

Index

- ϵ -algorithm, *see* epsilon algorithm
- ρ -algorithm, 394
- absolute error, 90
- accuracy, 91
 - automatic control of, 145–146
- Adams, 265
- Adams–Bashforth’s formula, 265
- Adams–Moulton’s formula, 265
- adjoint operator, 453
- Aitken, 273
- Aitken acceleration, 272–278, 311, 621
 - a-version, 274
 - active, 621
 - iterated, 274
- Aitken interpolation, 371–373
- algebraic equations, 662–682
- algorithm, 126
 - adaptive Simpson, 562
 - back-substitution, 30
 - bisection, 613
 - divide-and-conquer, 123
 - Euclidean norm, 119
 - Euler’s transformation, 282
 - golden section search, 658
 - LU factorization, 33
 - mathematically equivalent, 111
 - numerically equivalent, 111
 - Richardson extrapolation, 304
 - unstable, 137
 - Vandermonde inverse, 371
 - Vandermonde system, 375
- aliasing, 217, 498
- alternating series, 161
- analytic continuation, 288
- antithetic sequence, 79
- approximation
 - uniform, 471
- area coordinates, 595
- arithmetic
 - circular, 150
 - complex, 111
 - fixed-point, 96
 - floating-point, 107–112
 - interval, 147–153
 - multiple precision, 104–105
 - standard model, 107
 - unnormalized floating-point, 145
- arrowhead system, 424
- asymptotic
 - error estimate, 233–235
 - series, 214
- attenuation factors, 490
- B-spline, 426–436
 - basis, 430
 - definition, 429
 - evaluation, 433
 - exterior knots, 427
 - hat function, 427
 - multiple knots, 431
 - properties, 429
 - recurrence relation, 431
- Babbage difference engine, 245
- back-substitution, 29
- backward
 - stability, 138
- backward differentiation formula (BDF), 236
- backward error
 - analysis, 113
 - componentwise, 137
 - normwise, 137

- Banach, 442
- Banach space, 442, 620
- band matrix, 34, 252
- band-limited function, 497
- barycentric
 - coordinates, 595
 - Lagrange interpolation, 367
 - rational interpolation, 394
- basic linear algebra subprogram (BLAS), 42, 115
- Bauer–Skeel condition number, 136
- BDF (backward differentiation formula), 236
- bell sum, 208, 209, 218, 268, 319
- Bellman, 588
- Bernštejn, 287
- Bernštejn polynomial, 411–413
 - derivative, 414
- Bernštejn’s approximation theorem, 202
- Bernoulli, 168
 - function, 296
 - numbers, 168–169, 186, 293, 299
 - polynomial, 296, 309
- Bernoulli’s method, 669, 683
- Bessel function, 218, 219, 270
 - modified, 211
- Bessel’s inequality, 455
- Bézier
 - control points, 413
 - curve, 413–417
 - polygon, 413
- Bickley’s table, 231, 232
- bilinear interpolation, 409
- binary
 - number system, 94
 - point, 94
 - system, 94
- bisection method, 610–614
- Björck–Pereyra’s algorithm, 375
- BLAS (basic linear algebra subprogram), 42, 115
- boundary value problem, 217
- bounded variation, 193, 285
- branch cut, 104, 328, 385
- Buffon, 78
- butterfly relations, 505

