equations
. . . . . *Elements*
NBN 7DF . . . . . Boundary problems
P2 . . . Fredholm integral equations
AWI *Types of equations by other operations etc*
* Normal synthesis by Auxiliary Schedule AM1 is resumed here after its interruption at AWE MEN TL and AWE MF.
* Add to AWI letters JW/W from Auxiliary Schedule AM1. Note that -JW represents AM7 W, which immediately follows AM7 V Integration (which specifies Integral equations).
KL . Functional equations
. . *Types by method*
KLI 4 . . . Classical functional equations
. . *Types by property*
KLN A . . . Linear functional equations
KLN DQ . . . Multilinear functional equations
. . *Types by system*
KLT B . . . Matrix functional equations
Types of equations by property
OR . Dynamic systems of equations, dynamical systems
. . *Subsystems*
ORF VJ . . . Topological questions
. . *Types*
ORN B . . . Non-linear dynamical systems
Types of equations by elements
PL . Difference equations
. . *Types by operation*
PLJ R . . . Differential difference equations
PLJ R3C OG . . . . Asymptotic theory
. . . . *Properties*
PLJ RBY . . . . . Stability
PLJ RBY 3A . . . . . Stability theory
. . . . *Elements*
PLJ RDF DD . . . . . Boundary value problems

Mathematics AM
Mathematical systems AR5
Analysis AW
Other relations in analysis AWE
. . . . . Elements
. . . . . Boundary value problems AWI PLJ RDF DD

AWI PLJ RDG . . . . . Solutions
PLJ RDG NXF . . . . . Periodic solutions
. . . . . *Types*
PLJ T . . . . . Difference-partial differential equations
. . . . . *Types of difference equations by property*
PLN A . . . . . Linear difference equations
PLN B . . . . . Non-linear difference equations
PLN J . . . . . Finite difference equations
AWJ *Other relations in analysis*
* Normal synthesis is resumed here after its interruption at AWE MF.
* Add to AWJ number and letters 9N/AL in Auxiliary Schedule AM1.
9N . Inequalities
. . *Types by relations*
9NK L . . . Functional inequalities
Properties in analysis
* Add to AWJ letters AN/BXV in Auxiliary Schedule AM1.
BXV . Optimality
* For Optimal control use AWK. Normal synthesis is interrupted here; it is resumed at AWL.

AWK . Optimality, optimization
. . *Methods*
6QR . . . Approximation methods
. . . Variational methods
6Y . . . . Control theory, optimal control
. . . . . Special theories
6Y3 B . . . . . Maximum principle, minimum principle, Pontryagin's principle
. . *Relations*
8L . . . Functions
8L3 KP . . . . Problems involving functional relations
9L . . . Equations
9L3 KP . . . . Problems involving equations
9MF . . . . Ordinary differential equations
9MG . . . . Partial differential equations (optimal control)

Mathematics AM
Mathematical systems AR5
Analysis AW
Properties in analysis
. . Relations
. . . . Partial differential equations AWK 9MG

. . *Elements*
AWK DG . . . Solutions to optimal control problems
. . . . *Methods*
DG6 Q7G . . . . . Necessary conditions methods
DG6 QR . . . . . Approximate methods, approximation methods
DG6 X . . . . . Finite difference methods
DG6 Y . . . . . Linear programming methods
. . . . *Properties*
DGA NT . . . . . Existence problems for optimal solutions
E5 . . . Conditions for optimality
. . . . *Properties*
E5B S . . . . . Freeness, free problems
. . . . . *Types by property*
E5B SND K . . . . . Free problems in one independent variable
E5B SND N . . . . . Free problems in two or more independent variables
E6 . . . . Chain conditions
E7E . . . . . Necessary & sufficient conditions
E7S . . . . States in analysis
E7S ET . . . . . State variables
. . . Variables
ET . . . . Control variables
. . *Subsystems*
FUA . . . Spaces
FUA MO . . . . Abstract spaces
FUG . . . Manifolds
. . . . *Properties*
FUG B5 . . . . . Measure & integration
FUG B5T S . . . . . Geometric measure & integration
. . *Types by property*
NA . . . Linear optimal systems
AWL *Other properties & elements/entities in analysis*
* Normal synthesis is resumed here after its interrruption at AWJ BXV.
* Add to AWL letters BXX/EU from Auxiliary Schedule AM1.

Mathematics AM
Mathematical systems AR5
Analysis AW
Other properties & elements/entities in analysis AWL

Entities in analysis
AWL EO . Sequences & series in analysis
* See note under (Types) below for explanation of the treatment of sequences and series separately.
. . *Processes*
EO8 B . . . Convergence
EO8 BN4 Q . . . . Absolute convergence
EO8 BN4 S . . . . Conditional convergence
. . *Properties*
EOC 4Y . . . Summability
. . . . *Methods*
EOC 4Y6 KL . . . . . Function-theoretic methods
EOC 4Y6 TB . . . . . Matrix methods
EOC 4Y6 WO . . . . . Functional analytic methods
EOC 4Y7 3 . . . . . Integral methods
. . . . *Types by property*
EOC 4YN 4Q . . . . . Absolute summability
EOC 4YN LN . . . . . Strong summability
. . *Elements*
EOD M . . . Product
EOD MNK . . . . Infinite product
. . *Subsystems*
EOF RKL . . . Continued fractions
. . *General types of sequences & series*
* The literature usually considers sequences and series (a sequence expressed as a sum) together, although often only the series is significant. To avoid an unhelpful separation into three separate sequences (Types of sequences and series jointly; Types of sequences; Types of series) the arrangement is modified as shown below.
EP . . . Sequences, progressions
* For specific types of sequences, see AWL EQH/W.
EQ . . . Series
* For specific types of series, see AWL EQH/W.
. . *Specific types of sequences & series*
* Add to AWL EQ letters H/W from Auxiliary Schedule AM1.
. . . *Types by process & relation*
EQK C . . . . Divergent series
EQK L . . . . Functional series & sequences
. . . *Types by property*
EQN 8H . . . . Multiple series & sequences
EQP 2 . . . . Fourier series
. . . . . *Processes*
EQP 28B . . . . . Convergence
EQP 28B N4Q . . . . . Absolute convergence of Fourier series

Operators

Analysis AW
Entities in analysis
Sequences & series in analysis AWL EO
. . Types by property
. . . . Processes
. . . . . Absolute convergence of Fourier series AWL EQP 28B N4Q
. . . . *Properties*
AWL EQP 2C4 Y . . . . . Summability
. . . . *Elements*
EQP 2EK . . . . . Fourier coefficients
. . . . *Types by property*
EQP 2N8 H . . . . . Multiple Fourier series
. . . . . *Properties*
EQP 2N8 HC4 Y . . . . . Summability
. . *Types by element*
EQP N . . . Power series
. . . . *Processes*
EQP N87 . . . . . Continuation
EQP N87 W . . . . . Analytic continuation
. . *Types by system*
EQR I . . . Numerical series & sequences
. . . . *Processes*
EQR I87 . . . . . Continuation
EQT S . . . Geometric series
EQV E . . . Trigonometric series
. . . . *Properties*
EQV EAN U . . . . . Uniqueness problems
. . . . *Types by property*
EQV EN8 H . . . . . Multiple trigonometric series
ER Approximations, expansions
. *Processes*
ER8 B . . Convergence
ER8 BCQ R . . . Rate of convergence
ER8 E . . Interpolation
. *Relations*
. . Functions
. . . Rational
ER8 MY . . . . Approximations by rational functions
. *Elements*
ERE U . . Approximations by operators
. *Types by property*
ERM O . . Abstract approximations
ERM O3A . . Abstract approximation theory
ERO G . . Asymptotic approximations

Mathematics AM
Mathematical systems AR5
Analysis AW
Entities in analysis
Approximations AWL ER
. . Asymptotic approximations AWL ERO G

AWL EU Operators
EU3 A . Operator theory
. *Types of operator by operation*
EUJ R . . Differential operators
EUJ T . . . Partial differential operators
EUJ V . . Integral operators
. *Types by relation*
EUL G . . Self-adjoint operators
. . . *Subsystems*
EUL GFU AP2 . . . . Self-adjoint operators in Hilbert spaces
. *Types by property*
EUN A . . Linear
* For linear operators, use AWM. Normal synthesis by Auxiliary Schedule AM1 is interrupted here; it is resumed at AWM X.
AWM . . Linear operators
. . . *Methods*
6YY . . . . Operational calculus of linear operators
. . . *Relations*
8L . . . . Functions
. . . . . *Types by entity*
8N3 QH . . . . . Vector functions & operator functions
. . . . Similarity
9HG NA . . . . . Linear similarity
. . . . Equivalence
9JN A . . . . . Linear equivalence
. . . . Equations
9L . . . . . Equations involving linear operators
. . . . . Problems
9L3 KS . . . . . Incorrectly posed problems
. . . *Entities*
EN . . . . Spectra
EN3 A . . . . . Spectral theory of linear operators
. . . . . *Relations*
EN9 E . . . . . Operators extensions
. . . . . *Properties*
EN9 P . . . . . Inverse problems
. . . *Subsystems*
FRY . . . . Semi-groups of linear operators
FTA . . . . Algebras of linear operators
FUA . . . . Spaces
FUA NA . . . . . Linear spaces of operators

