

## Index

- $\bowtie$ , 87
- $\simeq$ , 2
- $\simeq_G$ , 220
- $\mathbb{A}^n(k)$ , 161
- $\mathcal{A}_p(G)$ , 217
- $a(G)$ , 218, 227
- $a(G)$ , nilpotent elements in, 191
- absolute Hurewicz theorem, 10
- acyclic Hochschild complex, 73, 74
- Adams operations, 45
- additive K-theory, 80
- Adem relations, 138, 144
- affine
  - polynomial identity algebra, 177
  - space, 161
  - variety, 163, 228
    - homogeneous, 165
- algebra
  - commutative, 161
  - Lie, 229
- algebraic
  - geometry, 161
  - group
    - connected, 228
    - linear, 228
  - K-theory, 68
- Alperin
  - 's conjecture, 233
  - Evens theorem, 160
- alternating group
  - $A_6$ , 201
  - $A_7$ , 247
- Andrews' theorem, 192
- annihilation of cohomology, 189
- approximation, cellular, 15
- Atiyah
  - Hirzebruch spectral sequence, 114
  - completion theorem, 48
  - spectral sequence, 114
- attaching
  - cells, 12
  - map, 12
- augmentation map, 216
- augmented chain complex, 216
- Avrunin
  - Carlson example, 172
  - Scott theorem, 179
- axiom
  - exactness, 45
  - excision, 45
  - homotopy, 45
- axioms, Eilenberg–Steenrod, 45
- $B_*(\Lambda)$ , 84
- $BC$ , 27
- $\mathcal{B}_p(G)$ , 231
- $\mathcal{B}_p^{(1)}(G)$ , 248
- $\mathcal{B}_p(G)$ , 217
- $b'_n$ , 73
- $b(G', G)$ , 59
- $b(G)$ , 58, 216
- $b_n$ , 74
- bar resolution, 30
- barycentric subdivision, 27, 215, 217
- base space, 16
- basepoint, 1
- $\beta, \hat{\beta}$ , 132
- $\tilde{\beta}$ , 135
- Becker–Gottlieb transfer, 53
- $BG$ , 38
- $BGL_n(\mathbb{C})$ , 42
- $BGL_n(\mathbb{F}_q)$ , 65
- $BGL_n(\mathbb{R})$ , 41
- bilinear form, symmetric, 169, 245
- bimodule, *vi*
- $BO$ , 46
- $BO(n)$ , 41
- Bockstein
  - higher, 134
  - homomorphism, 132
  - spectral sequence, 134
  - twisted, 135
- Borel

- Tits theorem, 231
- construction, 118
- subgroup, 230
- Bott periodicity theorem, 46
- Bouc's equivalence  $\mathcal{B}_p(G) \simeq \mathcal{S}_p(G)$ , 225
- boundary map, 5, 216
- bounded height, 226
- bouquet of spheres, 232
- Brown's theorem, 227
- $B\Sigma_n$ , 53
- $BU$ , 44
- $BU(n)$ , 42
- building, Tits, 231
- bundle
  - canonical, 41
  - fibre, 18, 93
  - principal, 35
  - pullback, 36
  - universal, 38
  - vector, 36
- Burnside ring, 58, 216, 219
- $C^n$ , 4
- $C_f$ , 11
- $C_n(\Delta)$ , 216
- $C_n(\Delta; \mathcal{F})$ , 242
- $\hat{C}_G(g)$ , 90
- $C_k(n)$ , 52
- $C_\zeta$ , 199
- $C_\zeta^{(\infty)}$ , 199
- $c_G(M)$ , 159
- $c_n(\Delta)$ , 216
- canonical bundle, 41
- Carlson's
  - conjecture, 154, 180
  - connectedness theorem, 194
  - favourite example, 183
  - rank variety, 180
- Cartan formula, 138
- Cayley category, 43, 79
- $CC_*(\Lambda)$ , 82
- cells, 12
- cellular
  - approximation, 15
  - chain, 13
  - homology, 12
  - map, 15
- central extension, 95
- centraliser, 76
  - extended, 90
- chain
  - cellular, 13
  - complex, 242
  - augmented, 216
  - cyclic, 82
  - group, 216
- character of a torus, 229
- characteristic
  - classes, 48
  - for modular representations, 63
  - Euler, 219
  - map, 12
  - odd, 189
- Chern
  - class, 49
  - map in algebraic K-theory, 91
- Chevalley group, 227, 228, 230, 246
- $\chi(T)$ , 229
- $\chi(\Delta)$ ,  $\tilde{\chi}(\Delta)$ , 219
- Chouinard's theorem, 157
- class
  - characteristic, 48
  - Chern, 49
  - homotopy, 2
  - Stiefel-Whitney, 50
- classification of reductive groups, 229
- classifying space, 27
- closed set, 163
- closure finite, 13
- coefficient system
  - constant, 238
  - fixed point, 238
  - generating, 241
  - homology of, 242
  - morphism of, 238
  - quotient, 238
  - sub-, 238
  - tautological, 244
  - universal, 246
- coefficients, local, 237
- cofibration, 6
- Cohen-Macaulay
  - cohomology, 211
  - ring, 168
- cohomological variety, 154
- cohomology
  - annihilation of, 189
  - Cohen-Macaulay, 211
  - cyclic, 85
  - equivariant, 117
  - finite generation of, 117, 126
  - gaps in, 205
  - Hochschild, 73
  - of  $BO(n)$ , 50
  - of  $BU(n)$ , 49
  - of  $F\psi^q$ , 65