- CAD (computer aided design), 410
- cancellation, 14
 - of errors, 146
 - of terms, 120–122
- Cardano–Tartaglia formula, 683
- cardinal basis, 355
- Cauchy, 191
 - product, 164
 - sequence, 440
- Cauchy–FFT (fast Fourier transform) method, 193–198, 537
- Cauchy–Schwarz inequality, 451
- ceiling of number, 21
- centered difference, 12
- characteristic equation (polynomial)
 - of difference equation, 252
- Chebyshev, 198
 - approximation, 474
 - expansion, 198–203
 - interpolation, 358, 370, 377, 379, 387, 467
 - points, 199, 357, 378
 - polynomial, 198–203, 460
 - minimax property, 200
 - support coefficients, 370
 - system, 355, 474
- Chebyshev’s
 - equioscillation theorem, 473
- chi-square distribution, 77
- Cholesky, 38
- Cholesky factorization, 38, 139, 578
- Christoffel, 568
- Christoffel–Darboux formula, 458
- circulant matrix, 509
- circular arithmetic, 150
- Clenshaw’s algorithm, 467, 468, 480
- Clenshaw–Curtis quadrature, 539–541
- c.m., *see* completely monotonic
- companion matrix, 579, 667
- compensated summation, 115–116
- complete space, 440
- completely monotonic (c.m.), 284–292
 - criteria, 290
 - function, 294
- complex
 - analysis, 385–407
 - arithmetic, 111
- composite
 - midpoint rule, 528
 - Simpson’s rule, 531
 - trapezoidal rule, 528
- computer aided design (CAD), 410

- condition number
 - Bauer–Skeel, 136
 - of matrix, 132
 - of problem, 126–133
- continued fraction, 321–329, 391
- contraction mapping, 619
- contraction mapping theorem, 619
- convergence
 - acceleration, 271–308
 - cubic, 648
 - linear, 622
 - order of, 622
 - sublinear, 622, 625
 - superlinear, 622
- conversion
 - between number systems, 95
- convex
 - hull, 383
 - set, 383
- convolution, 164, 496
 - discrete, 509
- coordinates
 - barycentric, 595
- correct decimals, 91
- correlation, 502
- Cotes, 527
- covariance matrix, 46
- cubic convergence
 - methods of, 647–650
- cubic spline
 - complete interpolant, 421
 - interpolation, 267
 - natural interpolant, 422
 - not-a-knot condition, 422
 - periodic, 423, 424
 - tridiagonal system, 420
- curse of dimensionality, 599
- cut (in the complex plane), 192

- d.c.m. (difference between two completely monotonic sequences), 284–292
- DCT-1 (discrete cosine transform), 512
- de Casteljaou’s algorithm, 415
- deflation, 18, 671–672
- delta function, 501
- density function, 45
- Descartes, 664
- Descartes’ rule of sign, 664
- determinant, 34
- determinant identity
 - Sylvester’s, 341

- DFT (discrete Fourier transform), 194, 489
- DFT matrix, 504
- diagonally dominant, 423
- difference
 - approximation, 11–15
 - centered, 12
 - checks, 222
 - equation, 20
 - frozen coefficients, 259
 - linear, 251–256
 - nonhomogeneous, 255
 - of product, 225
 - operator, 220–256
 - backward, 221
 - forward, 220
 - scheme, 14, 221
- difference between two completely monotonic sequences (d.c.m.), 284
- differential equation, 23
- differentiation
 - algorithmic, 174
 - automatic, 174
 - formula
 - backward, 236
 - forward, 237
 - higher derivatives, 246
 - numerical, 235, 245–248
 - of matrices, 136
 - symbolic, 174
- discrete
 - cosine transform (DCT-1), 512
 - distributions, 73
 - Fourier transform (DFT), 194, 489
 - sine transform (DST-1), 512
- discretization error, 12
- distance, 440
- distribution function, 45
- divergent series, 212–214
- divide and conquer strategy, 20–22
- divided difference, 359
 - inverse, 392
 - reciprocal, 392
 - table, 361
- domain of uncertainty, 616
- dominant root, 669
- double precision
 - simulating, 115
- double rounding, 98
- drafting spline, 417
- DST-1 (discrete sine transform), 512

