
Subject Index

A **boldface** page number indicates the page on which the term is defined.

- (z_i, z_j) -elementary diagonal, **46**
- C^M -smooth, **95**
- C^∞ , 105, 109
- I -decomposition, **515**
- M -diagonal, **50**
- Δ -complex, **466**
- Δ -domain, **71**
- χ -independent, **312**
- π
 - rational approximations to, 85
- s -diagonal, **45**
- z -constant term, **47**
- d -manifold with boundary, **513**
- d -manifold with corners, **514**
- k -cell, **466**
 - topological, 501
- k -form, **450**
- n -boundaries, **463**
- n -chains, **463**
- n -coboundaries, **475**
- n -cochains, **475**
- n -cocycles, **475**
- n -cycles, **463**
- n -skeleton, **466**
- n th cohomology group, **475**
- n th singular cohomology group, **475**
- n th singular homology group, **464**
- affine critical points, **214**
- Airy function, **113**, 426
- algebraic dual polynomial, **164**
- algebraic generating function, 41, 43, 402
- algebraic hypersurface, **141**, 165
- algebraic power series, **30**
- algebraic singularity, 70, 74, 402
- algebraic tangent cone, xviii, **162**, 323, 350
- algebraic variety, **222**, 353, 516
- algebraic variety defined by f , **141**
- algebraico-logarithmic singularity, 9
- amoeba, **141**
 - contour of, *see* contour of an amoeba
- amplitude, xvii, **89**, **114**
- analytic continuation, **63**
- analytic hypersurface, 165, **485**
- analytic variety, **153**
- annulus, 48, 141, 254

- aperiodic, **158**
- arrangement point, 210, **297**, 297, 320, 325
- asymptotic development, **5**
- asymptotic expansion, **5**
 - multivariate, *see* multivariate asymptotic expansion
- asymptotic scale, **5**
- asymptotic series, **5**, 69, 94, 100, 102, 111, 113, 277, 334, 399
- atlas, **441**
- atomic class, **51**
 - labeled, *see* labeled atomic class
- attachment, **474**
- attachment data, **474**, **506**
- augmented lognormal matrix, **492**
- basepoint, **443**
- Bessel function, 58, **113**
- bi-colored supertree, 196, **270**
- Big-O Lemma, 93, 108, 120, 364
- binomial coefficients, 21, 61, 171, 193, 230, 250, 251, 290, 392, 436
- Birkhoff polytope, 338
- boundary, **462**
- boundary conditions, **32**
- boundary locations, **33**
- boundary operator, **453**, **463**
- boundary point, **514**
- boundary values, **34**
- broken circuit, **311**
- bundle, **442**
 - cotangent, *see* cotangent bundle
 - exterior k -algebra, *see* exterior k -algebra bundle
 - tangent, *see* tangent bundle
- Camembert-shaped region, **71**
- Catalan numbers, **31**, 40, 49, 74, 403
- Cauchy Integral Formula, 48, 63, 136, 362, 438, **459**
- Cauchy–Riemann equations, 77
- cell complex, **466**
- cellular chain complex, **472**
- cellular homology groups, **472**
- central hyperplane arrangement, **296**
- Central Limit Theorem, 9, 22, 413, 416
 - Local, *see* Local Central Limit Theorem
- chain, 123–126, 140, 144, 183, 215, 260, 301, 304, **453**
- chain complex, **463**
- chain homotopy equivalence, **465**
- chain map, **464**
- chart, **439**
- chart map, **439**
- chart of dimension d , **440**
- Chebyshev polynomials, **251**
- circuits, **311**
- class
 - combinatorial, *see* combinatorial class
 - cycle, *see* cycle class
 - labeled, *see* labeled combinatorial class
 - neutral, *see* neutral class
 - set, *see* set class
- class C^M , **95**
- closed form, **462**
- CLT, *see* Central Limit Theorem
- cochain complex, **475**
- codimension, **228**
- codimension of the stratum S , **197**
- coefficient of z^r in F , **17**
- cohomology, 475

