

Index

- Abelian group 12
- additive group 12
- affine design 77
- affine plane 67, 77
- affine space 76
- affine transformation 167
- affine transformation group 167
- algebra 30
- algebraic number 6
- algebraic integer 7
- alternating group 149
- alternative ring 27
- Artin–Zorn theorem 48
- associative ring 27
- associativity 10
- automorphism 20, 33, 68, 187
- automorphism group 20, 33, 68, 187
- axis 230, 235, 255

- basis 50, 287
- block 61
- block design 61
- Burnside’s theorem 113, 140, 183

- Cameron’s theorem 204
- centralizer 16
- centre 17, 28, 72, 103, 235, 255
- character 128
- characteristic 39
- characteristic composition series 95
- characteristic subgroup 21
- class function 129
- class number 16
- coboundary 106
- cocycle 105
- cohomology group 91, 106
- collinear 272
- commutative 27
- commutative group 12
- commutator 17
- commutator ring 28, 127
- commutator subgroup 18
- complementary design 65
- complete Frobenius group 142
- complete matrix ring 31
- completely reducible 125
- composition series 94
- concurrent 272
- conjugacy class 16
- conjugacy operation 23
- conjugate 16
- connected 186
- coset 15
- cycle 147
- cycle component 147
- cycle decomposition 147
- cyclic group 12
- cyclotomic polynomial 6

- decomposition into cosets 15
- degree 8, 23, 123, 147, 155
- Dembowski–Wagner theorem 296
- derivation 91
- derivative 44
- Desarguean 272
- design 61
- dimension 49, 287
- direct product 2, 89, 91
- direct sum 3, 53, 125
- direction 230
- distributive ring 27
- doubly transitive 25
- dual 251
- dual block design 64
- duality for projective planes 251

- edge 186
- elation 255
- elation group 258
- elementary Abelian group 99
- elementary symmetric polynomial 8
- equivalence class 3, 16
- equivalence relation 3
- equivalent representation 124
- Euler-function 4
- even permutation 149

- factor set 105
- field 27
- finite field 39
- finite flag 252
- finite group 11
- finite line 252
- finite point 252
- finite ring 28
- Fischer's inequality 63, 69
- Fitting subgroup 98
- fixed point subset 147, 151
- flag 252
- focal subgroup 111
- Fratini subgroup 100
- free group 25
- Frobenius complement 141
- Frobenius group 141, 142
- Frobenius kernel 143
- Frobenius' theorem 114, 142
- fundamental relation 26
- fundamental theorem of projective geometry 79
- Galois' theorem 248
- general associative law 11
- general linear group 54
- general semi-linear group 54
- generalized character 135
- generator 12, 26
- geometric structure 60
- graph 186
- group 10, 102
- group ring 32
- Hadamard design 64
- half transitive ($\frac{1}{2}$ -transitive) 155
- Hall π -subgroup 22
- Hall–Higman theorem 109
- homogeneous polynomial 9
- homology 255
- homomorphic 19, 123
- homomorphism 19, 24, 33, 123
- homomorphism theorem 19, 34
- hyperfocal 111
- hyperplane 73, 76, 287
- ideal 33
- identity 10, 28
- identity representation 124
- imprimitive 158
- incidence matrix 62
- incidence structure 61
- independent 147, 287
- index 16
- induced character 137
- induced class function 137
- induced representation 137
- infinite group 11
- inner automorphism 20
- inner derivation 91
- inner product 136
- invariant domain 24
- inverse (element) 10, 28
- irreducible 36, 103, 124
- irreducible character 129
- irreducible component 136
- irreducible representation 124
- isomorphic 19, 33, 123, 252
- isomorphism 19, 33
- isomorphism theorem 20
- Ito's theorem 313
- Jordan's theorem 211, 215
- kernel 19, 102
- Knapp's theorem 205
- law of composition 3
- line 68, 73, 75, 76, 249, 252, 286, 294
- line at infinity 252
- linear fractional transformation 169
- linear map 49
- linear representation 124
- linearly dependent 49
- linearly independent 49
- little automorphism group 255
- lower central series 96
- Marggraf's theorem 213
- Maschke's theorem 126
- matrix representation 51, 123
- module 30, 49, 122
- multiply transitive 163, 164
- near field 28
- nilpotent group 96
- normal series 93
- normal subgroup 17
- normalizer 16
- odd permutation 149
- O'Nan's theorem 307
- operation 3, 23, 102
- orbit 23
- orbit decomposition 24
- orbital 184
- orbital graph 187

Index

327

- order 11, 12, 62, 286
 orthogonality relation 131, 134
 Ostrom–Wagner theorem 284
 outer automorphism group 20
- p*-group 21
p-solvable group 95
 paired orbital 185
 parameter 61
 parallel 252
 path 186
 permutation 22
 permutation character 138
 permutation group 22, 23
 permutation representation 23
 permutation matrix representation 125
 perspectivity 255
 plane 73, 76, 287, 294
 point 61, 73, 76, 249, 286
 point at infinity 252
 pre-design function 301
 prime field 39
 primitive 158, 163
 primitive permutation group 158
 primitive root of unity 6
 principal composition series 95
 principal ideal 33
 projective design 75
 projective general linear group 227
 projective general semi-linear group 227
 projective geometry 286
 projective line 287
 projective plane 67, 77
 projective space 73
 projective special linear group 227
- quotient group 17
 quotient module 123
 quotient ring 33
- rank 184
 Reciprocity theorem of Frobenius 138
 reducible 36, 124
 regular 155
 regular permutation representation 23
 regular representation 125
 representation 122
 representation module 122
 ring 27
 ring of endomorphisms 29
 ring of polynomials 35
- Schur's lemma 127
- Schur–Zassenhaus theorem 108
 self dual 251
 self-paired 186
 semi-direct product 90
 semi-linear transformation 54
 semiregular 155
 set of imprimitivity 158
 sharply transitive permutation group 166
 simple group 17
 Sims' theorem 194, 202
 skew field 27
 smooth block design 294
 solvable group 95
 stabilizer 24
 strongly closed subgroup 302
 structural constant 53
 subdesign 67
 subgroup 12, 102
 submodule 49, 123
 suborbit 185
 subplane 269
 subring 33
 subspace 49, 73, 76, 286, 294, 309
 Sylow *p*-subgroup 22, 85
 Sylow's theorem 85
 symmetric design 64
 symmetric group 22, 23
 symmetric polynomial 8
 system of generators 12, 17, 26, 101
 system of sets of imprimitivity 158
- Thompson subgroup 116
 Thompson's theorem 116, 144
 transfer 110
 transitive 24, 187, 262
 transitive component 24
 transitive plane 262, 264
 transitivity 262
 translation group 258
 transposition 148
 transvection 230, 235
 trivial design 62
 type of an Abelian group 99
 type of a permutation 148
- upper central series 17
 uniprimitive 188
- vector space 30, 49
 vertex 186

328

Index

Wagner's theorem 284
weakly closed subgroup 302
weakly Desarguean 272
Wedderburn's theorem 40
Witt's theorem 164

wreath product 93
Young partition 208
zero element 12