- of  $GL_n(\mathbb{F}_q)$ , 60
- of groups, 29
- product structure, 30
- singular, 9
- Tate, 206
- theory, generalised, 45
- cohomotopy, stable, 56
- colimit, 239
- commutative
  - algebra, 161
  - graded, 153
- compact Lie groups, 213
- complete
  - resolution, 206
- complete flag, 230
- completion theorem, Atiyah, 48
- complex
  - acyclic Hochschild, 74
  - double, 93, 106
  - filtered, 93
  - Hochschild, 74
  - Kan, 26
  - multiple, 199
  - simplicial, 13, 215
  - subgroup, 217, 237
  - total, 106
- complexity, 153, 159
- composite functor, 93
- composition, Yoneda, 30
- comultiplication, 212
- cone, 218
  - mapping, 11
- conically contractible, 222
- conjecture
  - Alperin's, 233
  - Carlson's, 154, 180
  - Segal, 56
  - Webb's, 224
- Conlon's induction theorem, 221, 234
- connected algebraic group, 228
- connectedness theorem, Carlson's, 194
- Connes sequence, 81
- constant coefficient system, 238
- construction
  - Borel, 118
  - Milnor's, 38
  - Quillen's plus, 68
- contractible, 2
  - conically, 222
  - poset, 222
  - weakly, 15
- couple
  - derived, 99
  - exact, 99
- cover, universal, 20, 218
- covering
  - number, Lebesgue, 20
  - space, 20
  - the variety, 200
- CW-complex, 12
- Cycl C**, 86
- cyclic
  - chains, 82
  - cohomology, 85
  - group, 45
  - homology, 81
  - map, 86
  - object, 86
  - set, 86
  - shifted subgroup, 181
- cyclically ordered sets, 85
- cylinder, mapping, 11
  
- $D_j$ , 137
- $D_{4q}$ , 195
- $d_i$ , 23
- deformation retract, strong, 16
- degeneracy map, 23
- degenerate simplex, 24
- degree, transcendence, 166
- $\Delta$ , 215
- $\Delta[n]$ , 24
- $\Delta^n$ , 24
- $\Delta_{H^i, \phi}$ , 59
- $\Delta$ , 23
- Dennis trace map, 76, 91
- depth, 132, 168
- derived couple, 99
- DGA, 112
- diagram, Dynkin, 229
- $\text{Diff}^+(M)$ , 35
- differential, 93
  - graded algebra, 112
- dihedral 2-groups, 195
- dilation, 164
- dimension, 165
  - Krull, 161, 166
- direct limit, 239
- $DL$ , 51
- domain, integral, 166
- dominant map, 167
- double
  - complex, 93, 106
  - complexes, pairing of, 115
  - cosets, *vi*
- duality, Poincaré, 209