- combinatorial class, **20**
 - atomic, *see* atomic class
- combinatorial series, **156**
- compatible, **440**
- complete intersection, **292**, 300, 318
- complex d -manifold, **441**
- complex link, **527**
- Complex Morse Lemma, 121, 132, 427
- complex phase, 97, 131
- complex projective d -space, **441**
- composition class, **27**
- computational algebra, 41
- cone
 - algebraic tangent, *see* algebraic tangent cone
 - convex, *see* convex cone
 - normal, *see* normal cone
 - recession, *see* recession cone
 - tangent, *see* tangent cone
- cone of hyperbolicity, xviii, 340, **348**, 348, 349, **350**, 350, 351, 355, 357, 369, 371
- cone point singularity, **211**, 374
- consistent, **442**
- constant coefficient, **17**
- contains, **440**
- contour of an amoeba, **160**
- contravariant, **442**
- contributing multiple points, **303**
- contributing point, **246**, 402, 426, 436
- controlled, **522**
- convergent Laurent series, **136**, 136
- convex combination, **136**
- convex cone, **150**
- convex dual, **165**
- convex hull, **142**
- convex polytope, **142**
- convex set, **136**
- convolution, **17**, 22, 30, 42, 290, 374, 408, 416, 419
- coordinate slice, 415
- cotangent bundle, **448**
- cotangent space, **448**
- covariant, **442**
- CPAI, *see* critical point at infinity
- critical
 - finitely, *see* finitely critical
- critical point, xviii, 78, 103, 107, 113, 130, 132, **198**, 231, 257, 262, 269, 270, 285, 288, 290, 304, 333, 395, 396, 399, 403, 423, 499–504, 508, 511–513, 525, 526, 528, 529
 - affine, *see* affine critical points at infinity, *see* critical point at infinity
 - smooth, *see* smooth critical point
- critical point (in the stratified sense), **116**
- critical point at infinity, **214**
- critical point of the height function h on the stratified space X , **518**
- critical points of the height function h , **500**
- critical value at infinity (CVAI), **215**
- critical values of the height function h , **500**
- cube grove, **212**
- cup product, **476**
- CW approximation theorem, **466**
- CW-complex, **466**
- cycle, **462**
- cycle class, **53**

- D-finite sequence, **44**
D-finite series, **42, 45, 57**
Darboux's Theorem, **69, 70**
de Rham complex, **476**
decay
 exponential, *see* exponentially
 decaying
 rapid, *see* rapidly decreasing
 super-exponential, *see*
 super-exponentially
 decaying
deformation retract, *see* strong
 deformation retract, **465**
degree of degeneracy, **265**
Delannoy numbers, **24, 48, 58,**
 193, 230, 250, 392, 399, 425
dependent sets, **311**
derivation, **444**
diagonal
 M , *see* M -diagonal
 s , *see* s -diagonal
 elementary, *see*
 (z_i, z_j) -elementary
 diagonal
 generalized, *see* generalized
 diagonal
 main, *see* main diagonal
diagonal method, **422**
diagonal slice, **414**
differential k -form, **451**
differential 1-form, **449**
differential of f , **449**
differential of f at p , **445**
differential operator, **455**
differentially algebraic, **57**
dimension of an ideal, **226**
dimension of the cell complex X ,
 466
dimension of the stratum S , **197**
direct analytic continuation, **63**
direction, **6**
disjoint union
 labeled, *see* labeled disjoint
 union
disjoint union class, **20**
divisors, **292**
domain of
 analyticity/holomorphicity,
 171
domain of convergence of a
 Laurent series, **136**
downward gradient flow, **116**
dual
 algebraic, *see* algebraic dual
 polynomial
 projective, *see* projective dual
 variety
dual cone, **150, 364, 369, 370, 373**
dual rate, **148**
embedded complex d -manifold,
 439
embedded normal space, **482**
embedded real d -manifold, **439**
embedded tangent space, **482**
enumerates, **20**
essential singularity, **78**
Eulerian numbers, **406**
exact form, **462**
exact sequence, **468**
excision property, **471**
exponential generating function,
 51, 70, 78, 83, 84
exponential growth rate, **63**
exponential torus, **135**
exponentially decaying, **5, 165,**
 278, 370–372, 374
exterior k -algebra bundle, **451**
exterior algebra, **450**
exterior derivative operator, **456**

