

## INDEX

*The numbers refer to pages*

- Abbreviated notation, 12
- Abstract mappings, 30
- Acyclic complex over a module, 76
- Additive category, 32
- Additive functor, 35
- Ascending chain condition, 144
- Associative law for tensor products, 160
- Augmentation homomorphism of a complex over a module, 76
- Augmentation ideal of a monoid-ring, 217
- Augmentation mapping of a monoid-ring, 216
- Augmentation translation, 75
  
- Bihomomorphism, 156
- Bimodule, 155
- Boundaries, 224
- Boundary homomorphism, 59
  
- Category, 31
- Chains, 223
- Coboundaries, 224
- Cochains, 224
- Cocycles, 224
- Cohomology theory of monoids, 221
- Coimage of a mapping, 6
- Cokernel of a mapping, 6
- Commutative diagram, 5
- Commutator subgroup, 230
- Complete derived sequence of a group, 252
- Complete free resolution of  $Z$ , 259
- Complete representation as a direct product, 10
- Complete representation as a direct sum, 10
- Complex, 59
- Complex associated with a module, 75
- Connected sequence of functors, 114
- Connecting homomorphism, 56
- Contravariant functor, 33
- Covariant functor, 33
- Cycles, 223
- Cyclic module, 138
  
- Diagram, 46
- Differentiation homomorphism, 59
- Direct epimorphism, 12
- Direct factor, 12
- Direct monomorphism, 12
- Direct product of modules, 9
- Direct summand, 12
- Direct sum of modules, 9
- Divisible module, 269
- Domain of a mapping, 32
  
- Epimorphism, 4
- Equivalence mapping, 32
- Equivalence of functors, 36
- Exact functor, 38
- Exact homology sequence, 61
- Exact sequence, 14
- Extension functors, 129
- Extension module, 3
- External direct sum, 9
  
- Factor module, 3
- Free group generated by a set, 213
- Free module, 7
- Free module generated by a set, 8
- Free monoid generated by a set, 212
- Free resolution, 77
- Functor of modules, 36
- Functor of one variable, 33
- Functor of several variables, 34
  
- Generators of a module, 7
- Global dimension of a ring, 138
- Group-ring, 216
  
- Homological codimension, 204
- Homological dimension of a module, 134
- Homology functor, 52
- Homology modules of a complex, 60
- Homology theory of a monoid, 219
- Homomorphism of a connected sequence of functors, 115
- Homomorphism of modules, 3
- Homomorphism of monoids, 212
- Homotopic translations, 62
  
- Ideal-theoretic dimension, 202
- Identity mapping, 4
- Image of a mapping, 6
- Induced mapping, 5
- Inductive system, 271
- Injective complex, 75
- Injective module, 67
- Injective representation as a direct sum, 10
- Injective resolution of a module, 76

## 282

Injective resolution of an exact sequence, 81  
 Integral domain, 176  
 Internal direct sum, 11  
 Irreducible word, 212  
 Isomorphism of a connected sequence of functors, 115  
 Isomorphism of modules, 4  
  
 Kernel of a mapping, 6  
  
 Left complex, 60  
 Left complex over a module, 76  
 Left-derived functors, 110  
 Left exact functor, 40  
 Linear functor, 35  
 Local ring, 185  
  
 Maximal ideal, 181  
 Minimal injective extension, 270  
 Module of fractions, 167  
 Module with respect to a monoid, 214  
 Module with respect to a ring, 1  
 Module with trivial operators, 214  
 Monoid, 211  
 Monoid-ring, 216  
 Monomorphism, 4  
 Multiplicatively closed set, 167  
  
 Natural mapping, 3  
 Natural transformation of functors, 35  
 Noetherian module, 144  
 Noetherian ring, 146  
 Noether's equations, 276  
 Normal sequence, 196  
 Norm homomorphism, 250  
 Norm of a homomorphism, 252  
 Null homotopic translation, 62  
  
 0-sequence, 13  
  
 Partially ordered set, 270  
 Prime ideal, 186  
 Principal ideal, 176  
 Principal ideal domain, 176  
 Projective complex, 75

## INDEX

Projective dimension of a module, 134  
 Projective module, 63  
 Projective representation as a direct product, 10  
 Projective resolution of a module, 76  
 Projective resolution of an exact sequence, 80  
 Proper ideal, 181  
  
 Range of a mapping, 32  
 Regular local ring, 203  
 Residue module, 3  
 Right complex, 60  
 Right complex over a module, 75  
 Right-derived functors, 102  
 Right exact functor, 40  
 Ring of fractions, 168  
  
 Semi-simple ring, 144  
 Similar diagrams, 46  
 Simple module, 142  
 Simply ordered set, 270  
 Special modules with respect to a finite group, 253  
 Split exact sequence, 14  
 Standard homogeneous resolution of  $Z$ , 225  
 Standard non-homogeneous resolution of  $Z$ , 227  
 Submodule, 3  
  
 Tensor product of mappings, 19  
 Tensor product of modules, 16  
 Torsion functors, 122  
 Totally ordered set, 270  
 Translation category of diagrams, 47  
 Translation of diagrams, 47  
 Translation over a homomorphism, 78  
  
 Weak global dimension, 150  
 Weak homological dimension of a module, 149  
 Well ordered set, 270  
  
 Zero-divisor for a module, 196  
 Zorn's lemma, 271