- efficiency index, 623, 631
- elementary
 - functions, 102–104
 - symmetric functions, 663
- epsilon algorithm, 278, 336–339, 553, 558
- equivalence transformation, 323
- error
 - absolute, 90
 - analysis, 137–142
 - backward, 137
 - forward, 137
 - running, 145
 - bound, 90, 128
 - bounds
 - a posteriori, 138
 - estimate, 90
 - asymptotic, 250
 - function, 164, 210, 218
 - human, 88
 - maximal, 130
 - propagation, 127–154
 - general formula, 130
 - random, 87
 - relative, 90
 - rounding, 88, 113–115
 - sources of, 87–90
 - standard, 117, 131
 - systematic, 87
 - truncation, 88
- Euclidean
 - algorithm, 25, 677, 680
 - norm, 119, 442
- Euclidean norm, 442
- Euler, 55, 293
- Euler numbers, 169, 293, 320
- Euler’s
 - constant, 315
 - formulas, 483
 - function, 212
 - iteration method, 648
 - method, 56, 57, 306
 - transformation, 212, 278–284
 - generalized, 279
 - optimal, 288
- Euler–Maclaurin’s formula, 292–302, 548, 550
- experimental perturbations, 146
- exponent, 96
 - overflow, 118
 - underflow, 118
- exponential
 - distribution, 75
 - integral, 329
- false-position method, 626–628
- fast Fourier transform (FFT), 194, 248, 267, 503–516
 - Cooley–Tukey, 508
 - Gentleman–Sande, 508
- Fejér’s quadrature rules, 538
- FEM (finite element method), 594
- FFT (fast Fourier transform), 194
- Fibonacci sequence, 267, 311
- Filon’s formula, 555
- finite element method, 594
- five-point operator, 14
- fixed-point iteration, 2, 618–621
 - with memory, 628
- floating-point
 - number, 96
 - representation, 96
 - standard arithmetic, 99–102
- floor of number, 21
- forward
 - difference, 12
 - stability, 138
 - substitution, 29
- Fourier, 482
 - analysis
 - continuous case, 485
 - discrete case, 488
 - coefficients, 454, 484
 - matrix, 504
 - series, 191–193, 482
 - transform, 548
- fractal curve, 684
- Fredholm integral equation, 53
- frozen coefficients, 270
- function
 - aliased, 498
 - analytic, 385–407
 - band-limited, 497
 - spaces, 441
- functionals, 227
- fundamental subspaces, 47, 52
- fundamental theorem of algebra, 662
- fused multiply–add, 108
- gamma function, 164, 206, 301, 316
 - incomplete, 77, 164, 328, 348

- Gauss, 29
- Gauss quadrature, 565–584
 - Hermite, 573
 - Jacobi, 572
 - Laguerre, 572
 - Legendre, 571
 - remainder in, 570
- Gauss–Kronrod quadrature, 575
- Gauss–Markov theorem, 46
- Gaussian elimination, 30–38
- GCA (Gustafson’s Chebyshev acceleration), 292
- generating function, 256
- geometric series, 165
 - comparison with, 158
- Gibbs’ phenomenon, 487
- global convergence, 9
- golden section
 - ratio, 658
 - search, 658
- gradual underflow, 101
- Graeffe’s method, 668
- Gram, 464
 - matrix, 577
 - polynomials, 464
- greatest common divisor, 680
- Green’s function, 268
- Gregory, 547
- Gregory’s quadrature formula, 547
- grid
 - irregular triangular, 594–599
 - rectangular, 591
- guard digits, 101
- Gustafson’s Chebyshev acceleration (GCA), 292

- Haar, 474
- Haar condition, 474
- Halley, 648
- Halley’s method, 648
- Halton sequences, 603
- Hankel, 337
 - determinant, 340
 - matrix, 337, 339–345, 568, 577
- harmonic points, 357
- Hausdorff, 287
- Heaviside, 238
- Hermite, 381
 - interpolation, 381–385, 388, 570
 - polynomials, 464, 573, 585
- Heron’s
 - formula, 124
 - rule, 4
- Hessenberg matrix, 44, 651
- Hilbert
 - matrix, 135, 334, 577
 - space, 451
- Horner’s rule, 17
- hypergeometric function, 167, 327