- extreme points, **142**
- feasible velocity region of the QRW, **286**
- field of formal Laurent series, xvii, **42**
- figure eight, 296, 320
- filtered space, **506**
- finite criticality, 289
- finitely critical, **258**
- finitely minimal point, **155**
- first Whitney condition, **515**
- flat torus, **341**
- flow, *see* vector flow
- form
 - holomorphic, *see* holomorphic form
 - volume, *see* holomorphic volume form
 - top level, *see* top level form
- formal Laurent series, *see* field of formal Laurent series
- formal partial derivative operator, **18**
- formal power series, **17**, 19, 21, 27, 29, 31, 33, 35, 36, 42, 44, 45, 50, 320, 391
- fortress, 372, 374
- Fourier transform, 106, 340, 365–368, 372, 374
- Fourier–Laplace integral, xvii, **89**, 129, 132, 330, 331
- multivariate, 114
- function
 - Airy, *see* Airy function
 - Bessel, *see* Bessel function
 - meromorphic, *see* meromorphic function
 - of class C^M , *see* class C^M
 - rate, *see* rate function
 - rational, *see* rational function
- functor
 - contravariant, *see* contravariant covariant, *see* covariant
- functorial, **442**
- Galton–Watson process, 29
- Gamma function, 69, 71, 92, 96, 110, 277–279, 332, 366
- Gauss map, xviii, **281**, 287, 395, 397, 398, 417, 426
- Gaussian curvature, **281**, 283, 285, 288, 397, 399, 417
- Gaussian distribution, 9, 80, 81, 119, 288, 335, 385, 386, 388, 390, 413
- generalized diagonal, **50**
- generalized Dyck paths, **38**
- generating function, **18**
 - algebraic, *see* algebraic generating function
 - D-finite, *see* D-finite series
 - exponential, *see* exponential generating function
 - rational, *see* rational generating function
 - semi-exponential, *see* semi-exponential generating function
 - spacetime, *see* spacetime generating function, 397
- generating function of the combinatorial class \mathcal{A} , **20**
- generating set, **222**
- generic direction, **292**
- generic property, **221**
- germ
 - smooth, *see* smooth germ
- GF-sequence method, **8**, 386
- gluing maps, **466**

- goes to infinity in the direction, **147**
- Gröbner basis, **224**
- gradient
 logarithmic, *see* logarithmic gradient
- grand measure, **412**
- growth rate, **147**
- Hadamard product, **47**
- Hausdorff metric, **163**
- height function, **183**
- Hessian, **114**, 115, 121, 122, 129, 281–283, 333, 413, 417, 418, 420, 500, 501
- Hessian matrix, 518
- holomorphic de Rham complex, **477**
- holomorphic form, **458**
- holomorphic function, **457**
- holomorphic volume form, **458**
- homogeneous part, **162**
- homogeneous polynomial, **233**
- homogenization of a polynomial, **233**
- homogenization of an ideal, **233**
- homologous, **463**, 485
- homology, 255, 462, 484, 499, 505–508, 512, 529, 530
- homology group, **463**
- homology with coefficients in \mathbb{C} , **463**
- homotopic, 99, 267, 365, 487, 488, 501, 502, 505
- homotopic maps, **465**
- homotopic spaces, **465**
- homotopy, 124, 284, 343, **465**, 485, 487, 488, 492, 499–501, 503–506, 508, 511, 512, 519, 526–529
- homotopy equivalence, **465**, 470
- horizontally convex polyominoes, **405**
- Hurwitz's Theorem, 164, 349
- hyperbolic polynomial, **348**
- hyperbolicity
 cone of, *see* cone of hyperbolicity
 radius, *see* radius of strong hyperbolicity
 strong, *see* strongly hyperbolic
 weak, *see* weakly hyperbolic
- hyperplane
 supporting, *see* supporting hyperplane
 tangent, *see* tangent hyperplane
- hyperplane arrangement, **293**
- hypersurface, 281, 282, 414, 417
 algebraic, *see* algebraic hypersurface
 analytic, *see* analytic hypersurface
- ideal
 dimension of, *see* dimension of an ideal
 generating set of, *see* generating set
 polynomial, *see* polynomial ideal
 prime decomposition of, *see* prime decomposition
 radical of, *see* radical
- ideal quotient, **226**
- ideal saturation, **226**
- imaginary fiber, **304**
- implied constant, **5**
- induced map, **442**
- integral