- Duflo's theorem, 132
- Dyer–Lashof map, 51
- Dynkin diagram, 229
- $E_n^{pq}$ ,  $E_{pq}^n$ , 96
- edge homomorphism, 103
- $E(\mathbb{F}_q)$ , 71
- $EG$ , 38
- Eilenberg
  - Mac Lane
    - shuffle, 27
    - space, 32
  - Moore spectral sequence, 64, 93, 112
  - Steenrod axioms, 45
  - Zilber theorem, 27
- Eisenbud's theorem, 192
- $\in_G$ , *vi*
- elementary
  - abelian group, 153, 155, 160, 173, 177, 180, 213, 224
  - matrices, 70
- embedding problem, 243
- $EO(n)$ , 41
- equation
  - functional, 211
- equation, functional, 211
- equivalence, 224
  - Bouc's,  $\mathcal{B}_p(G) \simeq \mathcal{S}_p(G)$ , 225
  - homotopy, 2
  - Quillen's,  $\mathcal{A}_p(G) \simeq \mathcal{S}_p(G)$ , 224
  - weak homotopy, 15
- equivariant
  - cohomology, 117
  - functor, 237
  - homotopy, 220
  - local coefficients, 237
- $EU(n)$ , 42
- Euler characteristic, 55, 219
- Evens norm map, 123
- exact
  - couple, 93, 99
  - sequence
    - Connes, 81
    - homotopy, 5
    - Milnor, 27
- exactness axiom, 45
- exceptional
  - case, 67
  - type, 229
- excision, 5
  - axiom, 45
- exponential isomorphism, 1
- extended centraliser, 90
- extension
  - $n$ -fold, 199
  - problem, 93
  - universal, 241
- exterior square, 190
- extraspecial group, 169
- $F\psi^q$ , 60
- $F^p H^{p+q}(\mathbf{X})$ , 102
- $F^p \mathbf{X}$ , 98
- $\mathcal{F}$ , 237
- $\mathcal{F}_M$ , 238
- $f^{-1}\mathcal{G}$ , 240
- $f_*\mathcal{F}$ , 240
- $f_!\mathcal{F}$ , 240
- $f/y$ , 222
- face map, 23
- fibration
  - Hurewicz, 16, 93
  - Kan, 25
  - Serre, 16, 93
  - spectral sequence of, 104
- fibre, 16
  - bundle, 18, 93
  - homotopy, 21
- fibring property, 17
- filtered complex, 93, 98
  - pairing of, 116
- finite
  - generation of cohomology, 117, 126
  - locally, 22
  - map, 166
  - type, 13, 157
- first quadrant, 96
- F-isomorphism, 167
- five term sequence, 103
- fixed point
  - coefficient system, 238
  - homotopy, 61
- flag, 230
  - complete, 230
  - isotropic, 244
- form
  - quadratic, 169, 245
  - symmetric bilinear, 169, 245
- frame, orthonormal, 36
- Fratini subgroup, *vi*
- free
  - cyclic object, 87
  - loop space, 77
  - ring, 157
- Frobenius
  - morphism, 167, 181, 230