- idempotent operator, 452
- IEEE 754 standard, 99–102
- ill-conditioned
 - multiple roots, 616
 - polynomial roots, 665–666
 - problem, 133
 - series, 206–212
- ill-posed problem, 53
- Illinois method, 636
- importance sampling, 81, 601
- inner product
 - accurate, 114
 - error analysis, 114
 - space, 450–453
- input data, 126
- integral
 - algebraic singularity, 552
 - infinite interval, 533
 - singular, 525–527
- integral domain, 182
- integration by parts, 525
 - repeated, 193, 214
- intermediate-value theorem, 610
- interpolation
 - Birkhoff, 382
 - broken line, 419
 - condition number, 356
 - error in linear, 363
 - formulas, 242
 - Hermite, 381–385
 - inverse, 366–367
 - iterative linear, 371–373
 - lacunary, 382
 - Lagrange, 355
 - barycentric form, 368
 - linear, 10
 - Newton, 359
 - osculatory, 381–385
 - piecewise cubic, 420
 - polynomial, 385–389

- rational, 389–395
- remainder term, 361
- trigonometric, 488
- two variables, 396–398
- with derivatives, 381–385
- interpolatory quadrature formula, 522
- interval
 - reduction method, 657
- interval arithmetic, 147–153
 - complex, 150
 - inclusion monotonic operations, 149
 - Newton’s method, 646–647
 - operational definitions, 148
- interval representation
 - infimum-supremum, 147
 - midpoint-radius, 149–150
- INTLAB, 154
- inverse
 - divided difference, 392
 - interpolation, 366–367, 634
- irregular errors, 223
- iteration
 - fixed-point, 2, 618–621
- iteration method
 - Euler’s, 648
 - Halley’s, 648, 654
 - Laguerre’s, 670–671
 - Newton’s, 637–645
 - Newton–Maehly’s, 672
 - Newton–Raphson’s, 637
 - Schröder’s, 650
- Jacobi, 463
- Jacobi’s
 - identity, 340
 - matrix, 580
 - polynomials, 463, 572
- Jacobian matrix, 8, 132
- Julia set, 684
- Kahan, 99
- kernel polynomial, 458
- Klein, 324
- Kronrod quadrature, 575
- Kummer, 168
- Kummer’s
 - first identity, 189, 209
 - hypergeometric function, 168
- Lagrange, 163
- Lagrange’s
 - barycentric interpolation, 367–371
 - interpolation, 355
 - two variables, 396
 - polynomial, 354
 - generalized, 388
 - remainder formula, 163
- Laguerre, 670
- Laguerre’s
 - method, 670–671
 - polynomials, 463, 572
- Lambert, 190
- Lambert’s W -function, 559, 642, 653
- Lanczos σ -factor, 487
- Laplace, 14
- Laplace’s equation, 14
- Laplace’s transform, 256, 285
- Laplace–Stieltjes transform, 285
- Laurent series, 191–193, 202
- least squares, 355
 - approximation, 355
 - characterization of solution, 46–50
 - data fitting, 466
 - general problem, 51
 - principle of, 46–47
 - problem, 45
 - statistical aspects, 469–471
- Lebesgue, 192
- Lebesgue constant, 356, 369
- Legendre polynomials, 462, 571
- Leibniz, 5, 431
- Leibniz’ formula, 431
- Leja ordering, 366
- limiting accuracy
 - multiple root, 616
 - simple root, 616
- Lin–Segel’s balancing procedure, 204
- line search, 657–661
- linear
 - approximation, 441
 - difference equation, 251–256
 - functional, 227
 - interpolation, 10
 - operator, 226
 - space, 441
- linear congruential generator, 69
- linear interpolation
 - on triangular grid, 596

- linear system
 - overdetermined, 45, 355
- linearization, 7
- logarithmic potential, 399
- low discrepancy sequences, 601
- LU factorization, 32–34, 139