- Cauchy, *see* Cauchy Integral
Formula
- Fourier–Laplace, *see*
Fourier–Laplace integral
- one-sided, *see* one-sided
integral
- two-sided, *see* two-sided
integral
- interior point, **514**
- intersection
complete, *see* complete
intersection
- partial, *see* partial intersection
- intersection class, **483**
- involution, 55, 83
- inward-facing normal, **159**
- irreducible decomposition, **226**
- irreducible variety, **226**, 244
- iterated residue, 334, 337, 338,
493, 494
- Jacobian, 121, 281, 287, 417, **446**,
492
- kernel method, **32**
- labeled atomic class, **51**
- labeled combinatorial class, **51**
- labeled disjoint union, **51**
- labeled neutral class, **51**
- labeled product, **52**
- lacuna, **376**, 376
- Lagrange inversion formula, 390
- Laplace transform, 16, **102**
- lattice of flats, **297**
- lattice paths with steps in S , **24**
- Laurent expression, *see* space of
formal Laurent expressions
- Laurent polynomial, **135**, 350,
352–354, 364–366, 369
support of, *see* support of the
Laurent polynomial f
- Laurent polynomial ring, *see* ring
of Laurent polynomials
- Laurent series, 48, 134, 137, 139,
140, 165, 171, 364, 415
convergent, *see* convergent
Laurent series
- LCLT, *see* Local Central Limit
Theorem
- leading term of an asymptotic
expansion, **6**
- leading term of the polynomial p ,
223
- Legendre transform, **165**
- Leray residue, *see* residue of ω
- lexicographic term order, **223**
- linking torus, **304**
- Local Central Limit Theorem, 9,
413, 416, 421
- local cycle, **529**
- local monodromy group, **326**
- local ring, 18
- local ring of analytic germs, **319**
- localization, 105–107, 257
- locally minimal, **342**
- logarithmic convexity, 139
- logarithmic domain of
convergence, 417, 418
- logarithmic gradient, **159**, 409,
492
- logarithmic locally minimal
arguments, **342**
- logarithmic singularity, 75
- lognormal cone, **303**
- long exact sequence, **469**
- long exact sequence of the pair,
471
- Lorentzian quadratic, **350**, 365,
366, 368, 371, 375, 376
standard, *see* standard
Lorentzian quadratic

