

Index

A

abstract group, 226
 action of group, 227
 action on the right, 29
 active form of permutation, 28
 adjacency matrix, 181
 adjacent, 160
 affine plane, 134
 affine space, 136, 266
 affine triple system, 117–118, 266
 Afriat, S. N., 42, 70
 Al-Ghazali, 27
 algorithms, 4
 algorithms for sequential generation, 41–44
 alternating group, 229
 alternating path, 186
 analog-to-digital converter, 169
 Anderson, I., 336
 antichain, 195
 antihole, 298
 antisymmetric relation, 35, 187
 Appel–Haken Theorem, 303
 arithmetic, 9, 20, 42
 arithmetic–geometric mean inequality, 18
 Arnol'd, V. I., 49
 Arrow's Theorem, 205–207, 208
 Artin, É., 336
 automorphism (of STS), 120
 automorphism group, 226, 234, 239–240, 242, 288, 323
 Axiom of Choice, 309, 311–312, 318, 323

B

Bailey, R. A., 98
 base (for permutation group), 236
 base (of partition), 213
 basic symmetric polynomial, 221
 Baxter, N., 333
 Beineke, L., 337
 Bell number, 39–40, 62, 70, 223, 243, 254
 Berge graph, 298
 Berge, C., 297
 Bernoulli number, 71, 85
 Bertrand's postulate, 55

Beth, T., 336
 Biggs, N. L., 107, 166, 291, 336
 Billington, D., 105
 binary Golay code, 287
 binary symmetric channel, 276
 binary tree, 72
 binomial coefficient, 23, *passim*
 Binomial Theorem, 25, 55
 bipartite graph, 177, 185, 292–294
 bipartition, 177, 292
 blocking set, 106
 Bollobás, B., 332, 337
 Bolzano–Weierstrass Theorem, 156, 177
 Boolean function, 18
 Boolean lattice, 193, 195
 Borcherds, R., 216
 Borges, J. L., 20, 147
 Bose–Shrikhande–Parker Theorem, 2
 Bouvet, J., 42
 Brace–Daykin Theorem, 105
 Braybrooke, N., 21
 bridges of Königsberg, 166–167
 Brooks' Theorem, 294–296
 Brouwer, A. E., 337
 Bruck–Ryser Theorem, 132, 141–143
 Bruck–Ryser–Chowla Theorem, 264
 Bryant, V., 337
 Buddha, 20
 Burnside, W., 246
 Burnside's Lemma, 245

C

C, 332
 Cameron, P. J., 336, 337
 canonical Ramsey Theorem, 317–318
 capacity (of channel), 277
 capacity (of network), 173–175
 cardinal numbers, 310–311
 cardinality, 16
 Carroll, L., 9, 21
 cartesian product, 17
 Catalan number, 60–61, 71, 218
 Cauchy's Inequality, 261
 Cauchy, A., 246

CAYLEY, 333
 Cayley digraph, 241
 Cayley graph, 241
 Cayley's Theorem (on groups), 95, 226–227
 Cayley's Theorem (on trees), 38–39, 86, 164
 ceiling, 11
 centraliser, 244
 chain, 195
 Chang, 99
 character, 223, 270
 characteristic (of field), 144
 characteristic function, 17, 22
 check matrix, 282
 chemistry, 162
 Chinese Postman Problem, 172
 Chinese Rings Puzzle, 70
 chromatic number, 294
 chromatic polynomial, 294–295
 circuit, 161
 class (of partition), 214
 clique, 292
 closed set, 203
 closure, 203
 coclique, 292
 code, dual, 283, 290
 code, equidistant, 281
 code, Golay, 287
 code, Hamming, 284–285, 290
 code, linear, 273, 281–285, 288–290
 code, maximum distance separable, 280, 290
 code, MDS, 280, 290
 code, perfect, 279, 285–288
 code, repetition, 286
 codewords, 274
 Cohen, A. M., 337
 column-complete latin square, 98
 compactness, 177
 comparability graph, 297, 306
 complement of design, 264
 complete graph, 137, 160
 complete symmetric polynomial, 221
 computational complexity, 325
 Comtet, L., 335
 congruence (for group), 238
 conic, 139
 conjugacy classes, 212
 conjugacy, of permutations, 212
 conjugate partition, 210
 conjugate subgroups, 233
 connected component (of graph), 162, 179
 connected graph, 162
 connective, 194
 Continuum Hypothesis, 311

contraction, 295, 301
 convex polygon, 155
 coset action, 232
 coset representative, 235
 coset space, 232
 coset, 232
 countable, 310, *passim*
 covering, 115
 cube, 169
 cycle decomposition, 30, 247
 cycle form of permutation, 29
 Cycle Index Theorem, 250, 256
 cycle index, 223, 247, *passim*
 cycle structure, 212
 cycle, 203
 cyclic group, 228, 251