Operators

Mathematical systems AR5
Analysis AW
Entities in analysis
Operators AWL EU
Subsystems
. . Linear spaces of operators AWM FUA NA

AWM FUA NLD . . Infinite-dimensional spaces
FUA NLD NA . . . Infinite-dimensional linear spaces
. . . . *Relations*
FUA NLD NA9 L . . . . . Linear equations in infinite-dimensional linear spaces
FUA OD . . Convex spaces
FUA ODN F . . . Locally convex spaces
FUA P2 . . Linear operator in Hilbert spaces
FUA P2E N3A . . . Spectral theory of linear operators in Hilbert spaces
FUA P3 . . Linear operators in Banach spaces
FUA P3E N3A . . . Spectral theory of linear operators in Banach spaces
Types by property
LG . Self-adjoint linear operators
. . *Subsystems*
LGF UAP 2 . . . Self-adjoint linear operators in Hilbert spaces
MP . Concrete operators
. . *Entities*
MPE N . . . Spectrum
MPE R . . . Expansions
MPE RQG . . . . Expansions in Eigenfunctions
N7 . Single linear operator
. . *Entities*
N7E N . . . Spectrum
N7E N3B . . . . Scattering theory
. . *Subsystems*
N7F RB . . . Sets
N7F RBQ N . . . . Spectral sets
N7F UBF . . . Subspaces
N7F UBO 2J . . . . Invariant subspaces
. . *Types by property*
N7M R . . . Normal operators
. . . . *Subsystems*
N7M RFU A . . . . . Spaces
N7M RFU AP2 . . . . . Normal operators in Hilbert spaces
N7N OJ . . . Symmetric operators
N7N R . . . Compact operators
N7P 2 . . . Volterra operators
N7P 2FU AP2 . . . . Volterra operators in Hilbert spaces
N7P 2FU AP3 . . . . Volterra operators in Banach spaces
N7P 3 . . . Hermitian operators
N7P 4F . . . Fredholm operators

Analysis AW
Entities in analysis
. . Types by property
. . . . Types by property
. . . . . Single linear operator AWM N7
. . . . . Fredholm operators AWM N7P 4F

AWM NW . . . . . Completely continuous operators
. . . . . *Entities*
NWE N3A . . . . . Spectral theory of completely continuous operators
P5F . . . . . Bounded linear operators
PL . . . . . Difference operators
. . . . *Types by element/entity*
QN . . . . . Spectral operators
X . . *Other types of operators*
* Normal synthesis is resumed here after its interruption at AWL EUN A.
* Add to AWM X letters NB/W in Auxiliary Schedule AM1.
XNB . . . Non-linear operators
. . . . *Relations*
XNB 9L . . . . . Equations involving non-linear operators
. . . . *Types by property*
XNB NOT . . . . . Monotone operators
Y *Other entities in analysis*
* Add to AWM Y letters U/X following AMQ.
AWN *Subsystems in analysis*
* Add to AWN letters R/W following A in AR/AW.

Y *Types of analysis*
* Add to AWN Y letters H/KL from Auxiliary Schedule AM1
YKL . Functional
* For functional analysis, use AWO. Normal synthesis is interrupted here; it is resumed at AWR Y.

AWO . Functional analysis
* See also Topology, TJ
. . *Methods*
6SX . . . Categorical methods
. . *Relations*
8L . . . Functions
. . . . *By relation*
8LL R . . . . . Generalized functions
. . . . *By property*
8NV . . . . . Continuous functions
. . . . . *Subsystems*
8NV FTA . . . . . Algebras
8NV FTD B . . . . . Banach algebras of continuous functions

Mathematical systems AR5
Analysis AW
Types of analysis AWN Y
Relations
. Functions AWO 8L
. . . . . Banach algebras of continuous functions
AWO 8NV FTD B

AWO 8X . Functionals
. . *Types by property*
8XN A . . . Linear functionals
. . . . *Elements*
8XN ADI . . . . . Moments
8XN ADI 3A . . . . . Theory of moments
. . *Types of functionals by system*
8XW . . . Linear analytic functionals
94 . Transforms
. . *Types by property*
94P 2 . . . Fourier transforms
94P 28L LR . . . . Fourier transforms of generalized functions
Properties
B5 . Measure
Elements
DU . Derivatives
DW . Functional integrals

Subsystems in functional analysis
FRB . Sets
FRB X . . Boolean algebra in functional analysis
. . . *Relations*
FRB X9S . . . . Representations of Boolean algebra
FSA . Groups
. . *Relations*
FSA 9S . . . Representations of groups
FSA 9SN LD . . . . Infinite-dimensional representations
FSM . Rings
FSS . . Ideals
FST . . Modules
FST MR . . . Normal modules
FST P2 . . . Banach modules
FTA . Algebras
FTA G . . Subalgebras
FTA VJ . . Topological algebras
. . . *Relations*
FTA VJ9 S . . . . Representations
FTC . . Lie algebras
. . . *Relations*
FTC 9S . . . . Representations of Lie algebras
FTC 9SN LD . . . . . Infinite-dimensional representations of Lie algebras
FTD B . . Banach algebras
. . . *Types by relation*
FTD BKN V . . . . Banach algebras of continuous functions

Mathematical systems AR5
Analysis AW
Types of analysis AWN Y
Algebras AWO FTA
. . Types by relation
. . . Banach algebras of continuous functions
AWO FTD BKN V

. . *Types by property*
AWO FTD BO9 . . . Commutative Banach algebras
. . . . *Relations*
FTD BO9 9S . . . . . Representations of commutative Banach algebras
FUA Spaces in functional analysis
. *Types by relation*
FUA KL . . Function spaces
. . . *Relations*
* For Functionals in linear spaces see Linear spaces AWO FUA NA8 X.
. *Types by property*
FUA NA . . Linear spaces
. . . *Relations*
FUA NA8 LLR . . . . Generalized functions
FUA NA8 NOG . . . . Homogeneous functions
FUA NA8 NOG LR . . . . . Homogeneous generalized functions
FUA NA8 X . . . . Functionals in linear spaces
FUA NA8 XN4 J . . . . . Positive
FUA NA8 XN4 JMQ B . . . . . Positive definite functionals in linear spaces
FUA P2 . . . Hilbert spaces
* For Banach spaces, see AWP P2.
FUA P85 . . . Normed linear spaces
. . . . *Properties*
FUA P85 BON . . . . . Reflexivity
FUA P85 BXD . . . . . Duality
FUA P85 C4Y . . . . . Summability
. *Types of spaces by element*
FUA PMO CL . . Inner product spaces, pre-Hilbert spaces
. . . *Elements*
FUA PMO CLD Y . . . . Structure
. . . *Subsystems*
FUA PMO CLF VJ . . . . Topology

Mathematics AM
Mathematical systems AR5
Analysis AW
Types of analysis AWN Y
Types of spaces by element
. . . Topology AWO FUA PMO CLF VJ

Types by system

AWO FUA VJ . Topological spaces
FUA VJN A . . Linear
* For topological linear spaces use AWP. Normal synthesis is interrupted here; it is resumed at AWP Y.
AWP . . Topological linear spaces, topological vector spaces
. . . *Processes*
8A . . . . Topological linear spaces of distributions
. . . *Properties*
B4V . . . . Dimension
B4V K6 . . . . . Approximate dimensions
BXD 3A . . . . Duality theory
C4Y . . . . Summability
. . . *Elements & entities*
E2 . . . . Extremal problems of topological linear spaces
EW . . . . Bases in topological linear spaces
. . . *Subsystems*
FRB . . . . Sets
FRC N8U . . . . . Fractals (topological linear spaces)
FTS . . . . Geometry of topological linear spaces
FUA . . . . . Spaces
FUA LF . . . . . Conjugate spaces
. . . . . *Relations*
FUA LF8 X . . . . . Linear functionals of conjugate spaces
FUB F . . . . . Subspaces
FUB FX . . . . . Retracts, retractions
FUC RB . . . . . Convex sets in linear spaces
. . . *Types of topological linear spaces by relation*
KNV . . . . Spaces of continuous functions
KW . . . . Spaces of analytic functions
. . . *Types of topological linear spaces by property*
OD . . . . Convex spaces
ODN F . . . . . Locally convex spaces
P2 . . . . Banach spaces
P5F . . . . Bounded
P5F NF . . . . . Locally bounded topological linear spaces
P82 . . . . Kernel spaces
P85 . . . . Normed spaces
. . . *Types by entity*
QO . . . . Spaces of sequences
. . . *Types by system*
TB . . . . Spaces of matrices