- reciprocity, 241
- function
  - length, 234
  - polynomial, 161, 163
- functional equation, 211
- functor
  - composite, 93
  - equivariant, 237
  - representable, 34
- fundamental group, groupoid, 4
- $G(\mathbb{F}_q)$ , 230
- $G/H$ , *vi*
- $G^F$ , 230
- $G^\infty$ , *vi*
- $G^n(\mathbb{R}^m)$ ,  $G^n(\mathbb{C}^m)$ , 36
- $\gamma(V)$ , 159
- gaps in cohomology, 205
- general linear group
  - $GL_3(\mathbb{F}_2)$ , 201, 239
  - $GL_n(\mathbb{C})$ , 36
  - $GL_n(\mathbb{F}_q)$ , 60, 230
  - $GL_n(\mathbb{R})$ , 35
  - $GL_n(k)$ , 228
- generalised
  - cohomology theory, 45
  - Steinberg module, 219, 226
- generating
  - coefficient system, 241
  - by fixed points, 243
  - periodicity, 192
- generic points, 164
- geometry, algebraic, 161
- $G$ -homotopy, 220
- $GL_3(\mathbb{F}_2)$ , 201, 239
- $GL_n(\mathbb{C})$ , 36
- $GL_n(\mathbb{F}_q)$ , 60, 230
- $GL_n(\mathbb{R})$ , 35
- $GL_n(k)$ , 228
- $G$ -map, 220
- $G$ -poset, 221
- graded
  - algebra, differential, 112
  - commutative, 153
  - ring, 164
- Grassmann variety, 36
- group
  - action on variety, 167
  - alternating
    - $A_6$ , 201
    - $A_7$ , 247
  - central extension, 95
  - chain, 216
  - Chevalley, 227, 228, 230, 246
  - cohomology of, 29
  - compact Lie, 213
  - cyclic, 45
  - dihedral, 195
  - elementary abelian, 153, 155, 160, 173, 177, 180, 213, 224
  - extension, 93
    - central, 95
    - spectral sequence of, 109
  - extraspecial, 169
  - fundamental, 4
  - general linear
    - $GL_3(\mathbb{F}_2)$ , 201, 239
    - $GL_n(\mathbb{C})$ , 36
    - $GL_n(\mathbb{F}_q)$ , 60, 230
    - $GL_n(\mathbb{R})$ , 35
    - $GL_n(k)$ , 228
  - homotopy, 2
  - hypo-elementary, 221, 227
  - linear algebraic, 228
  - metacyclic, 211
  - orthogonal, 243
    - $O(n)$ , 35, 36
    - $O_5(\mathbb{F}_q)$ , 243
    - $O_n(k)$ , 228
    - $O_{2n+1}(\mathbb{F}_q)$ , 246
  - reductive, 228
  - relative homotopy, 4
  - semidihedral, 191, 211
  - simplicial, 26
  - special linear
    - $SL_2(\mathbb{F}_q)$ , 247
    - $SL_n(k)$ , 228
  - special orthogonal
    - $SO_n(k)$ , 228
  - sporadic,  $J_4$ , 248
  - structure, 36
  - symmetric
    - $S_3$ , 247
    - $S_n$ , 175
  - symplectic, 243
    - $Sp_4(\mathbb{F}_q)$ , 243
    - $Sp_{2n}(\mathbb{F}_q)$ , 246
    - $Sp_{2n}(k)$ , 228
  - topological, 35
  - unipotent, 228
  - unitary, 35, 36
  - unitriangular, 228
- groupoid, fundamental, 4
- growth, 159
- $G$ -simplicial complex, 215

- $H^0$ ,  $H_0$ , 239  
 $H(G, k)$ , 153  
 $H^n(G, M)$ ;  $H_n(G, M)$ , 30  
 $H_n(\Delta; \mathcal{F})$ , 242  
 $\tilde{H}^*(G, M)$ , 206  
 $h_n$ , 9  
Hausdorff space, 12, 35  
 $HC^*(\Lambda)$ , 85  
 $HC_*(\Lambda)$ , 81  
height, bounded, 226  
 $HH_n(\Lambda)$ ,  $HH^n(\Lambda)$ , 75  
higher Bocksteins, 134  
Hilbert's Nullstellensatz, 162  
Hochschild  
  cohomology, 73  
  complex, 74  
  acyclic, 74  
  homology, 73  
 $\text{Hom}_{X, G}$ , 238  
homogeneous  
  affine variety, 165  
  ideal, 164  
homology, 216  
  cyclic, 81  
  Hochschild, 73  
  of coefficient systems, 242  
  reduced, 217  
  singular, 9  
homomorphism  
  Bockstein, 132  
  horizontal edge, 103  
  vertical edge, 103  
homotopy, 2  
  addition theorem, 10  
  axiom, 45  
  class, 2  
  equivalence, 2  
  weak, 15  
  equivariant, 220  
  exact sequence, 5  
  extension lifting property (HELP), 19  
  extension property (HEP), 6  
  fibre, 21  
  fixed points, 61  
  group, 2  
  relative, 4  
  lifting property (HLP), 16  
  stable, 57  
horizontal edge homomorphism, 103  
Hurewicz  
  fibration, 16, 93  
  map, 9, 77  
  theorem, 9  
  hypercohomology spectral sequence, 108, 202  
  hypersurface, 186  
  hypo-elementary group, 221, 227  
 $I$ , 2  
 $\sqrt{I}$ , 162  
ideal  
  homogeneous, 164  
  maximal, 161  
  prime, 163  
  radical, 162  
induction theorem, Conlon's, 221, 234  
inductive limit, 239  
inflation-restriction sequence, 110  
information, local, 243  
inseparable isogeny, 167, 174  
integral domain, 166  
invariant, Lefschetz, 218  
inverse limit, 239  
invertible system, 218  
irreducible closed set, 163  
isogeny, inseparable, 167, 174  
isomorphism, exponential, 1  
isotropic  
  flag, 244  
  subspace, 169, 244  
 $J_4$ , 248  
join, 38  
 $K(B)$ , 44  
 $K(BG)$ , 48  
 $K(G, 1)$ , 30, 42  
 $K(\pi, n)$ , 32  
 $K_1(\Lambda)$ ,  $K_2(\Lambda)$ , 71  
 $K_*(\Lambda)$ , 70  
K-theory, 44  
  additive, 80  
  algebraic, 68  
Kan  
  -Thurston theorem, 31  
  complex, 26  
  fibration, 25  
 $\kappa_M$ , 238  
 $KO(B)$ , 46  
Krull dimension, 161, 166  
Kudo transgression theorem, 151  
Künneth spectral sequence, 111  
 $L_G(\Delta, k)$ ,  $\tilde{L}_G(\Delta, k)$ , 219  
 $L_\zeta$ , 186  
 $\Lambda_G(\Delta)$ ,  $\tilde{\Lambda}_G(\Delta)$ , 219  
 $\wedge$ , 85