D
 Dantzig, T., 8
 Davey, B. A., 337
 De Bruijn–Erdős Theorem, 102–104, 186
 De Morgan, A., 291
 degree (of field extension), 144
 degree (of vertex), 162
 deletion, 295, 301
 delta-system, 157
 Denes, J., 336
 derangement, 2, 5, 57–59
 derangements, 77
 Desargues' Theorem, 132–133
 design, 257, *passim*, 287–288
 design, Hadamard, 269
 design, projective, 264
 design, square, 264
 design, symmetric, 264
 design, trivial, 265
 determinant, 94
 Devlin, K. J., 307
 diagram (of partition), 210, *passim*
 diameter (of graph), 180
 Diestel, R., 337
 Dieudonné, J., ix, 336
 difference, 16
 digraph, 160, 172–173
 digraph, Cayley, 241
 dihedral group, 228–229, 251
 Dilworth's Theorem, 196–197, 207
 dimension (of poset), 198–199, 207
 Dirac electrons, 216
 direct product (of groups), 229, 253
 direct product (of posets), 197–198, 201
 directed edge, 159
 directed graph, 160
 Dirichlet, L., 148

discrete topology, 38
 disjunctive normal form, 195, 208
 distance (in graph), 180
 distributive lattice, 191–193
 divalent, 162
 domino group, 230–231, 232, 237
 double counting, 15
 double exponential growth, 13
 doubly stochastic matrix, 94
 down-set, 191
 dual code, 283, 290
 dual partition, 210
 Dubinsky, E., 333

E

e-error-correcting, 275
 echelon form, 145
 edge colouring, 298–299
 edge, 159
 edge-cover, 178, 292–293
 edge-reconstruction, 330
 edge-weighted graph, 162
 eigenvalue, 182, 186
 elementary row operations, 124
 elementary symmetric polynomial, 221
 Eliot, T. S., 21, 271
 endofunction, 38
 energy, 216
 entry-permutation, 231
 equidistant code, 281
 equivalence of codes, 288
 equivalence relation, 35
 Erdős, P., 336
 Erdős–Ko–Rado Theorem, 100
 Erdős–Rado Canonisation Theorem, 317–318
 Erdős–Renyi Theorem, 320
 Erdős–Szekeres Theorem, 154, 306
 error-correcting code, 273, *passim*
 Euler, L., 166
 Euler's 36 officers, 2, 5, 286
 Euler's function, 244, 251
 Euler's pentagonal numbers theorem, 213–215, 224
 Euler's theorem (on Eulerian trails), 166, 173
 Euler's theorem (on embeddings), 300–301, 303
 Eulerian trail, 166
 even permutation, 84
 exponential generating function, 62
 exponential growth, 12, 19
 exponential, 12, 54, 82
 extension of design, 269

F

factorial, 12
 family of sets, 13, 99, *passim*
 Ferrers diagram, 210
 Fibonacci (Leonardo of Pisa), 69
 Fibonacci number, 50–53, 63, 69, 224
 figure-counting series, 249
 finite field, 64, 123, 143–145
 first-order logic, 308
 Fisher, R. A., 261
 Fisher's Inequality, 261–263
 floor, 11
 flow, 173
 forest, 162
 formal power series, 53–56
 formula, 194
 Forster, E. M., 160
 Four-colour Theorem, 303, 313, 324, 333
 four-squares identity, 141–142
 fractional exponential growth, 13
 free Boolean lattice, 195
 free construction, 319, 324
 free distributive lattice, 194, 208
 Frege, G., 308
 friendship theorem, 186
 Frobenius, G., 246
 Frucht's Theorem, 227, 241–242
 function-counting series, 249