- Möbius, 595
- machine epsilon, 97
- Maclaurin, 162
- magnitude of interval, 147, 153
- Mandelbrot set, 684
- mantissa, 96
- matrix
 - companion, 667
 - diagonally dominant, 423
 - Hankel, 337
 - Hessenberg, 44, 651
 - ill-conditioned, 135
 - nilpotent, 175
 - positive definite, 48
 - semicirculant, 175
 - shift, 175
 - Toeplitz, 175, 651
 - totally nonnegative, 434
 - tridiagonal, 34
- matrix multiplication, 26–28
 - error bound, 115
- maximal error, 130
- maximum modulus, 164, 194
 - theorem, 197
- maximum norm, 442
- Maxwell, 311
- Mersenne twister, 70
- method
 - of normal equations, 49
- method of undetermined coefficients, 565
- metric space, 440
- mignitude
 - of interval, 147
- Miller's formula, 187
- minimax property, 200
- minimization
 - one-dimensional, 657–661
- mixed congruential method, 69
- modulus of continuity, 449
- moment, 522
 - modified, 576
 - sequence, 286
- Monte Carlo method, 64–83

- Moore–Penrose inverse, 52
- Muller–Traub's method, 633
- Mulprec, 105
- multidimensional
 - integration, 587–601
 - interpolation, 395–398
- multiple recursive generator, 69
- multiplicity
 - of interpolation point, 382
 - of root, 616
- multisection method, 614
- multivalued function, 166, 173, 192

- Neville's algorithm, 306, 371–373
- Newton, 5
- Newton polynomials, 353
- Newton's formulas, 663
- Newton's interpolation formula, 359
 - constant step size, 243
 - two variables, 396
- Newton's method, 5, 637–645
 - complex case, 644
 - convergence of, 638–645
 - in several dimensions, 7–9
 - interval, 152, 646–647
 - modified, 675
- Newton–Cotes'
 - 9-point formula, 546
 - quadrature rule, 533–541, 552
- Newton–Maehly's method, 672
- Newton–Raphson's method, *see* Newton's method
- node polynomial, 524, 566, 567
- nonlinear spline, 417
- norm, 441
 - L_p , 443
 - l_p , 443
 - of matrix, 131
 - of operator, 444–445
 - of vector, 131
- norm and distance formula, 445–448
- normal
 - deviates, 75
 - distribution function, 75, 329
 - equations, 47, 454
- normal equations
 - method of, 49
- null space
 - numerical, 52
 - of matrix, 47

- number system
 - binary, 94
 - floating-point, 96
 - hexadecimal, 94
 - octal, 94
 - position, 93–94
- numerical
 - cubature, 587
 - differentiation, 235, 245–248
 - instability, 19
 - method, 127
 - null space, 52
 - problem, 126
 - rank, 52
 - simulation, 55, 56
- Numerov, 258
- Numerov’s method, 258, 306, 317
- Nyquist’s critical frequency, 498

- Oettli–Prager error bounds, 138
- operation count, 28
- operator
 - adjoint, 453
 - averaging, 226
 - calculus of, 225–250
 - central difference, 226
 - commutative, 227
 - differentiation, 226
 - expansions, 220–256
 - linear, 226
 - norm, 444–445
 - positive definite, 453
 - self-adjoint, 453
- order of accuracy, 522
- orthogonal
 - coefficients, 454
 - expansion, 455
 - function, 452
 - polynomials, 457–466, 565–584
 - and Padé table, 334
 - construction, 459
 - projection, 49, 52
 - projector, 50, 55
 - system, 450–453
- orthonormal system, 452
- oscillating integrand, 554–560
- osculating polynomial, 382
- osculatory interpolation, 381–385
- output data, 126

- Padé, 329
- Padé table, 329–336
 - of exponential function, 330
- parametric
 - curve, 411
 - spline, 424
- Parseval’s identity, 455, 485
- partial pivoting, 36
- Pascal matrix, 24, 263
- Peano, 238
- Peano kernel, 237, 429, 430
- Penrose’s conditions, 52
- permutation
 - bit-reversal, 506, 507
 - matrix, 35
 - perfect shuffle, 507
- perturbation
 - componentwise bound, 135
 - expansion, 203–205
 - regular, 203
 - experimental, 146
 - of linear systems, 134–136
 - singular, 204
- pivot element, 31
- point of
 - attraction, 3, 618
 - repulsion, 3, 618
- Poisson, 14
- Poisson’s
 - distribution, 208, 329
 - equation, 14
 - process, 77
 - summation formula, 272, 532, 548
- polar algorithm, 75
- polynomial
 - reciprocal, 663, 672
 - shift of origin, 664
- position system, 93–94
- positive definite, 37
 - matrix, 48
- power
 - basis, 352
 - truncated, 427
 - method, 670
- power series, 162–184
 - composite, 173
 - composite function, 179
 - division, 168