- LBG*, 77  
 Lebesgue covering number, 20  
 Lefschetz  
   invariant, 218  
   module, 219  
 lemma  
   Noether normalisation, 165  
   Quillen's, 222  
 length function, 234  
 $\leq_G$ , *vi*  
 Lie  
   algebra, 229  
   groups, compact, 213  
   rank, 229  
 $\varprojlim \mathcal{F}$ ,  $\varinjlim \mathcal{F}$ , 239  
 $\varprojlim^1$ , 28  
 limit, 239  
 linear algebraic group, 228  
 link, 232  
 little cubes, 52  
 local  
   coefficients, 237  
   equivariant, 237  
   information, 243  
   system of coefficients, 94  
   system, universal, 246  
 localisation, 165  
 locally finite, 22  
 loop, 2  
   free, 77  
   Moore, 3  
   space, 8  
 Lyndon–Hochschild–Serre  
   spectral sequence, 93, 169  
  
 $M_f$ , 11  
 $\mathcal{M}_T$ , 182  
 Möbius band, 16, 18  
 Macaulay's theorem, 168  
 Mackey formula for norm, 124  
 map  
   attaching, 12  
   augmentation, 216  
   characteristic, 12  
   Chern, 91  
   cyclic, 86  
   Dennis trace, 76, 91  
   dominant, 167  
   Dyer–Lashof, 51  
   Evens norm, 123  
   finite, 166  
   Hurewicz, 9, 77  
   pretransfer, 51  
   restriction, 237  
   simplicial, 23  
   stable, 56  
 mapping cone, cylinder, 11  
 matric Massey products, 212  
 matrices, elementary, 70  
 $\max(A)$ , 163  
 maximal  
   ideal spectrum, 163  
   torus, 229  
 metacyclic group, 211  
 Milnor  
   's construction, 38  
   exact sequence, 27  
 minimum weight module, 246  
 modular representations  
   characteristic classes for, 63  
 module  
   generalised Steinberg, 219, 226  
   Lefschetz, 219  
   minimum weight, 246  
   periodic, 154, 191  
   Steinberg, 219, 233  
   Weyl, 248  
 Moore loops, 3  
 morphism  
   Frobenius, 167, 181, 230  
   of coefficient systems, 238  
 Morse theory, 55  
 multiple complex, 199  
  
*NC*, 27  
 Nakaoka's theorem, 126  
 neighbourhood, tubular, 54  
 nerve, 27  
   of Cayley category, 43  
 nilpotent elements in  $a(G)$ , 191  
 Noether normalisation lemma, 165  
 non-degenerate, 239  
   simplex, 24  
 norm $_{H,G}$ , 121  
 nucleus, 213  
 Nullstellensatz  
   Hilbert's, 162  
   weak, 162  
  