G

Gale–Ryser Theorem, 293–294, 305
 Gallai–Milgram Theorem, 196
 Galois, É., 64
 Galois field, 64
 Galois' Theorem, 64
 GAP, 333
 Garey, M. R., 329
 Gaussian coefficient, 124–125, 145, 223–224, 265–266
 general graph, 160
 Generalised Continuum Hypothesis, 311
 generalised quadrangle, 138, 146
 generating function for Bell numbers, 62
 generating function for Catalan numbers, 61
 generating function for Fibonacci numbers, 61
 generating function for Stirling numbers, 81
 generating function, 49, *passim*
 generator matrix, 282
 geometric lattice, 204
 geometric matroid, 204
 Gilbert–Varshamov bound, 278–279, 281–282
 girth (of graph), 180
 g.l.b., 189

350

Golay code, 287
 Goldie, C. M., 336
 Gould, S. J., 332
 Goulden, D. M., 335
 Graeco-Latin square, 96
 Graham, R. L., 336
 graph, 14, 159, *passim*, 252
 graph, Berge, 298
 graph, bipartite, 177, 185, 292–294
 graph, Cayley, 241
 graph, comparability, 297, 306
 graph, complete, 137, 160
 graph, connected, 162
 graph, directed, 160
 graph, edge-weighted, 162
 graph, incomparability, 297, 306
 graph, interval, 305
 graph, latin square, 268, 270
 graph, line, 297
 graph, Moore, 181–184, 335
 graph, N-free, 306
 graph, null, 160
 graph, perfect, 296–298, 306, 333
 graph, permutation, 306
 graph, Petersen, 240–241, 243, 305–306
 graph, strongly regular, 330
 graph, vertex-weighted, 162
 graph minor, 301
 graph reconstruction, 329
 Gray code, 169
 greatest lower bound, 189
 greedy algorithm, 165–166, 184, 204, 208
 Gros, L., 70
 group, 60, 225, *passim*
 group, 95
 group, abstract, 226
 group, alternating, 229
 group, automorphism, 226, 234, 239–240, 242, 288, 323
 group, cyclic, 228, 251
 group, dihedral, 228–229, 251
 group, domino, 230–231, 232, 237
 group, imprimitive, 238
 group, intransitive, 232
 group, Klein, 229
 group, Mathieu, 288
 group, permutation, 226, *passim*
 group, primitive, 238
 group, symmetric, 70, 229
 group, transitive, 232
 Guthrie, F., 291

Index

H

Hadamard design, 269
 Hadamard matrix, 267–270, 334
 Hadamard's Theorem, 267
 Hadwiger's conjecture, 334
 Hajnal, A., 336
 Hall, M. Jr, 88, 94, 318, 335
 Hall, P., 88, 243
 Hall's Condition, 89
 Hall's Marriage Theorem, 88–89, 179, 185, 197, 205, 207, 243, 292, 318–319, 324
 Hamilton, W. R., 142, 167
 Hamiltonian circuit, 168
 Hamiltonian path, 167
 Hamming bound, 279, 290
 Hamming code, 284–285, 290
 Hamming distance, 274
 Hamming metric, 274
 Hamming space, 274, 288
 Handshaking Lemma, 16, 166
 Harary, F., 335
 Hasse diagram, 188
 Heawood, P. J., 304
 Higman, G., 1
 Hilbert's hotel, 310
 Hill, R., 336
 Hirschfeld, J. W. P., 336
 Hoban, R., ix, 209, 225, 232
 hole, 298
 Holton, D. A., 184
 homogeneous coordinates, 137
 homogeneous graph, 323
 hook length, 217–218
 Hughes, D. R., 259, 269, 336
 hyperoval, 146
 hyperplane, 265–266

I

Ifrah, G., 7
 imprimitive group, 238
 incidence algebra of poset, 199
 incomparability graph, 297, 306
 indicator function, 22
 induced subgraph, 160, 323
 induction, 10
 integrity theorem, 175
 intersecting family, 99–100, 208, 334
 intersection, 16
 interval graph, 305
 intransitive group, 232
 invariant relation (of group), 237
 involution, 59–60, 220
 irreflexive relation, 35, 160

