

Index

- action
 - compatible, 85
 - left, 3, 82
 - right, 82
 - source, 82
 - transformation of $-s$, 84
 - vanilla, 83
 - compatible, 85
- adjoint triple, 134
- adjunction, 92
 - counit, 93
 - left adjoint, 92
 - right adjoint, 92
 - unit, 93
- algebra
 - action, 76
 - carrier, 76
 - Eilenberg–Moore, *see* algebra, for a monad
 - for a monad, 79
 - multiplication axiom, 79
 - natural, 84
 - unit axiom, 79
 - for an endofunctor, 76
 - initial, 78
 - initial, 148
- arrow
 - composite, 1
 - curry, 12
 - epi, 6
 - identity, 1
 - injection, 10
 - join (coproduct), 10
 - Kleisli composite, 74
 - left transpose, 92
 - left-cancelable, 6
 - mediating, 137
 - mono, 6
 - projection, 9
 - right transpose, 92
 - right-cancelable, 6
 - split (product), 9
 - structure-preserving, 2
 - structure-reflecting, 2
- axiom
 - right turn, 84
 - special, 62
- bicartesian closed, 124
- bifunctor, 14
- bimorphism, 8
- box, 137
- category, 1
 - Cartesian closed, 96
 - coreflective subcategory, 109
 - Eilenberg–Moore, 79
 - functor, 19
 - Kleisli, 73
 - opposite, 4
 - pointed sets, 132
 - product, 4
 - reflective subcategory, 109
 - skeleton, 112
- cofork, 60
- commutative diagram, 25
- comonad, 70
 - coassociativity axiom, 70
 - costate, 72
 - counit axiom, 70
 - kernel operator, 71
 - nonempty list, 71
 - product, 108
- comonoid, 71
- component
 - of a transformation, 18
- composition
 - backward, 5
 - forward, 5
- coproduct, 10
 - infinite, 11
 - iterated, 11
- diagram
 - commutative, *see* commutative diagram

180

dual
 horizontal, 54
 vertical, 54
duality, 112
equation
 elevator, 38
 hockey stick, 121
 pseudo-associativity, 85
 scan, 120
 snake, 93
equivalence, 111
 adjoint, 114
equivariant function, 3
exchange condition, 29
exponential, 12
extension form, 89
fold, 147
fork, 60
free algebra, 146
Frobenius monad, 127
function
 direct image, 2
 graph of, 96
 inverse image, 2
functor, 13
 arrow map, 13
 composite, 13
 composition law, 13
 contravariant powerset, 15
 covariant powerset, 14
 diagonal, 14
 essentially bijective, 22
 essentially injective, 22
 essentially surjective, 22
 faithful, 22
 forgetful, 15
 free, 16
 full, 22
 fully faithful, 23
 identity, 13
 identity law, 13
 injective on arrows, 22
 injective on objects, 22
 laws, 13
 object map, 13
 polynomial, 16
 surjective on arrows, 22
 surjective on objects, 22
 underlying, 15, 146
Galois connection, 94
homomorphism
 of an endofunctor
 axiom, 76
 of endofunctor algebras, 76
Huber's construction, 130
idempotent, 124
 split, 124

Index

interchange law, 39
interface, *see* signature
inverse, 7
iso, 7
isomorphism, 7
 natural, 50
mates, 102
 horizontal composite, 104
 vertical composition, 104
monad, 63, 88
 associativity axiom, 64
 closure operator, 65
 environment, *see* monad, reader
 exception, 67
 free, 149
 functor, *see* monad map
 identity, 65
 identity map, 68
 map, 68
 morphism, *see* monad map
 multiplication, 64
 nonempty bag, 69
 nonempty list, 69
 nonempty powerset, 69
 nonempty set, 69
 powerset, 66
 reader, 108
 state, 67
 transformer, *see* monad map
 unit, 64
 unit axiom, 64
 writer, 67
natural transformation, 18
 horizontal composite, 38
 identity, 19
 vertical composite, 19
naturality condition, 18
naturality square, 19
object
 final, 9
 initial, 9
 source of arrow, 1
 target of arrow, 1
 terminal, *see* object, final
 zero, 9
planar isotopy, 43
post-inverse, 6
pre-inverse, 6
prefix points, 77
product, 9
 indexed, 11
 infinite, 11
quantale, 102
regular algebra, 102
signature, 78
spider theorem, 62

split epi, 6
split mono, 6
standard construction, *see* monad
string diagrams, 33
string of adjunctions, *see also* adjoint triple
subcategory, 4
 full, 4
sweep-line algorithm, 43
transformation, 18
transposition, 92
triple, *see* monad
type cast, 159
universal arrow from A to R , 136
universal property, 137
 coproduct, 10
 exponential, 12
 final object, 9
 initial object, 9
 product, 9