 $O(n)$ , 36  
 $O_5(\mathbb{F}_q)$ , 243  
 $O_n(k)$ , 228  
 $O_{2n+1}(\mathbb{F}_q)$ , 246  
 object  
   cyclic, 86  
   simplicial, 23

- obstruction theory, 7
- odd characteristic, 189
- $\Omega X$ , 8
- $\Omega^\infty S^\infty$ , 57
- $\Omega_1(G)$ , *vi*
- $\Omega BG$ , 42
- $O_p(G)$ ,  $O^p(G)$ , *vi*
- operations
  - Adams, 45
  - Steenrod, 136
- orientation, opposite, 216
- oriented simplex, 216
- orthogonal group, 243
  - $O(n)$ , 35, 36
  - $O_5(\mathbb{F}_q)$ , 243
  - $O_n(k)$ , 228
  - $O_{2n+1}(\mathbb{F}_q)$ , 246
- orthonormal frame, 36
- $P^i$ , 137
- $\mathbb{P}^{n-1}(k)$ , 165
- $p$ -rank, *vi*
- $p(V, t)$ , 157
- page, 97
- pairing
  - of double complexes, 115
  - of filtered complexes, 116
- parabolic subgroup, 230
- paracompact space, 21
- partition of unity, 22
- path fibration, 21
- periodic module, 154, 191
- periodicity
  - generating, 192
  - theorem, Bott, 46
- $\Phi$ , *vi*
- $\Phi_M$ , 176
- $\pi'_n(X, A, x_0)$ , 7
- $\pi'_n(X, x_0)$ , 7
- $\pi_{s,1}^*$ , 56
- $\pi_n(X, A, x_0)$ , 4
- $\pi_n(X, x_0)$ , 2
- plus construction, 68
- Poincaré
  - duality, 209
  - series, 157
- point, generic, 164
- pointed set, 5
- polynomial
  - functions, 161, 163
  - ring, 157, 162
- poset, 217, 221, 237
  - contractible, 222
- power, symmetric, 157, 247
- presheaf, 237
- pretransfer map, 51
- prime ideal, 163
  - spectrum, 164
- $\text{Princ}_G(B)$ , 38
- principal bundle, 35
- products
  - in spectral sequences, 115
  - matrix Massey, 212
- $\text{proj}(A)$ , 165
- projective
  - limit, 239
  - plane, 239
  - resolution, proper, 111
  - space, 165
  - variety, 165
  - virtual, 219
- proper projective resolution, 111
- $\psi^n$ , 45
- $P\text{Tr}$ , 51
- pullback, 240
  - bundle, 36
  - of fibrations, 93
- pushout, 240
- quadratic form, 169, 245
- quasiprojective variety, 165
- Quillen
  - 's Krull dimension theorem, 161
  - 's equivalence  $\mathcal{A}_p(G) \simeq \mathcal{S}_p(G)$ ., 224
  - 's lemma, 222
  - 's plus construction, 68
  - Venkov theorem, 155
  - stratification, 172
- quotient coefficient system, 238
- $R^{(r)}$ , 121
- $\mathcal{R}(CG)$ , 48
- $r_p(G)$ , *vi*, 161
- radical, 162
  - ideal, 162
  - unipotent, 231
- rank, 36
  - Lie, 229
  - variety, 154, 181
- realisation
  - simplicial, 217
  - topological, 24
- reduced
  - Euler characteristic, 219
  - homology, 217
  - Lefschetz module, 219



- reductive group, 228
  - classification of, 229
- refinement, 22
- regular sequence, 168
- relations, Adem, 138
- relative
  - CW-complex, 12
  - homotopy group, 4
  - Hurewicz theorem, 10
- representable functor, 34
- representation ring, 218
- $\text{res}_{G,H}^*$ , 173
- resolution
  - bar, 30
  - complete, 206
  - proper projective, 111
  - standard, 30
- restriction map, 237
- retraction, 6
- ring
  - Burnside, 216, 219
  - Cohen–Macaulay, 168
  - free, 157
  - graded, 164
  - polynomial, 157, 162
  - representation, 218
- Ronan–Smith, 237
- root system, 229
  