- lower halflink, **525**
- lower semi-continuous, **340**
- main diagonal, **46**
- manifold
- complex, *see* complex d -manifold
 - embedded complex, *see* embedded complex d -manifold
 - embedded real, *see* embedded real d -manifold
 - orientable, *see* orientable manifold
 - real, *see* real d -manifold
 - smooth, *see* smooth manifold
- manifold point, **514**
- map, **464**
- chart, *see* chart map
 - induced, *see* induced map
 - smooth, *see* smooth map
 - transition, *see* transition maps
- matrix
- Hessian, *see* Hessian
 - transfer, *see* transfer matrix
 - unimodular, *see* unimodular matrix
- matroid, **311**, 409
- Mayer–Vietoris sequence, **473**
- meromorphic function, **64**
- method
- of steepest descent, 103
 - saddle point, *see* saddle point method
 - transfer matrix, *see* transfer matrix method
- minimal point, **155**
- finitely, *see* finitely minimal point
 - strictly, *see* strictly minimal point
- minimal torus, **260**
- monodromy group, **326**
- monomial order, **223**, 224
- Morse data, 204, **506**
- normal, *see* normal Morse data
 - tangential, *see* tangential Morse data
- Morse filtration, **508**
- Morse function, **500**, **518**
- Morse function with distinct critical values, **500**, **518**
- Morse height function, **185**
- Morse index of h at p , **501**
- Morse Lemma, 499, 500, 503, 519
- Stratified, *see* Stratified Morse Lemma
- Morse Lemma, Complex, *see* Complex Morse Lemma
- Motzkin paths, **40**
- multinomial distribution, 415
- multiple point, **291**, 293, 296, 320, 322–326, 336–338, 351, 355, 380
- multivariate asymptotic expansion, **7**
- multivariate Fourier–Laplace integrals, **114**
- Narayana numbers, **49**, 58, 403
- natural, **486**
- neighborhood, **18**
- neighborhood growth rate, **147**
- neutral class, **51**
- labeled, *see* labeled neutral class
- Newton diagrams, **34**
- Newton polytope, **143**
- non-obstructed direction, **358**

- nondegenerate critical point, **185**
- nondegenerate critical point for h ,
500
- nondegenerate critical point on S ,
204
- nondegenerate phase, **114**
- normal
 - inward-facing, *see*
 - inward-facing normal
 - outward-facing, *see*
 - outward-facing normal
- normal cone, **150**
- normal crossing, 380, 429
- normal density, **418**
- normal link, 204, **524**
- normal Morse data, 204, **524**
- normal plane, 204
- normal slice, 204, **524**, 528
- numbers
 - Catalan, *see* Catalan numbers
 - Delannoy, *see* Delannoy numbers
 - Eulerian, *see* Eulerian numbers
 - Narayana, *see* Narayana numbers
 - Stirling, *see* Stirling numbers
- one-sided Fourier–Laplace integral, 100
- one-sided integral, 98
- order map, **143**
- order of vanishing, **162**
- ordinary points of the ODE, **241**
- orientable manifold, **442**
- orientation, **442**
- Ornstein–Zernike, 413, 417
- outward-facing normal, **159**
- P-recursive sequence, **43**, **44**
 - multivariate, 44
- pair complex, **469**
 - pair labeled, **52**
 - pair map, **469**
 - pair of spaces, **469**
- Paley–Wiener theorem, 369
- partial fraction decomposition, **60**
- partial intersection, 301
- phase, xvii, **89**, 90, 93, **114**, 114, 277, 285, 336, 380, 395
 - complex, *see* complex phase
 - nondegenerate, *see* nondegenerate phase
 - standard, *see* standard phase
- point
 - contributing, *see* contributing point
 - multiple, *see* multiple point
 - transverse, *see* transverse multiple point
 - nondegenerate, *see* nondegenerate critical point
- pole, **64**
 - simple, *see* simple pole
- polyannulus, **460**
- polydisk, **18**, **459**
- polynomial ideal, **222**
- polyradius, **18**
- polytope
 - convex, *see* convex polytope
 - vertices of, *see* vertices of a polytope
- positively oriented simplex, **455**
- power series
 - homogeneous part of, *see* homogeneous part of power series
 - order of vanishing of, *see* order of vanishing
- prime decomposition, **225**
- principal k th root, **98**