Analysis AW
Types of analysis AWN Y
Subsystems in functional analysis
. . Types by system
. . . . Topological linear spaces, topological vector spaces AWP
. . . . . Spaces of matrices AWP TB

AWP Y . . . . *Other types of topological spaces*
* Normal synthesis is resumed here after its interruption at AWO FUA VJN A.
* Add to AWP Y letters NB/W in Auxiliary Schedule AM1.
AWQ A . . *Other types of spaces in functional analysis*
* Normal synthesis is resumed here after its interruption at AWO FUA VJN A.
* Add to AWQ A letters VK/W from Auxiliary Schedule AM1.
B *Other subsystems in functional analysis*
* Add to AWQ B letters UB/W following A in AUB/AW.
H *Types of functional analysis*
* Add to AWQ letters H/NA in Auxiliary Schedule AM1.
NB . Non-linear
* For Non-linear functional analysis, use AWR. Normal synthesis is interrupted here; it is resumed at AWR X.
AWR . Non-linear functional analysis
. . *Relations*
8X . . . Non-linear functionals
. . . . *Methods*
8X7 2 . . . . . Differential calculus for non-linear functionals
. . . . *Entities*
8XE U . . . . . Non-linear operators
8XE UNO T . . . . . Monotone operators
. . . . *Subsystems*
8XF VJ . . . . . Topological properties
. . *Entities*
EU . . . Non-linear operators
. . . . *Methods*
EU6 X . . . . . Infinitesimal calculus for non-linear operators
. . . . *Entities*
EUE G . . . . . Eigenvalues of non-linear operators
. . *Subsystems*
FUA . . . Functional spaces
. . . . *Relations*
FUA 9MN B . . . . . Non-linear equations
FUA 9MN B3K S . . . . . Incorrectly posed problems
. . . . . *Properties*
FUA 9MN BAN T . . . . . Existence

Analysis

Mathematics AM
Mathematical systems AR5
Analysis AW
Types of analysis AWN Y
. . Types of functional analysis AWQ H
. . . . . Existence
AWR FUA 9MN BAN T

AWR X . . *Types of functional analyis by other properties etc*
* Normal synthesis is resumed here after its interruption at AWQ NB.
* Add to AWR X letters NC/W in Auxiliary Schedule AM1.

Y *Types of analysis by other relations etc*
* Normal synthesis is resumed here after its interruption at AWN YKL.
* Add to AWR Y letters KX/NXH in Auxiliary Schedule AM1 (representing AM8X/ANXH in the schedule).

YN5 . Measure, measure theory
* See also Probability AWX

. . *Operations*

YN5 7V . . . Integration & disintegration of measures

. . *Relations*

YN5 8L . . . Measurable functions

YN5 8YM . . . . Non-measurable functions

. . *Properties*

YN5 B4V . . . Dimensions

YN5 B8U . . . . Hausdorff dimension

. . *Types by property*

YN5 O2J . . . Invariant measures

YN5 P2 . . . Lebesgue measures

YN5 P4H . . . Hausdorff measure

YN5 P4I . . . Hausdorff distance, Hausdorff metric

. . *Types by entity*

YN5 QH . . . Vector valued measures

YNX H . Harmonic analysis
* For Harmonic analysis, use AWS. Normal synthesis is interrupted here; it is resumed at AWS Y.

AWS . Harmonic analysis, spectral analysis

. . *Subsystems*

FSA . . . Groups

. . . . *Methods*

FSA 6O4 Y . . . . . Summability methods on groups & semi-groups

. . . . *Relations*

. . . . . Functions on groups

FSA 8L . . . . . Harmonic analysis of functions on groups

. . . . . *Types of functions*

FSA 8NX G . . . . . Almost periodic functions on groups

FSA 9S . . . . . Representations of groups & semi-groups

. . . . *Subsystems*

FSA FTA . . . . . Algebras on groups

FSA FTA N5 . . . . . Measure algebras on groups

Analysis AW
Types of analysis by other relations etc AWR Y
. . Subsystems
. . . Groups AWS FSA
. . . . Subsystems
. . . . . Algebras on groups AWS FSA FTA
. . . . . Measure algebras on groups
AWS FSA FTA N5

AWS FSA FUV NI . . . . . Integral geometry

. . . . *Types of groups by property*

FSF . . . . . Abelian groups (harmonic analysis)

FSF NR . . . . . Compact

FSF NRN F . . . . . Locally compact Abelian groups, LCA groups

. . . . . *Relations*

FSF NRN FA9 4 . . . . . Transforms on locally compact Abelian groups

FSF NRN FA9 4P2 . . . . . Fourier transforms

FUA . . . Spaces

FUA NOG . . . . Homogeneous spaces

. . . . . *Relations*

FUA NOG 8L . . . . . Functions on homogeneous spaces

. . *Types of harmonic analysis by property*

MO . . . Abstract harmonic analysis

. . . . *Methods*

MO6 SX . . . . . Categorical methods

. . . . *Relations*

MO8 OYB . . . . . Spherical functions

. . . . *Subsystems*

MOF SA . . . . . Groups & semi-groups

. . . . . *Operations*

MOF SA7 7 . . . . . Synthesis

MOF SA7 7QN . . . . . Spectral synthesis on groups & semigroups

Y *Types of analysis by other properties etc*
* Normal synthesis is resumed here after its interruption at AWR YNX H.
* Add to AWS Y letters NXJ/QP2 in Auxiliary Schedule AM1.

YQP 2 . Fourier series
* For Fourier analysis, use AWT. Normal synthesis is interrupted here; it is resumed at AWT Y.

AWT . Fourier analysis

. . *Processes*

8E . . . Interpolation

8EV E . . . . Trigonometric interpolation

. . *Relations*

8L . . . Functions

. . . . *Subsystems*

8LF RB . . . . . Sets of functions

. . . . . *Properties*

Mathematical systems AR5
Analysis AW
. Types of analysis by other properties etc AWS Y
. . . Relations
. . . . Functions AWT 8L
. . . . . Subsystems
. . . . Properties

AWT 8LF RBB TN . . . . . Completeness of sets of function
. . . . . *Types by property*
8N4 J . . . . . Positive
8N4 JMQ B . . . . . Positive definite functions
8NX G . . . . . Almost periodic functions
8NX GI4 . . . . . Classical almost periodic functions
94 . . . . Fourier transforms
. . . *Elements*
DI . . . . Moment problems
DIV E . . . . . Trigonometric moment problems
. . . *Entities*
EQ . . . . Series
. . . . . *Types by property*
EQO U . . . . . Series of orthogonal functions
EQO UAN U . . . . . Uniqueness for orthogonal series
EQO UBF . . . . . Localization for orthogonal series
. . . . . *Types by system*
EQV E . . . . . Trigonometric series
. . . . . *Properties*
EQV EC4 Y . . . . . Summability
Y . *Types of analysis by other properties etc*
* Normal synthesis is resumed here after its interruption at AWS YQP 2.
* Add to AWT Y letters QP3/W in Auxiliary Schedule AM1.

AWX Probability
* Most of the literature on this branch of mathematics refers to statistics and so the detailed schedule appears under class AX Statistics and probability.
* A selection of concepts prominent in general probability is given below to demonstrate the scope of the schedule.
* Division is like that for any other branch of Mathematics, following Auxiliary Schedule AM1, but with the addition of some concepts from AX.
. Theory
3A . . Abstract probability theory
3D . Axioms
3P . Foundations
4 . . Logical probability
. *Operations*
86 . . Approximation
8B . . Convergence of probability measures

Mathematics AM
. . . Operations
. . . . Convergence of probability measures AWX 8B

. . . *Relations*
AWX 8L . . . . Functions
8L8 H . . . . . Optimization
8L8 HX . . . . . Minimization
95 . . . . Transformations
. . . *Properties*
D8 . . . . *Special statistical properties*
* Add to AWX D8 letters B/Y following AXA in AXA B/AXA Y.
* Add to AWX D9 letters B/J following AXB in AXB B/AXB J. A selection of the more prominent concepts is given here for convenience.
. . . . . Dependence & independence
D8L . . . . . Dependence
D8M . . . . . Independence
D8X . . . . . Evidence
D9F . . . . . Chance
. . . *Elements & entities*
DH . . . . Limits
DI . . . . Moment problems
ES . . . . Invariants
ET . . . . Variables
. . . *Systems*
* Include probability theory and measures on mathematical structures
RD . . . . Combinatorial probability
RX . . . . Algebraic structures in probability
SA . . . . . Groups (probability)
* See also Fourier transforms, AWT94
TS . . . . Geometric probability
VJ . . . . Topological structures in probability
VKO N . . . . . Metric spaces in probability
VKV J . . . . . Topological spaces in probability
W . . . . Analysis in probability
* See also Stochastic processes, AWU XN
W6X . . . . . Calculus of probability
W8L . . . . . Functions in probability
WB . . . . . Potential theory in probability
. . . . *Special systems*
* Add to AWU X letters G/X following AX.
XGT . . . . . Conditional probability
XH . . . . . Random variables
XI . . . . . Probability distributions
XN . . . . . Stochastic processes

AWY Applied mathematics
* Other than Statistics (AX).
* The preferred arrangement is to subordinate the mathematics of a given subject (e.g. Physics) to the subject.