- $S(\Delta)$ , 217
- $S[1] \bowtie X$ , 87
- $S[n]$ , 26
- $S^n$ , 2
- $S_n(\Lambda)$ , 73
- $\tilde{S}_n(\Lambda)$ , 73
- $S_p(G)$ , 217
- $s_i$ , 23
- $sd(\Delta)$ , 217
- Segal conjecture, 56
- self-reference, 277
- semidihedral group, 191, 211
- sequence
  - Connes, 81
  - five term, 103
  - inflation–restriction, 110
  - regular, 168
  - spectral, 93, 99
- series, Poincaré, 157
- Serre
  - 's theorem, 148
  - fibration, 16, 93
- set
  - cyclic, 86
  - simplicial, 23
- $SG$ , 78
- sheaf, 237
- shifted subgroup, 181
- shuffle, Eilenberg–Mac Lane, 27
- $\sigma_E$ , 173
- Simp**  $\mathcal{C}$ , 23
- simple space, 7
- simplex
  - degenerate, 24
  - non-degenerate, 24
  - oriented, 216
  - singular, 24
- simplicial
  - $n$ -sphere, 26
  - complex, 13, 215
  - group, 26
  - map, 23
  - object, 23
  - realisation, 217
  - set, 23
- simply connected, 3
- $\text{Sing}(Y)$ , 24, 87
- singular
  - cohomology, 9
  - homology, 9
  - simplices, 24
- skeleton, 13, 27
- $SL_2(\mathbb{F}_q)$ , 247
- $SL_n(\mathbb{F}_q)$ , 242
- $SL_n(k)$ , 228
- smash, 2
- Smith's theorem, 246
- $SO_n(k)$ , 228
- Solomon–Tits theorem, 232
- $Sp_4(\mathbb{F}_q)$ , 242, 243
- $Sp_{2n}(\mathbb{F}_q)$ , 244, 246
- $Sp_{2n}(k)$ , 228
- space
  - affine, 161
  - base, 16
  - classifying, 27
  - covering, 20
  - Eilenberg–Mac Lane, 32
  - Hausdorff, 12, 35
  - loop, 8
  - paracompact, 21
  - projective, 165
  - simple, 7
  - total, 16
- $\text{spec}(A)$ , 164
- special
  - linear group

- $SL_2(\mathbb{F}_q)$ , 247
- $SL_n(k)$ , 228
- orthogonal group  $SO_n(k)$ , 228
- spectral sequence, 93, 99
- Atiyah, 114
- Atiyah–Hirzebruch, 114
- Bockstein, 134
- Eilenberg–Moore, 64, 93, 112
- for an extraspecial 2-group, 169
- hypercohomology, 108, 202
- Künneth, 111
- Lyndon–Hochschild–Serre, 93
- of a double complex, 106
- of a fibration, 104
- of a filtered complex, 98
- of a group extension, 109
- of the Borel construction, 118
- products in, 115
- Steenrod operations in, 150, 171
- transgression in, 103
- spectrum
  - maximal ideal, 163
  - prime ideal, 164
- spheres, bouquet of, 232
- sporadic group  $J_4$ , 248
- $Sq^i$ , 137
- square
  - exterior, 190
  - Steenrod, 136
  - symmetric, 190
- $\square$ , *vi*
- $St_p(G)$ , 226
- stable
  - cohomotopy, 56
  - homotopy, 57
  - map, 56
- standard resolution, 30
- Steenrod operations, 136
  - in spectral sequences, 150, 171
- Steinberg module, 219, 233
  - generalised, 226
  - inversion, 233
- Steinberg’s tensor product theorem, 247
- Stiefel
  - Whitney class, 50
  - variety, 36
- stratification, Quillen, 172
  - for modules, 179
- strong
  - deformation retract, 16
  - topology, 39
- structure group, 36
- sub-coefficient system, 238
- subdivision, barycentric, 27, 215, 217
- subgroup
  - Borel, 230
  - complex, 217, 237
  - parabolic, 230
  - shifted, 181
- $Subsp(V^F)$ , 232
- subspace, isotropic, 169, 244
- $\sum_{HgK}$ , *vi*
- sum, Whitney, 37
- suspension, 8, 25
  - unreduced, 232
- symmetric
  - bilinear form, 169, 245
  - group
    - $S_3$ , 247
    - $S_n$ , 175
    - power, 157, 247
    - square, 190
- symplectic group, 243
  - $Sp_4(\mathbb{F}_q)$ , 243
  - $Sp_{2m}(\mathbb{F}_q)$ , 246
  - $Sp_{2n}(k)$ , 228
- system
  - invertible, 218
  - root, 229
- Tate cohomology, 206
- tautological coefficient system, 244
- tensor product
  - of commutative rings, 169
  - of vector bundles, 37
  - theorem, Steinberg’s, 247
- theorem
  - Alperin–Evens, 160
  - Andrews’, 192
  - Atiyah completion, 48
  - Avrunin–Scott, 179
  - Bott periodicity, 46
  - Brown’s, 227
  - Carlson’s connectedness, 194
  - cellular approximation, 15
  - Chouinard’s, 157
  - Conlon’s induction, 221, 234
  - Dufлот’s, 132
  - Eilenberg–Zilber, 27
  - Eisenbud’s, 192
  - homotopy addition, 10
  - Kan–Thurston, 31
  - Kudo transgression, 151
  - Macauley’s, 168
  - Nakaoka’s, 126
  - Quillen