- probability generating function, **22**
- product
 labeled, *see* labeled product
 wedge, *see* wedge product
- product class, **22**
- product complex, **473**
- projective dual variety, **164**
- projective space
 complex, *see* complex
 projective d -space
 real, *see* real projective d -space
- projective vector field, 380
- proper Morse function, **500, 518**
- pullback, **449**
- pullback of ω , **452**
- Pushing Down Lemma, 506
- quantum random walk, **285, 394, 426**
- quantum walk, **285, 397**
- quasi-local cycle, **529**
- quasi-powers, **386**
- radical, **225**
- radius of convergence, 63, 254, 387, 388, 390, 391, 416
- radius of strong hyperbolicity, **351**
- random walk, 29, 32, 75, 337, 394, 419
- rapidly decreasing, **5, 91, 106, 107, 109, 111**
- rate function, 165, 418
- rational function, 37, 41, 42, 50, 57, 59, 338, 394
- rational generating function, 33, 170
- real d -manifold, **441**
- real projective d -space, **441**
- real projective variety, **441**
- real root property, 379
- real stable polynomial, 379
- recession cone, **150**
- reduced Gröbner basis, **224**
- reduced homology group, **471**
- reduction map, **52**
- relative boundaries, **469**
- relative cycles, **469, 485, 506, 529**
- relative homology, **469**
- relative intersection class, **485**
- Relog map, xviii, **135**
- represented, **466**
- residue, 48, 64, 257, 271
 Leray, *see* residue of ω
 multivariate, *see* residue of ω
- residue class, **489**
- residue of ω , **486**
- resolution of singularities, 380
- Riemann surface, 104
- ring
 Laurent polynomial, *see* ring of Laurent polynomials
 Laurent polynomials
 local, *see* local ring
 ring of formal power series, **17**
 ring of germs of analytic functions, **19, 31**
 local, *see* local ring of analytic germs
- ring of Laurent polynomials, xviii, **135**
- Riordan arrays, **386**
- saddle point, 77, 78, 104, 262, 302, 502
 multivariate, 114
- saddle point method, **77, 103**
- Schröder paths, **40**
- secant cone, 163
- second Whitney condition, **515**
- section of a bundle, **443**

- semi-continuity, 340, 351, 353, 355
- semi-exponential generating function, **54**
- sequence class, **22**
- series
 - asymptotic, *see* asymptotic series
 - formal power, *see* formal power series
 - Laurent, *see* Laurent series
 - Taylor, *see* Taylor series
- set class, **53**
- set partitions, 55, 84
- short exact sequence, **468**
- short exact sequence of chain complexes, **469**
- signed intersection number, **272**
- simple pole, **64**, 486
- simplex
 - positively oriented, *see* positively oriented simplex
 - standard, *see* standard p -simplex in \mathbb{R}^p
- simplicial complex, **466**
- simplicial homology, **467**
- singular n -chain, **463**
- singular n -cochains, **475**
- singular n -simplex, **463**
- singular points of the ODE, **241**
- singular variety, xviii, **153**, **171**
- singularity, **63**, **153**
 - algebraic, *see* algebraic singularity
 - algebraico-logarithmic, *see* algebraico-logarithmic singularity
 - cone point, *see* cone point singularity
 - essential, *see* essential singularity
 - logarithmic, *see* logarithmic singularity
- size, **20**
- slice
 - coordinate, *see* coordinate slice
 - diagonal, *see* diagonal slice
 - normal, *see* normal slice
- slit plane, **98**
- Smirnov words, **28**
- smooth, **182**
- smooth p -simplex, **453**
- smooth analytic hypersurface, **485**
- smooth analytic hypersurface at w , **485**
- smooth critical point, **184**
- smooth critical point equations, **184**
- smooth germ, **444**
- smooth map, **442**
- smooth partitions, **515**
- smooth point, **182**, 245, 277, 279, 282, 287, 289, 293, 350, 351, 381, 413, 435, 528
- smooth poles of order k , **486**
- smooth vector field, **447**
- smooth within strata and continuous across strata, 521
- snaps, **401**
- space $\mathbb{C}^p(\mathcal{M})$ of p -chains, **453**
- space of formal Laurent expressions, **135**
- spacetime generating function, **286**, 395, 416, 419, 426
- square-free, 164, **182**, 221, 229, 235, 262, 325
- square-free at p , **323**
- square-free part, **182**
- standard p -simplex in \mathbb{R}^p , **453**