Isbell, J., 335

ISETL, 333

J

Jackson, I., 335

Jacobi's triple product identity, 216–217, 224

JI element of lattice, 192

Johnson, D. S., 329

Johnson, S., 1

join, 189

join-indecomposable, 192

Jordan Curve Theorem, 300

Jungnickel, D., 336

K

Kaliningrad, 166

Keedwell, A. D., 336

Kempe, 304

Keynes, J. M., 147

Kirkman, T. P., 107

Kirkman system, 108

Kirkman's schoolgirls, 2, 5, 88, 119–120, 122

Klein, E., 155

Klein bottle, 302

Klein group, 229

knot, 331, 334

König, D., 337

König's Infinity Lemma, 311–312, 323–324

König's Theorem, 178, 185, 293

Königsberg, 166–167

Kronecker product, 268

Kronecker, L., 7

Kuratowski–Wagner Theorem, 301

L

labelled structure, 14, 62, 234

Lachlan–Woodrow Theorem, 323

Lagrange's Theorem, 95, 232

Lao Tzu, 258

Latin rectangle, 90

Latin square, 87–88, 90, *passim*, 286, 334

Latin square graph, 268, 270

Latin squares, orthogonal, 95

lattice, 189

lattice, Boolean, 193, 195

lattice, distributive, 191–193

lattice, free boolean, 195

lattice, free distributive, 194, 208

lattice, geometric, 204

lattice, power-set, 189–198

least upper bound, 189

LeGuin, U. K., 325

Leibniz, G., 42

Lem, S., 1, 310

Lenz, H., 336

Levin, G., 333

lexicographic order, 43

line graph, 297

linear code, 273, 281–285, 288–290

linear extension of poset, 190–191, 199, 314

linear independence, 203

linear recurrence relation, 56

linear space, 334

Liouville, J., 64

list colouring conjecture, 334

Lloyd, E. K., 166, 291

Llull, R., 27

logarithm, 12, 54, 83

logic, first-order, 308

logic, propositional, 194

loop, 159

Lovász, L., 335, 336

Lovász–Müller Theorem, 330

l.u.b., 189

Lucas' Theorem, 28

LYM technique, 102

M

Macdonald, I. G., 210, 218, 336

MacWilliams, F. J., 336

main problem of coding theory, 278, 334

map colouring, 291, 303–305, 313

matching, 178, 292–293

Maté, A., 336

Mathews, P., 99

Mathieu group, 288

matrix, adjacency, 181

matrix, check, 282

matrix, doubly stochastic, 94

matrix, generator, 282

matrix, Hadamard, 267–270

matrix, stochastic, 94

matroid, 203–205, 208

Max-Flow Min-Cut Theorem, 174–176, 185, 294

maximal element of poset, 188, 313

maximum distance separable code, 280, 290

maximum-likelihood decoding, 277

McDiarmid, C., 64

MDS code, 280, 290

meet, 189

membership test for group, 236

Menger's Theorem, 177

metric, 171, 180, 274

minimal connector, 164, 171, 185

minimal counterexample, 11

minimal spanning tree, 164

minimum distance, 275

352

minimum weight, 281
 minor of graph, 301, 333
 Mirsky, L., 336
 Möbius, A., 291
 Möbius function, 199–202, 207, 244
 Möbius inversion, 66, 201–202, 221
 Möbius strip, 302
 MOLS, 95, 135, 146
 monomial equivalence, 289
 Moore graph, 181–184, 335
 Morgenstern, O., 21
 Motzkin, T. S., 147
 multigraph, 160
 multiple edge, 159
 mutually orthogonal Latin squares, 95, 135, 146

N

N-free graph, 306
 Nagell's equation, 286
 natural partial order (of partitions), 211
 nearest-neighbour decoding, 275, 277
 necklace, 251
 Netto system, 118, 125
 network, 173, *passim*
 Neumaier, A., 337
 Newton, I., 25, 49
 Newton's Theorem, 222
 non-deterministic polynomial time (NP), 328
 non-orientable surfaces, 302–303
 NP-completeness, 329
 null graph, 160

O

odd permutation, 84
 Odometer Principle, 9, 18, 41, 169
 orbit, 232, 235
 Orbit-counting Lemma, 81, 246, *passim*
 order of projective plane, 131
 order, 36, 46
 order, linear, 188
 order, natural (of partitions), 211
 order, lexicographic, 43
 order, partial, 36, 46, 188
 order, reverse lexicographic, 43, 211
 order, total, 36, 188
 ordered pair, 17
 ordinal numbers, 309–310
 Ore's Theorem, 168
 orientable surfaces, 302–303
 orthogonal array, 281
 orthogonal Latin squares, 95, 286
 oval, 139, 146
 Oxtoby, J. C., 322