Applied mathematics AWY

* Two alternatives are provided: First, to locate applications at the end of the class to which they refer; for this, the letter Y is reserved in Auxiliary Schedule AM1 - see the notes given there. Second, this location (AWY) is an alternative for libraries wishing to keep all applied mathematics together. If this option is taken, proceed as follows:
* Add to AWY numbers and letters 4/9, A/Z from the whole classification, e.g. AWY B Mathematics of physics.
* Each subject (where the hyphen represents the classmark) may be fully qualified by preveding facets, as follows:
* Add to - the number 2 followed by numbers 2/9 from Auxiliary Schedule 1 (with any amendments shown at AM2).
* Add to - the number 3 followed by numbers 3/9 following AM.
* Add to - the number 3 followed by letters MB/WX following A.
* Further subdivisions of the subject field to which Mathematics is applied may be added as follows:
* Add to - the number 4 followed by numbers 3/4 3/4 for any topical subdivisions of the class numbered 3/4.
* Add to - the numbers 5/9 for any topical subdivisions of the class numbered 5/9.
* Add to - letters A/Z.
* For a worked example of this method, see Applied statistics AXY.

AX . Statistics & probability
AX2 . . *Common subdivisions*
* These are amended in the same way as for Mathematics.
* Add to AX2 numbers 2/9 from Auxiliary Schedule 1 with the adjustments given in AM2.

3N . . . Statistical tables
7 . . . History of statistics & probability
9 . . . . Biography of statisticians
9B . . . *Relations with other subjects*
A . . . . Philosophy
. . *Agents & instruments in statistical operations*
M . . . Data processing in statistics
* The provision below expands that at AM2M to meet the increased need for detail in Statistics.

MG . . . . Machines & equipment in statistics
N . . . . . Computers in statistics
P . . . . . Programs in statistics
Q . . . . *Special operations*
* Add to AX2 Q letters H/Y following K7X.
* Add to AX2 R letters C/L following K7Y.

QC . . . . . Coding in statistics
AX3 4 . . *Forms of mathematical presentation*
* These apply mainly to mathematical statistics (AX7). Use this position only for those few concepts which may be needed to qualify Descriptive statistics (AX5/6).
* Add to AX3 numbers 5/9 & letters A/L following AM3 in AM35/39, AM3A/3L.

Applied mathematics AWY
Statistics & probability AX
Forms of mathematical presentation AX3 4

AX3 5 . Errors in descriptive statistics
* Apply only to Descriptive statistics. In Mathematical statistics use AXA B.

. Theory
A . . General theory of statistics & probability
* Use only for works dealing with descriptive as well as mathematical statistics.

AX5 Descriptive statistics
7 . Data collection
* The detailed schedule in K7 applies primarily to social sciences but may be used here so far as applicable.
* Add to AX5 7 numbers & letters 8/9, A/V following K7.

77 . . Survey design
* Interviewing, questionnaires, etc.

78 . . . Confidentiality
796 . . . Non-response
7B . . . Factor control
7C . . . Sampling operation (narrowly)
* For sampling distribution and theory see AXW.

7J . . . Observation
7JL . . . . Recording observations
7L . . . . Questioning
7M . . . . . Interviewing
7N . . . . . Questionnaires
7X . Data processing
* Use AX2 M.

8 . Presentation of data
8C . . Charts, graphical presentation, pictorial presentation
8E . . Tabulation
8H . . Index numbers
8P . Preservation of original data
9 . Descriptive measures
9C . . Classification of data
* See also Analysis of variance, AXT

AX6 . . Frequency distributions
* Distributions derived from actual data serving purely descriptive function. For distribution theory & theoretical distributions, see AXI 73A.
* For variables in general, see AXG H.

7 . . . Population characteristics & parameters
9 . . . . Central tendency, averages, means in statistics
B . . . . . Clustering
C . . . . . Arithmetic mean
D . . . . . Median
E . . . . . Mode
F . . . . . Geometric mean
G . . . . . Harmonic mean
H . . . . . Logarithmic mean

Mathematical statistics

Statistics & probability AX
Descriptive statistics AX5
. . Frequency distributions AX6
. . . Population characteristics & parameters AX6 7
. . . . Central tendency AX6 9
. . . . . Logarithmic mean AX6 H

AX6 J . . . . Variability
K . . . . . Dispersion
* Most of the literature implies Probability distributions; see AXI BK.
L . . . . . Deviation
M . . . . . Standard deviation
N . . . . . Standard error
O . . . . . Large deviation
* See also Limit theorems, AXM 73F.
P . . . . . Range in statistical populations
Q . . . . . Quartiles
R . . . . . Extreme quartiles range
S . . . . . Skewness
T . . . . . Kurtosis
X . . . *Types of frequency distribution*
* Add to AX6 X letters IJ/M following AX e.g. Poisson frequency distribution AX6 XKL.
Y . . *Other descriptive measures*

AX7 Mathematical statistics, statistical mathematics
* The complete mathematics schedule is available here if need be. In some cases, a concept has its own special significance and set of relationships in statistics and in such cases this should be preferred to the concept as derived from AM/AW, e.g. Decision procedures AXC J (not AX7 4GJ); inequalities AXA V (not AX7 9N).
* Add to AX7 numbers & letters 3/9, A/W in Auxiliary Schedule AM1, with details from AM/AW.
* Occasionally, a mathematical concept will need to be qualified by a concept from the purely statistics class. In such cases the end of the classmark derived from Mathematics must be signalled by 'Z' before adding the statistics component - e.g. Discrete distributions - Superposition - Decomposition AXJ K78 EXZ 8DE. (See also Introduction, Section 10.42).
. *Forms of mathematical presentation*
3A . . Theory
3D . . Axioms
3F . . Theorems
3L . . Models
3LX . . . Simulation
. *Methodologies*
3P . . Foundations
4 . . . Mathematical logic
4G . . . . Algorithms
4GJ . . . . . Decision procedures
* See also Decision making AXC J.
6D . . Numerical analysis
6RS . . Algebraic methods
6TS . . Geometric methods
6VJ . . Topological methods
6W . . Analytic methods
6X . . . Calculus

Applied mathematics AWY
Statistics & probability AX
Mathematical statistics AX7
Methodologies
. . Calculus AX7 6X

Operations
AX7 7R . Differentiation
7V . Integration
7W . Partition
* See also Analysis of variance, AXT
Processes
86 . Approximation
8B . Convergence
8E . Interpolation
8EX . Superposition
8GM . Decomposition
8H . Optimization
8HX . Minimization
Relations
8L . Functions in mathematical statistics
8YJ . . *Functions special to statistics*
* These are subordinated to specific problems - e.g. Markov processes - Transition functions AXO 78Y J; Analysis of experiments - Functions - Contrasts AXS 78Y H.
94 . Transforms
95 . Transformations
9E . Extensions
9L . Equations
9MP 3 . . Planck's equation
9N . Inequalities
* See also Statistical methods AXA V
9QY . Proportion, ratio
9S . Representations
AB . Homomorphisms
AC . . Automorphisms
Properties
CG . Asymptotic
CU . Orthogonal
Elements
DC . Domain
DCY . Range
DF . Boundary
DG . Solutions
DH . . Limits
EB . Points
ED . Spaces
Entities
EE . Scalars
EH . Vectors
EK . Coefficients
EN . Spectra
EP . Sequences, progressions
EQ . Series
ES . Invariants
ET . Variables

Statistical method

Applied mathematics AWY
Statistics & probability AX
Mathematical statistics AX7
Entities
. Variables AX7 ET

AX7 F *Subsystems*
* Add to AX7F letters R/W following A in AR/AW.

H *Types*
* Auxiliary Schedule AM1 provides (via H/W) a set of specifiers for indicating particular types of anything.
* In it, letters H/Q introduce the earlier facets in AM3/AQ (Methodologies, Operations, Processes, etc.) when these are used as specifiers to signify types (species), e.g. Spaces AX7 UN; Linear spaces AX7 UN NA (in which the -NA is from ANA).