- expansion, 22–23
- inverse function, 179
- reversion, 179
- precision, 91
 - double, 99
 - multiple, 104–105
 - single, 99
- problem
 - ill-conditioned, 133
 - well-conditioned, 133
- projection
 - orthogonal, 49, 52
- projection operator, 452
- pseudoinverse, 52
- pseudoinverse solution, 50, 52
- pseudorandom numbers, 66–77
- Pythagoras' theorem, 452
- Pythagorean sum, 118

- qd algorithm, 339–345, 673
- qd scheme, 339
- quadratic interpolation
 - on triangular grid, 596
- quadrature
 - adaptive rule, 560–563
 - closed rule, 529
 - Gauss–Christoffel, 565–584
 - Gauss–Lobatto, 573
 - Gauss–Radau, 574
 - midpoint rule, 528
 - Monte Carlo methods, 599–601
 - Newton–Cotes' rule, 533–541
 - open rule, 529
 - product rule, 590–594
 - Simpson's rule, 530–531
 - successive one-dimensional, 589–590
 - trapezoidal rule, 527
- quadtree algorithm, 679
- quasi–Monte Carlo methods, 601–604
- quicksort, 21

- radical inverse function, 602
- radix, 96
- random
 - normal deviates, 75
 - number, 66–77
 - antithetic sequence of, 79
 - generator, 68
 - uniformly distributed, 67
 - variable, 45
 - mean, 46
 - variance, 46
- random number generator (RNG), 69
- range of matrix, 47
- range reduction, 102
- rational interpolation, 389–395
 - Neville-type, 394
- reciprocity relations, 498
- rectangle-wedge-tail method, 77
- rectangular grid, 14
- rectangular wave, 486
- recurrence
 - backward, 252
 - forward, 252
 - relation, 17–20
- reduction of variance, 77–81
- regula falsi, *see* false-position method
- rejection method, 77
- relative error, 90
- remainder term
 - in series, 161
 - interpolation, 361
- Remez algorithm, 478
- repeated averaging, 278
- residual vector, 45
- resultant, 681
 - of polynomials, 682
- rhombus rules, 340
- Richardson, 10
- Richardson's
 - correction, 303
 - extrapolation, 10, 59, 302–308, 548
 - repeated, 302
 - iteration, 40
- Riemann, 192
- Riemann–Lebesgue theorem, 192
- RNG (random number generator), 69
- Rodrigues' formula, 458, 462
- Romberg, 548
- Romberg's method, 11, 302, 548–552
 - error bound, 549
- root condition, 256
- rounding, 92
 - chopping, 92
 - error, 88
- Runge, 59, 377

