

Index of Notation

- | | |
|--|--|
| $\ \cdot\ _{\mu,a}$, 103
$(\cdot, \cdot)_{\mu}$, 89
$B_r(x)$, 8
χ_U^V , <i>see</i> characteristic function
χ_U , <i>see</i> characteristic function
$C(K)$, 69
$\mathcal{C}_{\mathcal{L}}$, 19
$C(X, d)$, 53
Δ_{μ} , 108
$\bar{\delta}(\nu, \mu)$, 152
$\underline{\delta}(\nu, \mu)$, 152
$\mathcal{DF}(V)$, 42
$\widetilde{\mathcal{DF}}(V)$, 42
$\text{diam}(\cdot)$, 14
$\text{dim}_{\mathbb{H}}$, <i>see</i> Hausdorff dimension
d_S , 134
$d_S(K, R)$, 138
$d_S(\mu)$, 138
$E_D(\cdot)$, 132
$E(k, A)$, 181
$E_N(\cdot)$, 132
G_D , 94
G_{μ} , 102
g^x , 99
$\underline{h}(\lambda : \nu, \mu)$, 152
$\bar{h}(\lambda : \nu, \mu)$, 152
\mathcal{H}^s , <i>see</i> Hausdorff measure
$[H]_U$, 45
$\ell(V)$, 41
$J(p)$, 36
$J(p, V_0)$, 36
$K(\Lambda)$, 23 | $K_{m,x}$, 20
$k(p)$, 181
$\mathcal{LA}(V)$, 42
$\widetilde{\mathcal{LA}}(V)$, 42
$\mathcal{L}(\Lambda)$, 23
$\widetilde{M}(K)$, 89
$m(p)$, 36
$m(p, V_0)$, 36
ψ_p , 82
ψ_p^m , 81
$\mathcal{P}_{\mathcal{L}}$, 19
P_m , 81
$P_{V,U}$, 44
$\mathcal{RF}(X)$, 56
$\widetilde{\mathcal{RF}}(X)$, 56
$\rho_b(x, \mu)$, 133
$\mathcal{RM}(X)$, 56
$\widetilde{\mathcal{RM}}(X)$, 56
$R_m(\mu)$, 90
$R_m^t(\mu)$, 102
$\mathcal{R}_{\mathbf{r}}$, 70
Σ_w , 13
V_* , 22
$V_0(\mathcal{L})$, 19
V_0 , 19
$V(\Lambda)$, 22
$V(\Lambda, \mathcal{L})$, 22
V_m , 22
W_* , 18
W_m , 18 |
|--|--|

Index

- affine nested fractal, **116**, 117, 150
 arcwise connected, **33**
 arithmetic case, **207**
- Bernoulli, 25
 Borel
 measure, **25**
 regular measure, **25**, 26
 set, **25**
 σ -algebra, **25**
- boundary condition, 92, 93
 Dirichlet, *see* Dirichlet bound-
 ary condition
 Neumann, *see* Neumann bound-
 ary condition
- boundary of self-similar set, **19**
- Cantor set, **15**, 39, 66
 topological, **13**, 19
- characteristic function, **42**, 203
- closable, **197**
- closed form, **197**
- compact operator, 92, 94, **198**
- compact resolvent, 64, 92, 93, 133,
 198
- compatible sequence, **51**, 65, 69
- complete measure, **25**
- connected, **33**
 arcwise, *see* arcwise connected
 locally, *see* locally connected
- contraction, **9**
- contraction principle, **9**, 10
- contraction property, **199**
- contraction ratio, 9
- core, **202**
- critical set, **19**
- D-eigenfunction, *see* Dirichlet eigen-
 function
- D-eigenvalue, *see* Dirichlet eigen-
 value
- Δ -Y transform, **48**, 67, 129
- diameter, **14**
- diffusion process, 66, 193
- directly Riemann integrable, 207
- Dirichlet boundary condition, **93**,
 158
- Dirichlet eigenfunction, **132**
- Dirichlet eigenvalue, **132**
- Dirichlet form, 65, 88, 92, 185,
 202
 local, *see* local Dirichlet form
 on a finite set, **42**
 regular, *see* regular Dirichlet
 form
- Dirichlet Laplacian, **93**, 95, 111
- Dirichlet problem for Poisson's equa-
 tion, **114**
- effective resistance, **46**, 51, 65
- effective resistance metric, **48**, 66,
 83, 138
- eigenfunction
 Dirichlet, *see* Dirichlet eigen-
 function