- standard basis for $T^p\mathcal{M}$, **448**
 standard basis for $T_p\mathcal{M}$, **445**
 standard Lorentzian quadratic,
 348, 351
 standard phase, 115
 standard quadratic, **114**
 Stirling numbers, 55
 Stirling numbers of the first kind,
 55
 Stirling numbers of the second
 kind, **55**
 Stokes phenomenon, **192**
 stratification of the pair (X, Y) , **517**
 Stratified Morse Lemma, 519
 stratified Morse theory, 513
 stratified space, 517–519, 526,
 527, 529
 stratum, 229, 231, 301, 323, 353,
 355, 380, **491**, 494, 499, 518,
 526, 527
 strictly minimal point, **155**
 strong deformation retract, **465**
 strong torality hypothesis, **257**
 strongly hyperbolic, **351**, 351,
 352, 354
 super-exponentially decaying, **5**,
 269
 support of a rational function, **312**
 support of the Laurent polynomial
 f , **142**
 supported on a set, **453**
 supporting hyperplane, **159**, 160,
 161
 surgery method, **174**, 250, 253,
 334
 surjection of size n , **56**
 tangent bundle, **446**
 tangent cone, **150**, 353, 369, 380
 tangent hyperplane, **164**
 tangent space, **444**
 tangent vector, **444**
 tangential Morse data, **524**
 Taylor series, 77, 111, 114
 teardrop, 371
 tensor product complex, **473**
 top level form, **451**
 topological k -cell, **501**
 topological map, **464**
 topological method, **174**
 torality
 strong, *see* strong torality
 hypothesis
 torus, 11, **18**, 140, 395, 398, 417,
 459, 502, 508
 total attachment pair, **200**
 total degree term order, **223**
 total space of the normal bundle,
 482
 transfer matrix, 286, 383, 393
 transfer matrix method, **26**
 transform
 Fourier, *see* Fourier transform
 Laplace, *see* Laplace transform
 Legendre, *see* Legendre
 transform
 transition maps, **440**
 transverse
 arrangement, 297
 intersection, 483
 transverse analytic hypersurface,
 491
 transverse multiple point, **292**,
 294, 313, 322, 324, 333, **491**,
 491, 494
 transverse pole, **491**
 transverse simple point, **491**
 transverse simple pole, **491**
 triangulation, **455**, **466**
 tube around γ , **482**

- tubular neighborhood, **176**
- two-sided integral, 92, 100, 105, 111
- uniform asymptotic expansion, **7**
- unimodular matrix, **50**
- unit d -sphere, **439**
- unit torus, **440**
- upward gradient flow, **116**
- valley, **33**
- variety
 - algebraic, *see* algebraic variety
 - analytic, *see* analytic variety
 - irreducible decomposition of,
see irreducible decomposition
 - real projective, *see* real projective variety
 - zero-dimensional, *see* zero-dimensional variety
- vector field
 - smooth, *see* smooth vector field
- vector flow, 106, **116**, 127
- vertices of a polytope, **142**
- walk
 - quantum, *see* quantum walk
 - random, *see* random walk
- Watson's Lemma, 102, 112
- weak deformation retract, **465**
- weak hyperbolicity, 340
- weakly hyperbolic, **351**, 380
- wedge, **504**
- wedge product, **450**
- weight map, **20**
- Whitney stratification, 196, **515**, 518, 530
- Whitney stratified space, **515**
- Whitney umbrella, **530**
- zero-dimensional variety, 244