Systems, branches of mathematics

RB . Sets
RD . Combinatorics
RI . Arithmetic
RJ . Number theory
RQB . Ordered structures
RR . . Lattices
RS . Algebra
SA . . Groups
TB . . Matrices
TB8 YD . . . Determinants
TS . Geometry
VJ . Topology
W . Analysis
W6X . . Calculus
W8L . . Functions
WB3 A . . . Potential theory
WLE U . . Operators
WO . . Functional analysis
WRY N5 . . Measure theory
WS . . Harmonic analysis, spectral analysis
WX . *Probability*
* See AXG

. *Special systems*

X . . Bayesian statistics
* Hypotheses classified by experimenter's confidence in them, modified as experiment proceeds.
* See also Conditional probability, AXG T.

X3F . . . Bayesian theorem

Applied mathematics AWY
Statistics & probability AX
Mathematical statistics AX7
Systems, branches of mathematics
. . . Bayesian theorem AX7 X3F

AX8 Statistical method

8 . *Conceptual agents*
* For use when any statistical concept is used in an exceptional role as an agent.
* Add to AX88 numbers & letters 8/9, A/X following AX in AX8/AXX, e.g. Regression - Estimation - Maximum likelihood - using Normal distribution AXU NDK 88 KP.

9 . . *Special concepts as agents*
* When special to a given context; see Estimators AXD 89E for example.

A . *Properties of operations*
* Use this provision only when qualifying the Operations below (AX8D/AX9).
* Add to - (where hyphen represents the classmark of the operation) letters A/B following AX in AXA/AXB, e.g. Errors in scaling AX8 UFA B.

. *Operations*
* All operations in AX8D/AX9C may be qualified retroactively by dropping the initial AX8 of preceding classmarks; e.g. AX8 TF (Reliability - Tests).

D . . Analysis in statistics, statistical analysis in general
* Use only for qualification of concepts filing before design & analysis (AXR) where it is mainly applicable.

DE . . . Decomposition
F . . Testing, tests
S . . Measurement
* The following details are taken from K6S/K6Y. (social science research). Notation is modifed as indicated. Further details may be obtained from K6T/K6Y.

. . . *Properties*

SAB . . . . Errors
SAI . . . . Accuracy
SR . . . . Scales & scaling
ST . . . . Validity & reliability
T . . . . . Reliability, precision
TF . . . . . Tests of reliability
TG . . . . . Test-retest
TH . . . . . Equivalent forms
TJ . . . . . Split halves test
TV . . . . . Validity, relevance
. . . . . *Properties*
TVA I . . . . . Accuracy
TVA Q . . . . . Bias
TWE . . . . . External validity, empirical validity
TWN . . . . . Internal validity
TX . . . . . Construct validity, congruent validity

Statistical method

Mathematical statistics AX7
Statistical method AX8
Operations
. Measurement AX8 S
. . Properties
. . . . . Construct validity AX8 TX

. . *Techniques & characteristics of measurement*
AX8 UC . . . Scaling, scales
UD . . . . Construction of scales
UF . . . . Scaling techniques
UH . . . . Levels of measurement
UJ . . . . . Discrete scales, discontinuous scales
UK . . . . . Non-metric scales
UL . . . . . Nominal scales, category scales
UM . . . . . Ordinal scales, rank scales
UMV . . . . . Ranking techniques
UQ . . . . . Continuous scales
UR . . . . . Metric scales
US . . . . . Interval scales
UV . . . . . Ratio scales, absolute scales
. . . . *By number of variables*
UX . . . . . One variable measurements
V . . . . . Rating scales, intensity scales
W . . . . . Multivariable measurements
XB . . . . . Unidimensional scales
YB . . . . . Multidimensional scales
YG . . . *Other techniques*
* See Measures of stochastic processes AXN 8YG for example.
AX9 C . Sampling operation
* For samples as statistical models, see AXW.
D . *Operations special to a context*
* Classmarks -9D/9U are reserved for operations special to a particular context, which are therefore enumerated under that context. For an example of its application, see AXR 9 Design of experiments.
AXA *Properties in statistical method*
* Many of the properties below have special (& possibly unique) reference to particular operations, etc. (e.g. inference, test of significance). When they do refer to a particular problem they should, of course, be cited after that problem, e.g. Inference - Consistency.
B . Errors in statistical method
* For Type I & II errors, see AXF AE.
C . . Control of errors
D . . Process errors
G . . Probable errors
H . . Random errors
I . Accuracy
J . Sufficiency
* See also Comparison of experiments AXR 9Q
K . Exchangeability
KP . . Partial exchangeability
KY . Dependence & independence
* Applicable primarily to Conditional probability AXG T.
L . . Dependence
M . . Independence

Statistics & probability AX
Mathematical statistics AX7
Statistical method AX8
Properties in statistical method AXA
. Dependence & independence AXA KY
. . Independence AXA M

AXA N . . Laws of large numbers
NP . . . Weak law
NS . . . Strong law
P . Consistency in statistical methods
Q . Bias
R . Unbiasedness
S . Efficiency & inefficiency
* For Asymptotic efficiency, see Estimators AXD 89E AS
T . Robustness
U . Risk
V . Inequality in statistical method
W . Likelihood
X . Evidence
AXB B . Expectation
* Usually implies random variables.
D . Degrees of freedom
F . Chance
G . *Properties special to a context*
* Classmarks -BG/-BY are reserved for properties special to a particular context and which are therefore enumerated under that context. For examples of their application see Hypothesis testing AXF; Probability distributions AXI.

Types of methods
. *By distribution assumed*
AXC D . . Parametric methods
* Usually assumed. Use to qualify specific concepts only when explicitly distinguished from non-parametric.
F . . Non-parametric methods, distribution-free methods
F8S . . . Measurement
F8U MV . . . . Ranking techniques
G . . . Order statistics
. *By technique*
J . . Decision making
J3A . . . Decision theory
* See also Bayesian probabilities AXG T7X
. . . *Special properties*
JBJ . . . . Admissability
JBK . . . . Utility
JBK 3A . . . . . Theory
JBL . . . Loss
JBM . . . . Regret
K . . Change detection
L . . Compound decision, multiple decision

Inference

Applied mathematics AWY
Statistics & probability AX
Mathematical statistics AX7
Statistical method AX8
By technique
. Compound decision AXC L

AXC N Inference
. *Properties*
NAP . . Consistency
NAR . . Unbiasedness
NAS . . Efficiency
NAT . . Robustness
AXD . Estimation, parameter estimation, prediction (estimation)
* See also Expectation (probability) AXH BB.
7 . . Mathematics
73C A . . . Asymptotic theory
73C F . . . Filtering theory
74G . . . Algorithms
. . . Bayesian statistics
7XZ CN . . . . Bayesian inference
. . *Conceptual agents*
89E . . . Estimators
. . . . *Properties*
89E AS . . . . . Asymptotic efficiency
. . *Properties*
AU . . . Risk
AV . . . Inequality
* See also Tolerance intervals AXE
AW . . . Likelihood
. . *Types of estimation*
* See also Bayesian inference AXD 7XZ CN
F . . . Finite population process
G . . . Prediction (estimation)
* See also Correlation AXU E
G7 . . . . Mathematics
G7W S . . . . . Harmonic analysis
H . . . Underestimation
J . . . Point estimation
. . . . *Properties*
JAP . . . . . Consistency
JAR . . . . . Unbiasedness
JAS . . . . . Efficiency
JCF . . . . Non-parametric methods
. . . . *Types*
K . . . . . Maximum likelihood
L . . . . . Least squares
M . . . . . Fiducial estimation
. . . . . Minimax test
* See AXF DP.
AXE . . . Interval estimation, confidence intervals, confidence limits, tolerance intervals
. . . . *Properties*
BD . . . . . Degrees of freedom
CF . . . . Non-parametric methods

Statistics & probability AX
Mathematical statistics AX7
Statistical method AX8
Inference AXC N
Estimation AXD
. . . Non-parametric methods AXE CF