- localized, *see* localized eigenfunction
- Neumann, *see* Neumann eigenfunction
- pre-localized, *see* pre-localized eigenfunction
- eigenvalue
- counting function, **133**, 190
 - decimation method, 135, **156**
 - Dirichlet, *see* Dirichlet eigenvalue
 - Neumann, *see* Neumann eigenvalue
- equilibrium point, 9
- extension
- Friedrichs, *see* Friedrichs extension
 - of a form, **197**
- finite rank operator, 92, **198**
- finitely ramified, **23**
- fixed point, 9, 14, 70
- focal point, **180**
- Friedrichs extension, 111, 188, **198**
- Frostman's lemma, 29
- fundamental solution, 162
- γ -elliptic measure, **89**
- Gauss–Green's formula, **110**, 145, 187
- generator, **199**
- Green's function, 95, **98**, 102, 188, 189
- Green's operator, **94**, 95, 102, 103, 145
- extended, **102**
- harmonic function, 45, 52, **73**, 75, 143
- harmonic structure, **69**, 73, 138
- regular, *see* regular harmonic structure
- Harnack inequality, **46**, 78, 100
- Hata's tree-like set, 16, **24**, 71, 129
- Hausdorff
- dimension, 28, **29**
 - measure, **28**, 138
 - metric, **10**
- heat
- equation, **162**, **164**, 190
 - kernel, **158**, 171, 190
 - semigroup, 190
- heat kernel, 152
- hitting time, 194
- inequality
- Harnack, *see* Harnack inequality
 - Nash, *see* Nash inequality
- integrated density of states, **135**, 155
- isomorphism between self-similar structures, **18**
- Koch curve, **15**, 17
- Λ -harmonic function, **139**
- Laplacian, 65, 66, 92, 107, **108**, 186
- Dirichlet, *see* Dirichlet Laplacian
 - Neumann, *see* Neumann Laplacian
 - on a finite set, **42**
 - standard, *see* standard Laplacian
- lattice case, **134**, 142, 207
- L^∞ -solution of the heat equation
- on $[0, \infty)$, **164**

224

Lipschitz, **9**
 Lipschitz constant, **9**
 local Dirichlet form, **65, 88, 202**
 local property, **93, 202**
 localized eigenfunction, **141**
 locally connected, **33**

m-harmonic, **81**
 Markov property, **42, 56, 93, 162, 202**
 of a semigroup, **202**
 mass distribution principle, **29**
 maximum principle, **45, 52, 76, 77, 81**
 parabolic, *see* parabolic maximum principle
 strong version, **81**
 weak version, **77**

measure
 Bernoulli, **25**
 Borel, *see* Borel measure
 Borel regular, *see* Borel regular measure
 complete, *see* complete measure
 Hausdorff, *see* Hausdorff measure
 probability, *see* probability measure
 self-similar, *see* self-similar measure

minimal, **21**
 modified Sierpinski gasket, **129, 129**
 Moran's theorem, **32**
 multi-harmonic function, **143**

N-eigenfunction, *see* Neumann eigenfunction

Index

N-eigenvalue, *see* Neumann eigenvalue
 Nash inequality, **153, 172, 202, 204**
 nested fractal, **117, 146**
 affine, *see* affine nested fractal
 nesting condition, **117**
 net, **10**
 Neumann boundary condition, **92, 158**
 Neumann derivative, **110**
 Neumann eigenfunction, **132**
 Neumann eigenvalue, **132**
 Neumann Laplacian, **92, 111**
 Neumann problem for Poissons equation, **129**
 non-arithmetic case, **208**
 non-lattice case, **134, 208**

open set condition, **30, 32**
 operator
 compact, *see* compact operator
 finite rank, *see* finite rank operator
 Green's, *see* Green's operator
 renormalization, *see* renormalization operator
 self-adjoint, *see* self-adjoint operator
 symmetric, *see* symmetric operator

p. c. f., *see* post critically finite
 parabolic maximum principle, **164**
 partition, **22, 23, 83, 139, 173**
 pentakun, **119**
 piecewise harmonic function, **81**
 Poisson's equation, **114, 129**

- post critical set, **19**, 72
 post critically finite, **23**, 34
 pre-localized eigenfunction, **141**,
 146, 153
 probability measure, **25**
- quadratic form
 associated with a self-adjoint
 operator, **197**
 non-negative, **197**
- r-network, *see* resistance network
 random walk, 54
 refinement of partition, **22**
 regular Dirichlet form, 55, 65, 88,
202
 regular harmonic structure, **69**,
 75, 167
 renewal
 equation, 137, **207**
 theorem, 135, 137, **207**
 renormalization operator, **70**
 resistance
 form, **55**, 61
 metric, **56**, 61, 70, 75
 network, **43**, 69
- self-adjoint operator, **196**
 self-affine set, 10
 self-similar
 measure, 25, **26**, 105
 set, **10**, 13
 structure, **18**, 25, 26
 self-similarity of a form, **83**
 semigroup, 160, **199**
 of symmetric operators, **199**
 property, **199**
 strong continuous, *see* strong
 continuous semigroup
 shift
- map, **13**
 space, **12**, 18
- Sierpinski
 carpet, **24**
 gasket, **15**, 24, 71, 108, 128,
 135, 137, 149, 155
- similarity dimension of harmonic
 structure, 138
- similitude, **9**, 13
 snowflake, **120**
 solution of the heat equation
 L^∞ -, *see* L^∞ -solution of the
 heat equation
 on $(0, \infty)$, 162
- spectral
 dimension, 135, 137, **138**, 155
 exponent, **134**, 137
- standard harmonic structure, **71**,
 77
- standard Laplacian, **109**, 135, 149
 strong continuous semigroup, **199**
 strongly symmetric, **116**
 symbol, **12**, 18, 20
- symmetric
 operator, **196**
 strongly, *see* strongly symmet-
 ric
 weakly, *see* weakly symmet-
 ric
- symmetry
 group, **146**
 of a harmonic structure, **115**
- theorem
 renewal, *see* renewal theorem
 Weyl's, *see* Weyl's theorem
- totally bounded, **10**
- unit contraction, **202**
- variational formula, 136, 140, **198**

226

Index

Vicsek set, 147

weakly symmetric, **37**Weyl's theorem, **133**word, **12** empty, **12** length of, **12**