- Runge's
 - phenomenon, 377–379, 398–407
 - second order method, 60, 306
- Rutishauser, 339
- sampling theorem, 497
- scalar of operator, 230
- scale factors (fixed-point), 96
- scaling and squaring, 170
- Scheutz, 245
- Schoenberg–Whitney condition, 434
- Schröder methods, 650
- Scylla and Charybdis, 195, 197, 250
- secant method, 7, 267, 628–631
 - modified, 636
 - rate of convergence, 630
 - waltz rhythm, 631
- seed, 251
- Seidel, 325
- Seidel's theorem, 325
- self-adjoint operator, 453
- semicirculant matrix, 175
- semiconvergent series, 212–214
- seminorm, 451
- semiseparable matrix, 268
- series
 - alternating, 161
 - asymptotic, 214
 - convergence acceleration, 271–308
 - divergent, 212–214
 - geometric, 165
 - ill-conditioned, 206–212
 - semiconvergent, 212–214, 218
 - tail of, 158
 - Taylor's, 162
 - with positive terms, 212, 271, 292
- Shanks' sequence transformation, 337
- Shannon's sampling theorem, 497
- shift
 - matrix, 175, 579
 - operator, 220
- Sievert, 587
- sign, 160
- significant digits, 91
- simple root, 615
- Simpson, 530
- Simpson's rule, 530, 542
 - with end correction, 543
- single precision, 99
- singular
 - value, 50
 - value decomposition (SVD), 50–54
 - vector, 50
- smoothing, 355
- sparse matrix, 38
- spectral analysis, 483
- spline
 - best approximation property, 423
 - function, 418–436
 - definition, 418
 - interpolation, 417–434
 - closed curves, 425
 - least squares, 434–436
 - parametric, 424
 - truncated power basis, 427
- splitting technique, 81
- square root
 - Heron's rule, 4
 - Schröder's method, 650
- square wave
 - Fourier expansion, 486
- stability of algorithm, 137–142
- standard deviation, 46
- standard error, 117, 131
- Steffensen's method, 621, 631
- Stieltjes, 285, 329
- Stieltjes'
 - integral, 285
 - procedure, 468
- Stirling, 243
- Stirling's formula, 206, 300
- Sturm, 677
- Sturm sequence, 677–680
- subdistributivity, 148
- sublinear convergence, 622, 625
- subtabulation, 265
- successive approximation, 2
- summation
 - algorithms, 271–308
 - by parts, 225
 - repeated, 262
 - compensated, 115–116
- superlinear convergence, 622
- superposition principle, 222
- support coefficients, 367
- SVD (singular value decomposition), 50–54
- Sylvester's
 - determinant identity, 341
 - matrix, 682

- synthetic division, 18, 663
with quadratic factor, 664
- Szegő polynomials, 466
- tablemaker's dilemma, 92
- tail of a series, 158
- Taylor, 162
- Taylor's
formula
integral form of remainder, 162
series, 162
symbolic form of, 229
- termination criteria, 158, 617–618
- Thiele's reciprocal differences, 393
- thinned sequence, 275
- thinning, 275–284
geometric, 276
- three-term recurrence, 467, 468
- titanium data, 435
- Todd, 257
- Toeplitz, 175
- Toeplitz matrix, 140, 175, 509, 651
method, 175
- total differential, 130
- totally positive matrix, 376
- transform
 z , 256
Fourier, 194, 548
Laplace, 256
Laplace–Stieltjes', 285
- translation operator, 220
- transposition matrix, 36
- trapezoidal rule, 9
composite, 528
error in, 302
superconvergence, 531–533
- triangle
family of polynomials, 352–353
inequality, 451, 452
- triangular
grid
interpolation on, 596
refinement of, 594
systems of equations, 28–30
- tridiagonal
matrix, 252
system
algorithm for, 34
- trigonometric
interpolation, 488
polynomial, 483
- truncation error, 88, 158
global, 528
local, 528
- Ulam, 65
- ulp (unit in last place), 98
- unattainable point, 390
- unbiased estimator, 46
- uncorrelated random variables, 46
- uniform approximation, 471
- uniform convergence, 443
- unimodal function, 657
- unit in last place (ulp), 98
- unit roundoff, 98
- unitary operator, 480
- Van der Corput sequence, 602
- Vandermonde, 352
determinant, 228, 261
-like systems, 377
matrix, 228, 352, 568
complex, 504
confluent, 382
inverse, 370
systems, 373–377
- variance, 46
reduction of, 77–81
- vector
conjugate even, 511
conjugate odd, 511
space, 441
- von Neumann, 65
- Wallis, 653
- Weierstrass, 449
- Weierstrass'
approximation theorem, 449
method, 673
- weight function, 522
- weighted quadrature rule, 522
- well-conditioned problem, 133
- Wiberg, 245
- Wilkinson, 37
- wobbling, 97
- word-length, 95
- wrapping effect, 153
- z -transform, 256
- zero suppression, 672
- ZEROIN algorithm, 635
- ziggurat algorithm, 76