AXE G . . . Special intervals
* See measure involved: e.g. confidence interval for variance of normally distributed variables.
AXF Tests of significance, hypothesis testing, statistical testing
. Theory
73C A . . Asymptotic theory
. *Properties*
AB . . Errors
AE . . . Type I error
AF . . . Type II error
AR . . Unbiasedness
AS . . Efficiency
BG . . Power in hypothesis testing
* Probability of rejecting null hypothesis.
BG7 EN . . . Power spectra
BH . . . Uniformly most powerful, UMP
BJ . . Discrimination
CD . Parametric tests
* For specific parametric tests, see Types below.
CF . Non-parametric tests
DJ . Point estimation
DP . . Minimax test
. *Types*
. . *By complexity*
GS . . . Simple tests
GT . . . . Individual tests, A/Z
GV . . . Composite tests
GW . . . . Individual tests, A/Z
. . *By method*
H . . . Likelihood ratio test
* For maximum likelihoood, see Point estimations, AXD K.
I . . . Sequential tests
J . . . *Other parametric tests (A/Z)*
. . *By sample*
K . . . Two sample problem
L . . . K-sample problem
. . *By direction*
M . . . Direction test
N . . . Non-directional tests, two sided tests, two tailed tests
. . *By hypothesis*
O . . . Hypothesis test
* Add to AXF P letters K/V following K6I.
PK . . . . Working hypothesis
PP . . . . . Null hypothesis
PQ . . . . . Alternative hypotheses
. . . . *By propositions factor*
PV . . . . . Complex hypotheses, composite hypotheses

Statistical probability

Mathematical statistics AX7
Statistical method AX8
. Types of methods
. . . Tests of significance AXF
. . . . . By hypothesis
. . . . Complex hypotheses AXF PV

AXF PW . . . . . Simple hypotheses
. . . . . *By other non-purposive characteristics*
Q . . . . . Outlier tests
. . . . . *By purpose*
R . . . . . Goodness of fit
S . . . . . Tests of independence
. . . *Types of inference*
U . . . . Abstract inference
V . . . . Linear inference
W . . . . Simultaneous inference
. Design & analysis of experiments
* See AXR.
Y Probability
* Alternative (not recommended) for libraries wishing to keep together all Probability. The preferred arrangement is to treat probability in general as a branch of mathematics, at AWX.
* If this option is taken, add to AXF Y in the same way as shown at AWX (i.e. using Auxiliary Schedule AM1).
* The position at AWX would still be retained for use as a qualifier of specific mathematical concepts in class AM/AW.
* See also Logical probability AWX 4.

AXG Statistical probability
* For probability in pure mathemetics, see AWX (or the alternative at AXF Y).
7 . Mathematics
7B5 . . Measure theory
* As applied to statistics.
. . *Elements*
7DG . . . Solutions
7DH . . . . Limits (statistical probability)
. . *Entities*
7EN . . . Spectra (statistical probability)
7ES . . . Invariants (statistical probability)
7ET . . . Variables
* See AXG H.
7W . . Analysis
7W6 X . . . Calculus of probability
. *Properties*
AKY . . Dependence & independence
AX . . Evidence
BF . . Chance

Applied mathematics AWY
Statistics & probability AX
Mathematical statistics AX7
Statistical probability AXG
Properties
. Chance AXG BF

Elements
AXG H . Variables in statistical probability
I . . *Treatment variables*
* For the general class, see Design & analysis of experiments AXQ RGI. Use this provision only when qualifying (e.g. Optimal designs - Treatment variables AXR SP GI).
J . . Dependent variables
. . . *Properties*
JBG . . . . Contingency
JBG 23N . . . . . Contingency tables
K . . Independent variables
L . . Discrete variables, discontinuous variables
M . . Continuous variables
N . . Qualitative variables
N8S R . . . Scales
N8U K . . . . Non-metric scales
O . . . Nominal variables, categorical data, classification variables
P . . . Ordinal variables, ranked data
Q . . Quantitative variables
Q8S R . . . Scales
Q8U R . . . . Metric scales
Q8U RS . . . . . Ordered metric scales
R . . . Interval variables
S . . . Ratio variables
. . Random variables
* See AXH.

Systems
T . Conditional probability
. . Bayesian statistics
T7X . . . Bayesian probabilities
* See also Decision theory AXC J3A
. . . *Properties*
TAK Y . . . . Dependence & independence
. . . *Methods*
TCN . . . . Inference
. . . . . Bayesian statistics
TCN 7X . . . . . Bayesian theorem
U . . Transition probability

Probability distributions

Applied mathematics AWY
Statistics & probability AX
Mathematical statistics AX7
Statistical probability AXG
Conditional probability AXG T
. Transition probability AXG U

AXH Random variables, variates
7 . Mathematics
. . Functions
78L . . . Random functions
. . *Elements & entities*
7DK . . . Sums of random variables
. . . . Integrations
7DK 7V . . . . . Convolution
7EH . . . Vectors
7EP . . . Sequences
7EP 8B . . . . Convergence
. . *Systems*
7RS . . . Algebra
7SV . . . . Random fields
7W . . . Analysis
7WO . . . . Functional analysis
7WP . . . . . Topological linear spaces
7WP P2 . . . . . Banach spaces
. *Properties*
BB . . Expected values
BBA B . . . Errors
BBA G . . . . Probable errors
. . Normality
* See Normal distribution, AXK P.
. *Types*
. . *By statistical property*
GJ . . . Dependent real variables
GK . . . Independent real variables
GK7 DK . . . . Sums
. . . . . Limits
GK7 DKD H . . . . . Limit theorem
H . . *By mathematical characteristics*
* Add to AXH letters H/W from Auxiliary Schedule AM1, e.g. Transformed Beta distributions AXK WB HL4
NOG . . . Homogeneous random variables
QB . . . Point random variables

Statistics & probability AX
Mathematical statistics AX7
Statistical probability AXG
Random variables AXH
Types
. . Point random variables AXH QB

AXI Probability distributions, statistical distributions
7 . Mathematics
. . Theory
73A . . . Distribution theory
* See also Monte Carlo methods, AXX X
73C A . . . . Asymptotic theory
73C C . . . . Characterization & structure theory
73C I . . . . Infinitely divisible laws
73C S . . . . Stable laws
73L . . Models
73L X . . . Simulation
73L YB . . . Urn models
78L . . Functions
* See also Properties of distributions, AXI BK
78P 2 . . . Hartree Fock functions
794 . . . Transforms of variates
795 . . Transformations
79C X . . . Probit transformation
79L . . Equations
79M P3 . . . Planck's equation
7W . . Analysis
7WT . . . Fourier analysis
. *Properties*
BK . . Statistical dispersion
* See also Variability AX6 J; Variance theory AXT 73A
BKL . . . Dispersion functions
BL . . Homogeneity
BM . . Heterogeneity
BN . . Shape of distributions
BP . . Moments in statistical probability
BQ . . . Moment generating functions, MGF
BR . . . Moment about the mean
BS . . . Variance in statistical probability
BSS . . . . Semi-invariants
BV . . Characteristic function
* See also Fourier analysis AXI 7WT
BX . . Density function, probability density function, PDF, distribution function, frequency function

Mathematical statistics AX7
Statistical probability AXG
Random variables AXH
Probability distributions AXI
Properties
. Density function AXI BX

Types of probability distributions
. *By mode*
AXJ D . . Unicharacteristic distributions, unimodal distributions
E . . Bimodal distributions
G . Conditional & non-conditional distributions
H . Marginal distributions
K . Discrete distributions
K78 EX . . Superposition
K7P G . . Solutions
K7P H . . . Limits
O . Continuous distributions
. *By number of variables*
AXK . . Univariate distributions
8S . . . Measurement
8SR . . . . Scaling
JK . . . Discrete
K . . . . Binomial distribution
* For Multinomial distribution see Multivariate distributions, AXL L.
KBX . . . . . Density functions
KN . . . . . Negative binomials
L . . . . Poisson distribution
MB . . . . Logarithmic series distribution
ME . . . . Contagious distribution
MG . . . . Exponential distribution
MJ . . . . Hypergeometric distribution
N . . . . Others (A/Z)
O . . . Continuous univariate distributions
P . . . . Normal distribution, gaussian distribution
P79 5 . . . . . Transformation
Q . . . . Chi-square distribution
* By far the greater part of the literature is on the use of these in tests of significance.
S . . . . F distribution
T . . . . T distribution
V . . . . Gamma distribution
WB . . . . Beta distribution
WF . . . . Log-normal distribution
WH . . . . Truncated distribution
WJ . . . . Mixed distribution
WL . . . . Extreme value distribution
WN . . . . Weibull distribution
WP . . . . Pearson distribution
WS . . . . Sequential distributions
X . . . . Others (A/Z)
* For example, Cauchy distribution AXK XCA.