Index**P**

packing, 115, 276
 pairwise orthogonal Latin squares, 95
 Paley type (Hadamard matrix), 268, 270
 Palmer, E. M., 335
 Pappus' Theorem, 133
 parallelism, 134
 Paris–Harrington Theorem, 156
 parity check, 282
 partial geometry, 137
 partial matching, 292–293
 partial order, 36, 46, 187, 188
 partial order, natural (of partitions), 211
 partial permutation, 32, 46–47
 partial preorder, 36–38, 46
 partial transversal, 203
 particle number, 216
 partition (of number), 209, *passim*, 306
 partition (of set), 35
 partition function, 210
 Pascal's Triangle, 25, 79
 Pascal, 332
 passant, 139
 passive form of permutation, 28–29
 path, 161
 pentagon, 183, 187
 pentagonal number, 213
 perfect code, 279, 285–288, 335
 Perfect Graph Theorem, 298
 perfect graph, 296–298, 306, 333
 Perfect, H., 337
 permanent, 94
 permutation, 13, 28, 334
 permutation, even, 84
 permutation, odd, 84
 permutation graph, 306
 permutation group, 226, *passim*, 334
 permutations and combinations, 21, 32
 perspective, 128
 Petersen graph, 183–184, 240–241, 243, 305–306
 PIE, 57, 75, *passim*, 265, 270
 Pigeonhole Principle, 147–149, 155, 156, 312
 Pinch, R. G., 336
 Piper, F. C., 259, 336
 place-permutation, 231
 Plotkin bound, 279, 290
 Plummer, M. D., 336
 POLS, 95
 polynomial growth, 13, 19
 polynomial time (P), 327
 polyominoes, 334
 polytopes, 334
 poset, 187, *passim*

poset, two-level, 207
 power set, 13, 17
 power sum (symmetric) polynomial, 221
 power-set lattice, 189, 198
 pre-partial order, 36
 preorder, 36, 46, 85
 Priestley, H. A., 337
 primitive component, 238
 primitive group, 238
 principal down-set, 191
 Principle of Inclusion and Exclusion, 57, 75,
passim, 265, 270
 Principle of Induction, 10
 Principle of the Supremum, 156
 probabilistic method, 153–154
 projective design, 264
 projective geometry (or space), 129, 189, 265,
 289
 projective plane, 102, 131, 186, 265–266, 302,
 334
 projective triple system, 116–117
 propositional Compactness Theorem, 314–315,
 323–324
 propositional logic, 194

Q

q -binomial Theorem, 127, 223
 quadratic non-residue, 143
 quadratic residue, 143
 quasigroup, 92–95
 quaternions, 142, 146
 QUICKSORT, 66–68, 72–73

R

Radio Times, 186
 radius of convergence, 56
 Rado, R., 322, 336
 Ramsey, F. P., 147
 Ramsey, M., 147
 Ramsey game, 3, 5, 149
 Ramsey number, 151–154
 Ramsey's Theorem, 147, *passim*, 316, 323–324
 random graph (countable), 320–323, 324
 random graph (finite), 331
 rank function, 203
 real projective plane, 128, 188, 302
 recurrence relation for Bell numbers, 40, 62
 recurrence relation for Catalan numbers, 61
 recurrence relation for Fibonacci numbers, 51
 recurrence relation for partition function, 215
 recurrence relation for Stirling numbers, 80
 recurrence relation, 49, *passim*
 recurrence relation, linear, 56
 reduced echelon form, 124, 145

reflexive relation, 35, 187
 regular family, 104–105
 relation, 34–35
 repeated blocks, 259–261
 repetition code, 286
 reverse lexicographic order, 43, 211
 Ringel–Youngs Theorem, 303
 Riordan, J., 335
 Robertson–Seymour Theorem, 302
 Robinson–Schensted–Knuth correspondence,
 218–220
 rooted tree, 38
 Rothschild, B. L., 336.
 row-complete Latin square, 98
 RSK correspondence, 218–220
 Rubik's cube, 230
 Rubik's domino, 230
 Russell, B., 308, 312
 Russell's paradox, 308, 310
 Russian peasant multiplication, 19–20, 63, 69
 Ryser, H. J., 335