- 's Krull dimension, 161
- Venkov, 155
- stratification, 174
- stratification for modules, 179
- Serre's, 148
- Smith's, 246
- Solomon–Tits, 232
- Steinberg's tensor product, 247
- Whitehead, 15
- Tits building, 231
- topological
  - group, 35
  - realisation, 24
- topology
  - strong, 39
  - weak, 12
  - Zariski, 163
- torus, 229
- total
  - Chern class, 49
  - complex, 106
  - space, 16
  - Stiefel–Whitney class, 50
- trace map, Dennis, 76, 91
- transcendence degree, 166
- transfer, 51
  - as stable map, 57
  - Becker–Gottlieb, 53
- transgression, 103, 150
  - theorem, Kudo, 151
- tubular neighbourhood, 54
- twisted Bockstein, 135
- type
  - exceptional, 229
  - finite, 13
  - universal, 247
- typical case, 67
- $U(n)$ , 36, 42
- $\text{Uni}_n(k)$ , 228
- unipotent
  - group, 228
  - radical, 231
- unitary group, 35, 36
- unitriangular group, 228
- unity, partition of, 22
- universal
  - bundle, 38
  - coefficient system, 248
  - cover, 20, 218
  - extension, 241
  - local system, 246
  - type, 247
- unreduced suspension, 232
- $V(I)$ , 162
- $V_E^{\#}(M)$ , 181
- $V^n(\mathbb{R}^n)$ ,  $V^n(\mathbb{C}^m)$ , 36
- $V_E^+$ , 173
- $V_E^+(M)$ ,  $V_{G,E}(M)$ ,  $V_{G,E}^+(M)$ , 179
- $V_G$ , 153, 172
- $V_G(M)$ , 154
- $V_{G,E}$ ,  $V_{G,E}^+$ , 174
- $\bar{V}(I)$ , 165
- $\bar{V}_G$ , 173
- $\hat{V}^n(\mathbb{C}^\infty)$ , 42
- $\hat{V}^n(\mathbb{R}^\infty)$ , 41
- variety
  - affine, 163, 228
  - covering the, 200
  - Grassmann, 36
  - group action on, 167
  - homogeneous affine, 165
  - projective, 165
  - quasiprojective, 165
  - rank, 154, 181
  - Stiefel, 36
- vector bundle, 36
  - tensor product of, 37
- vertical edge homomorphism, 103
- virtual projective, 219
- $W_G(E)$ , 174
- weak
  - homotopy equivalence, 15
  - Nullstellensatz, 162
  - topology, 12
- weakly contractible, 15
- Webb's conjecture, 224
- wedge, 2, 232
- Weyl module, 248
- Whitehead theorems, 11, 15
- Whitney sum, 37
- wreath product, *vi*
- $[X; Y]$ , 2
- $|X|$ , 24, 217
- $y \setminus f$ , 222
- Yoneda composition, 30
- $\mathcal{Z}_p(G)$ , 226
- Zariski topology, 163
- $\zeta_{H', \phi}$ , 58
- $Z(G)$ , *vi*