Mathematical statistics AX7
Statistical probability AXG
Random variables AXH
Probability distributions AXI
. . . Univariate distributions AXK
. . . . . Others AXK X

AXL . . . Multivariate distributions
78L . . . . Functions
78L KGM . . . . . Decomposition function
8S . . . . Measurement
8SR . . . . . Scaling
H . . . . Random variables
H78 L . . . . . Random functions of several variables
HNO G . . . . . Homogeneous random variables
HQB . . . . . Point random variables
JK . . . . Discrete distributions
L . . . . . Multinomial distribution
M . . . . . Others (A/Z)
O . . . . Continuous multivariate distributions
P . . . . . Multivariate normal distribution
Q . . . . . Others (A/Z)
V . . . . Bivariate distributions
AXM . . . Limit distributions, limiting
. . . . Theorems
73F . . . . . Limit theorems
* See also Law of large numbers AXM AN; Large deviations, AX6 O.
73F XC . . . . . Central limit theorem
73F XE . . . . . Zero-one law
73F XM . . . . . De Moivre-Laplace theorem
. . . . *Properties*
AN . . . . . Laws of large numbers
ANS . . . . . Strong theorems
. . . . *Types of limit distributions*
N . . . . . Asymptotic distributions

AXN Stochastic processes, stochastic chains
7 . Mathematics
. . Theory
73A . . . General theory of stochastic processes
. . *Methods*
76R D . . . Combinatorial methods
. . *Processes*
786 . . . Approximation
78B . . . . Convergence
. . Functions
* See Stochastic analysis AXN 7W
. . *Elements & entities*
7EP . . . Sequences
7EP DH . . . . Limit theorems for stochastic processes
. . *Systems*

Stochastic processes

Mathematical statistics AX7
Statistical probability AXG
Random variables AXH
Stochastic processes AXN
Mathematics AXN 7
. Systems

. . Analysis
AXN 7W . . . Stochastic analysis
7W6 X . . . . Calculus
7W7 2DV . . . . . Stochastic differentials
7W7 3DW . . . . . Stochastic integrals
7W8 L . . . Functions
. . . . Theory
7W8 L3A . . . . . Random function theory
7WB . . . . . Harmonic functions
7WB 3A . . . . . Potential theory
. . . Equations
7WE L . . . . Stochastic equations
7WE ME . . . . . Differential equations
7WH . . . . . Integral equations
7WO . . . Functional analysis
7WO FUA KL . . . . Function spaces
8S Measurement
8SA B . Errors
8SA H . . Random errors
8YJ . Induced measures
. . *Properties*
8YJ BQ . . . Continuity
8YJ BR . . . Singularity
8YK . Stopping times
8YL . Extreme values
8YL 3B . . Asymptotic theory
CN Inference
DG . Prediction
DG3 A . . Prediction theory
O . Time
P . Sample path
PQ . . Generalized sample paths
S . Stochastic dynamical systems
S76 D . . Numerical analysis
ST . . States in stochastic processes
STD . . . Estimation
SV . . Linear stochastic dynamical systems
T . Ensembles
U . Networks in statistical inference
. . *Properties*
UBS . . . Reversibility

Mathematical statistics AX7
Statistical probability AXG
Random variables AXH
Stochastic processes AXN
Inference AXN CN
. . . Reversibility AXN UBS

Types of stochastic processes
AXN W . Ergodic processes
AXO . . Markov processes
7 . . . Mathematics
78L . . . . Functions
78Y J . . . . . Transition functions
78Y L . . . . . Green's function
78Y M . . . . . Sample function
795 . . . . Transformations
. . . . *Elements*
7DF . . . . . Boundaries, general boundary conditions
7DF 3A . . . . . Boundary theory
7DF X . . . . . Martin boundary
7VJ . . . . Topology
7VO ZXO . . . . . Topologies connected with Markov processes
7W . . . . Analysis
7W8 L . . . . . Functions
. . . . . Potential theory
7WB 3A . . . . . Probabilistic potential theory
7WL EU . . . . . Operators
7WM XX . . . . . Infinitesimal & characteristic operators
7WO . . . . . Functional analysis
7WO 8LN F . . . . . Local time functions
7WO 8RL JJ . . . . . Additive functions
* See also Potential theory, AXO 7WB 3A
8S . . Measurement
8S7 94 . . . Transformation of measures
. . *Special properties*
AU . . . Markov risk
BT . . . Strong Markov properties
D . . Estimation
I . . Distributions
I7D H . . . Limits
I7D H3F . . . . Ergodic theorem
. . . Discrete
JK . . . . Markov processes with discrete parameters
JO . . . Continuous distributions
Q . . Markov chains
QU . . . Denumerable Markov chains
R . . Birth & death processes
RT . . . Logistic processes
. . . . Transformation
RT7 95 . . . . . Logit
S . . . Birth processes, pure birth processes
T . . Poisson processes

Random variables

Mathematical statistics AX7
Statistical probability AXG
Random variables AXH
Stochastic processes AXN
. . Ergodic processes AXN W
. . . Poisson processes AXO T

AXO U . . . Gaussian processes
U7 . . . . Mathematics
U7D U . . . . . Derivatives
. . . . *Properties*
UAL . . . . . Dependence
UAL M . . . . . Asymptotic weakening of dependence
UBU . . . . . Sample function properties
V . . . Branching process
. . . . Birth & death
* See AXO R
VW . . . . Galton-Watson process
X . . . Polya process
AXP D . . . Diffusion process, epidemic processes
E . . . . Non-linear diffusion process
F . . . . Wiener process, brownian motion process
G . . . . Random walk
H . . . . . Jump processes
. . . *Other Markov processes*
J . . . . Dirichlet forms
K . . . . Markov processes with independent increments
L . . . . Hunt process
M . . . . Controlled Markov processes
. . . . Semi-Markov processes
* See Renewal theory, AXQ F
S . . Stationary processes
* See also Time series AXV
S7 . . . Mathematics
. . . . Theorems
S73 F . . . . . Ergodic theorems
. . . . *Processes*
S78 E . . . . . Interpolation
. . . *Special processes*
ST . . . . Filtration
SV . . . . . Stopping times
V . . Martingales
V7 . . . Mathematics
V78 B . . . . Convergence
. . . . Limits
V7D H . . . . . Martingale limit theory
Special probabilistic phenomena
* A number of processes studied initially in a special context (e.g. stores inventory) are then found to be more widely applicable. A process which is special to given application, goes with the latter. But these more generally applicable ones go here.
X . Games theory
X7 . . Mathematics
X7R J . . . Number theory
YB . . Ill-posed problems
YC . . Dynamic non-cooperative games
YD . . Differential games

Applied mathematics AWY
Statistics & probability AX
Mathematical statistics AX7
Statistical probability AXG
. . . . Games theory AXP X
. . . . . Differential games AXP YD

AXP YF . . . . . Search games
YH . . . . . Pursuit & evasion games
AXQ B . . . . Queuing theory
C . . . . . Congestion
D . . . . . Order in queuing theory
F . . . . Renewal theory
. . . . . Markov processes
FO . . . . . Markov renewal processes, semi-Markov processes
G . . . . Inventory & storage
H . . . . . Storage theory
J . . . . Success runs
K . . . . Interacting random processes
L . . . . Point processes, point random processes
M . . . . Traffic flows
N . . . . Innovation processes
P . . . . One dimensional series

R Statistical models, design & analysis of experiments
* See also Statistical method AX8
RGH . Variables
RGI . . Treatment variables
* Differences amongst effects observed by experimenter.
RGO . . Classification variables
AXR . Design of experiments, statistical design
* Do not use this classmark (AXR) in compounding. Only specific design concepts are cited first, e.g. Optimal designs - Treatment variables AXR SPG I.
. . *Operations*
9D . . . Randomization
9E . . . . Random numbers
9F . . . Adjustment
9G . . . Sensitivity problems
9H . . . Screening tests
9J . . . Preference tests
9K . . . Response surfaces
9L . . . Weighting
9M . . . Replication
* Add to AXR 9M letters C/R following K9C 6HW, e.g. Experimental units AXR 9MC; Internal replication AXR 9MD.
. . . . *Properties*
9MB Y . . . . . Number of replications
9MS . . . . Practical replication
9N . . . Confounding factors
* Add to AXR 9N letters D/W following K9C 7B, e.g. Matching AXR 9NG; Situational variables AXR 9NR.
. . . . Randomization
* See AXR 9D

Analysis of experiments

Mathematical statistics AX7
Statistical models AXQ R
Design of experiments AXR
. Operations
. . Confounding factors AXR 9N
. . . Randomization

AXR 9P . . Independent variables control
9Q . . Combining tests, compounding tests, comparison tests
9R . . . Paired comparisons
9S . . . . Tournaments
9T . . . Multiple comparisons
9U . . *Operations special to a particular context*
* See Sampling theory AXW 9V/X for example.
. *Types of designs*
* Add to AXR S letters E/G following K9C. Two major types are given here as examples.
SE . . Experimental groups
SF . . Control groups
SL . . Linear statistical models
SN . . Log-linear statistical models
SP . . Optimal designs
SS . . Systematic designs
ST . . Repeated & sequential experiments
SY . . Comparative designs, classical designs
* See also Analysis of variance AXT
T . . . Block designs
U . . . . Randomized blocks, latin squares
UW . . . . Complete & incomplete blocks
V . . . Factorial designs, factorial arrangements
VW . . . . With blocks factorial designs
WJ . . Representative designs
WL . . Lattice designs
WN . . Mixed designs
WP . . Field experiments
WR . . Laboratory experiments
X . . Others (A/Z)