S

Schreier vector, 235
 Schreier's Lemma, 235
 Schreier–Sims algorithm, 234–236, 333
 Schur function, 223
 Schur's Theorem, 157
 SDR, 88–90, 98, 185, 203, 270, 292, 318–319,
 324
 secant, 139
 Segre's Theorem, 137–139
 selection, 32
 self-similarity, 27
 separation axioms, 38
 Sewell, E., 21
 Shannon's Theorem, 277
 Shao Yung, 42
 sign of permutation, 83–85
 Singer, K., 307
 Singleton bound, 279–280, 290
 Sheehan, J., 184
 Skolem, T., 288
 Sloane, N. J. A., 335, 336
 Slomson, A., 30
 slope (of partition), 213
 social choice function, 205
 sorting, 66, 73
 source, 173
 spanning forest, 163
 spanning subgraph, 160, 323
 spanning tree, 163
 Spencer, J., 336

354

Sperner family, 101–102
 sphere-packing bound, 279
 square design, 264
 St George, 7
 standard tableau, 217
 Stanley, R., 336
 Steiner quadruple system, 121, 266, 319–320, 324
 Steiner system, 108, 334
 Steiner triple system, 98, 100, 107, *passim*, 137, 239, 257–258, 265, 319–320, 324
 stepwise improvement, 175, 185
 stereographic projection, 299–300
 Stewart, I., 286
 Stewart, R., 7
 Stirling number, 80, 84, 223, 254–255
 Stirling's formula, 31, 45
 stochastic matrix, 94
 strong generating set, 236
 Strong Perfect Graph Conjecture, 298, 333
 strongly connected digraph, 173
 strongly regular graph, 330
 subdivision, 301
 subgraph, 160
 substitution, 29
 subsystem (of STS), 112, 121–122
 support of codeword, 287
 surfaces, 302–303
 surjective mappings, 77
 Sylvester type (Hadamard matrix), 268, 270
 symmetric design, 264
 symmetric difference, 16
 symmetric function, 220
 symmetric group, 70, 229
 symmetric polynomial, 220–224, 255–256
 symmetric relation, 35, 160
 syndrome decoding, 283
 syndrome, 283
 system of distinct representatives, 88–90, 98, 185, 203, 270, 292, 318–319, 324

T
t-design, 257, *passim*
t-transitive, 238
 tableau, 217, *passim*
 Tall, D. O., 286
 tangent, 139
 target, 173
 Tarry, G., 3, 286
 tautology, 194
 tensor product, 268
 ternary golay code, 287
 Thas, J. A., 336

Index

Tietäväinen's Theorem, 287
 Todd–Coxeter algorithm, 333
 topological graph theory, 299–304
 topology, 1, 37–38, 177
 torus, 302
 total order, 36, 188
 totient, 251
 tournament schedule, 119, 299
 'Trackwords', 186
 trail, 161
 transfinite induction, 310
 transitive group, 232
 transitive relation, 35, 187
 Travelling Salesman Problem, 170, 185
 tree, 38–39, 86, 162
 tree, binary, 72
 trek, 161
 triangle inequality, 171–172, 180
 trivalent, 162
 trivial design, 265
 truth table, 194
 Tsuzuku, T., 336
 Turing machine, 326
 'Twenty Questions', 67, 72, 271
 Twice-round-the-tree Algorithm, 171, 185
 two-level poset, 207
 two-line notation for permutation, 29

U
 union, 16
 unique factorisation, 64
 universal graph, 322–323
 unlabelled structure, 14, 234
 unordered pair, 17

V
 valency, 162
 valuation, 194
 value of flow, 173
 van der Waerden permanent conjecture, 94
 van Lint, J. H., 335, 336, 337
 variance trick, 261
 Varshamov–Gilbert bound, 278–279, 281–282
 Veblen–Young Theorem, 130
 Venn diagram, 76
 vertebrate, 38
 vertex, 159
 vertex-weighted graph, 162
 Vilenkin, N. Ya, 307, 310
 Vizing's Theorem, 298
 von Neumann, J., 21

W

walk, 160

Watkins, J. J., 304

weakly connected digraph, 173

weight function, 162, 249

weight, of codeword, 281

Welsh, D. J. A., 336, 337

Wên, King, 42

Wharton, W., 123

White, A. T., 336

Whitehead, J. H. C., 1

widgets, 170

Wielandt, H., 336

Wilson, R. J., 27, 166, 291, 304, 337

Wilson, R. M., 335

windmill, 186

Witt, E., 288

word, 33

wreath product, 229–230, 253, 288, 290

X**Y**

Youden square, 270

Young diagram, 210

Young tableau, 217

Z

Zorn's Lemma, 55, 313–314, 323