AXS Analysis of experiments, statistical analysis
* Use only for general studies. In compounding, only specific analysis concepts (AXS/AXU) are cited first, e.g. Variance analysis - Categorical data AXT GO.
* For analysis in its looser and wider sense, see AX8 D.
7 . Mathematics
78H . . Optimization
78H X . . Minimization
78L . . Functions
78Y M . . . Contrasts
RY . Univariate analysis
S . Multivariate analysis, analysis of dispersion
S7 . . Mathematics
S79 N . . . Inequalities
T . . Discriminant analysis, discriminant classification
* See also Cluster samples, AXX F
TV . . . Discrete discriminant analysis
U . . Canonical variables
* For canonical correlation, see AXU L

Statistics & probability AX
Mathematical statistics AX7
Statistical models AXQ R
Analysis of experiments AXS
Multivariate analysis AXS S
. Canonical variables AXS U

AXS V . Factor analysis
W . Component analysis, element analysis
X . Bivariate analysis
AXT Variance, analysis of variance
7 . Mathematics
73L . . Models
73L YC . . . Fixed effects model
73L YE . . . Variance components model
73L YG . . . Mixed models
EBD . Degrees of freedom
F . Tests of significance
FO . . Hypothesis test
FOP . . . Non-standard conditions
FOQ . . . . Failure of assumptions
GH . Variables data
GO . . Categorical data
GP . . Ranked data
RSY . Comparative designs
RWB . . Multicomparison procedures
RWD . . . Orthogonal comparisons
RWF . . . Non-orthogonal comparisons
RWH . . . Students range, studentization
SS . Multivariate analysis
. . Models
SS7 3L . . . Multivariate models
V . Covariance, analysis of covariance
AXU C Correlation & regression
E . Correlation
* See also Prediction, AXD G
E8S . . Measurement
E8S 7EK . . . Correlation coefficient
EGN . . Qualitative variables
EGN 7EK . . . Coefficients
EGO . . . Nominal variables
EGO BG . . . . Contingency
EGO BG2 3N . . . . . Contingency tables
EGP . . . Ordinal variables
EGP 8UM . . . . Rank order
. . . . . Coefficients
EGP 8UM 7EK . . . . . Rank order correlation coefficient
EGQ . . Quantitative variables
. . . Coefficients
EGQ 7EK . . . . Pearson product moment correlation coefficient
F . . Partial correlation
G . . Autocorrelation
H . . Serial correlation
I . . Cross correlation
J . . Spatial correlation
K . . Directional correlation

Statistical models

Mathematical statistics AX7
Statistical models AXQ R
Analysis of experiments AXS
. Correlation & regression AXU C
. . Correlation AXU E
. . . Directional correlation AXU K

AXU L . . . Canonical correlation
* For Canonical variables, see AXS U
N . . Regression
N7 . . . Mathematics
N7E L . . . . Polynomials
O . . . Linear regression
* Usually assumed.
. . . . Hypothesis
OFO . . . . . Linear hypothesis in regression
P . . . Non-linear regression
PV . . . . Curve fitting
PW . . . . . Moving averages
PX . . . . . Least squares methods
Q . . . Multiple regression analysis
Q78 L . . . . Functions
Q78 YM . . . . . Contrasts
Q78 YME K . . . . . Contrast coefficients
. . . *Autocorrelation analysis*
* See Time series AXV UR
S . Graphical analysis
T . Longitudinal analysis
U . Nearest neighbour analysis
UDH . . Underestimation
V . *Other types of analysis*
Y Series design & analysis
AXV . Time series
* See also Stochastic processes AXN
7 . . Mathematics
78L . . . Functions
794 . . . Transforms
7W . . . Analysis
7WS . . . . Harmonic analysis, spectral analysis
. . . . . Functions
7WS 8L . . . . . Spectrum (time series), spectral function, spectral density
7WT . . . . Fourier analysis
O . . Markov processes
T . . Variance
T8F . . . Tests
T8F X . . . . Runs
UE . . Correlation
UH . . . Serial correlation
UN . . Regression
UPV . . . Curve fitting
UPW . . . . Moving averages
UR . . . Autocorrelation regression
. . *Constituent movements*
VB . . . Longterm movements, secular trends
VE . . . Cyclical movements
VG . . . Seasonal variation
VJ . . . Irregular fluctuations, random fluctuations

Statistics & probability AX
Mathematical statistics AX7
Statistical models AXQ R
Series design & analysis AXU Y
. . Constituent movements
. . . Irregular fluctuations AXV VJ

AXV VN . . Stationary series
* For stationary processes see AXP S
VQ . . Non-stationary series
W . . Forecasting, prediction (forecasting)
* See also Estimation AXD
WV . . . Longterm forecasting.
AXW Sampling theory, random sampling theory
* Use of samples to estimate population parameters and to determine magnitude of errors involved.
* See also Specific types of sampling distributions (e.g. F distribution AXK S).
3A . Theory
8S . Measurement
8SR . . Scales
8T . . Precision
. *Operations*
9V . . Acceptance
9W . . Inspection
9X . . Process control
. *Properties*
BU . . Nature & number of units
CG . Order statistics
CN . Inference
I . Sampling distributions
. Design
R . . Sampling design
S . Analysis
SS . . Multivariate analysis
T . . Variance
TRS Y . . . Comparative designs
TRW H . . . . Studentization in sampling theory
UC . . Correlation & regression
. *Types of sampling*
X . . Small samples
AXX A . . Probability samples
B . . Simple random samples
C . . Stratified samples
D . . . Proportional stratified samples
E . . Non-probability samples
EW . . . Quota samples
EX . . . Judgement samples
F . . Cluster samples
FSS . . . Multivariate analysis
. . . . Discriminant analysis
FST . . . . . Cluster analysis
G . . . . Multistage sample
H . . Sequential sampling, sequential analysis
. . . *Special operations*
H9Y C . . . . Cumulative sum techniques
H9Y E . . . . Optimal stopping
* See also Stochastic processes - Stopping times AXN 8YH

Statistics & probability

Statistics & probability AX
Mathematical statistics AX7
. . Sampling theory AXW
. . . . Sequential sampling AXX H
. . . . . Special operations
. . . . . Optimal stopping AXX H9Y E

AXX HI . . . . . Distributions
HM . . . . . Limit distributions
HMP . . . . . Non-central distributions
. . . . . *Types of sequential sampling*
I . . . . . Linear forms sampling
J . . . . . Quadratic forms sampling
. . . . *Other types of sampling*
L . . . . . Sampling with unequal probability
M . . . . . Multiphase sampling
N . . . . . Double sampling
O . . . . . Censored sampling
P . . . . . Systematic sampling
Q . . . . . Periodic sampling
R . . . . . Work sampling
S . . . . . Matched samples
T . . . . . Panel data, panel samples
X . . Monte Carlo methods
* See also Numerical analysis AX7 6DA; Simulation AX7 3LX
. . . Approximation
X78 6X . . . . Stochastic approximation

AXY Applied statistics
* Alternative (not recommended) to locating under the specific subject wherever it is located in the general classification.
* Add to AXY numbers 3/9 and letters A/Z from whole classification, e.g. Operations research AXY TQS.
* Each subject (where the hyphen represents the classmark) may be fully qualified by preceding facets, as follows:
* Add to - the number 2 followed by numbers 2/9 from Auxiliary Schedule 1 (with any amendments shown at AM2).
* Add to - the number 3 followed by numbers and letters 3/9, A/X following AX.
* Further subdivisions of the subject field to which Statistics is applied may be added as follows:
* Add to - the number 4 followed by numbers 3/4 for any topical subdivision of the class numbered 3/4.
* Add to - the numbers 5/9 for any topical subdivisions of the class numbered 5/9.
* Add to - letters A/Z.
* An example follows:

HH . Applied statistics in health & medical sciences
HH2 9 . . Medical statisticians
HN . . Clinical medicine & pathology
HN3 57 . . . Data collection
HN3 UC . . . Correlation & regression
HN9 . . . Internal medicine
HN9 357 . . . . Data collection
HNS . . . Radiotherapy
HNS 3W . . . . Sampling theory

Statistics & probability AX
Applied statistics AXY
Applied statistics in health & medical sciences AXY HH
Clinical medicine & pathology AXY HN
Radiotherapy AXY HNS
. Sampling theory AXY HNS 3W

AXY HOL Surgery