

Cambridge University Press

978-1-107-13743-1 - Convergence of One-Parameter Operator Semigroups: In Models of
Mathematical Biology and Elsewhere

Adam Bobrowski

Index

[More information](#)

Index

- Q*-matrix, 74
- absorbing state, 97
- AL-space, 354
- alleles, 96, 152, 311
- approximation
- discrete-time, 100, 105
 - Hille, 103
 - Yosida, 53
- asymptotic analysis, 341
- averaging principle
- of Freidlin and Wentzell, 327, 361, 370
- Banach lattice, 76
- basic cosine family, 386
- Bernstein
- Approximation Theorem, 103
 - polynomials, 103
- Bielecki
- distance, 225
 - norm, 122, 211
- birds inhabiting islands, 262
- boundary conditions, 17
- continuous dependence on, 18, 350
 - convex combination of, 352
 - general, 21
 - perturbation of, 346
 - Robin, 60, 106
 - singular perturbation of, 369
- Brownian motion
- elastic, 60
 - elementary return, 19
 - minimal, 60
 - snapping out, 66
 - stopped (absorbing), 19
- bulk part, 341
- cell division, 30, 347
- cell proliferation, 30
- change of time, 299
- Chapman-Enskog expansion method, 341
- Chernoff's Product Formula, 101
- of *k*th order, 104
- climate, 289
- coagulation, 219
- comparing semigroups, 335
- condition
- boundary, 17
 - Hasegawa's, 85
 - Müller, 214, 263
 - range, 2, 85
 - transmission, 25
- convergence
- irregular, 145, 390
 - regular, 51, 383, 390
- convex combination of generators, 292
- core of an operator, 53, 89
- cosine
- family, 3
 - operator function, 3
- cross-over, 311
- densities, 74
- depolarization, 166
- discrete-time approximation, 100, 105
- distributions, 74
- early cancer, 216, 238
- elastic barrier, 20
- elementary return Brownian motion, 19
- Engraulis encrasicolus, 304

Equation

- Hilbert, 2, 47
- resolvent, 2
- semilinear, 210

evolution family, 123

Ewens Sampling Formula, 119

Example

- Blackwell's, 90
- Khasminskii's, 327
- exchangeable random variables, 312
- excitation impulses, 166
- explosion, 75
- extended limit, 15, 45

Feynman–Kac Formula, 121

fish population dynamics, 304, 352

Formula

- Chernoff's Product, 101
- Ewens Sampling, 119
- Feynman–Kac, 121
- Lie–Trotter, 103, 123
- Taylor's, 49
- Trotter's Product, 103
- Volkonskii's, 299
- Weierstrass, 4, 110

Fréchet differential, 218

fragmentation, 219

gene

- expression, 165, 283, 303
- regulation, 281, 303

genetic drift, 96

graph extension, 15

Gronwall's Lemma, 238

growth factor molecules, 216

heavy traffic, 57

herding model, 133

Hilbert Equation, 2, 47

Hill-type function, 216

Hille approximation, 103

Hille–Yosida

- operators, 52
- space, 51

holomorphic semigroup, 87, 171

- boundary value of, 87

homogenization theorem

- of Conway, Hoff, and Smoller, 228
- of Pardoux and Veretennikov, 235

homomorphism, 82

hydrodynamic space, 341

inequality

- Poincaré, 228
- Sobolev, 228

infectious disease, 338

infinite product of semigroups, 86, 90

inhibitory impulses, 166

injective norm, 328, 334

injective tensor product, 327, 334

intensity matrix, 74

irregular convergence, 145, 390

Kantorovič–Banach space, 76

KB-space, 76

kinase, 233, 241

kinetic space, 341

Kingman's n -coalescent, 116

Kisyński space, 5

Kolmogorov matrix, 22, 74

Kowalski, S., 102

Krein–von Neumann extension, 36

layer

- boundary, 342
- corner, 342
- initial, 342

Lemma

- Gronwall, 123, 211, 268
- Kurtz, 253
- Poincaré, 228
- Riemann, 386
- Sobolev, 228

Lie–Trotter Formula, 103

ligand, 241

line graph of \mathcal{G} , 203

Lord Kelvin's method of images, 386

lung cancer, 216

Müller conditions, 214, 263

manufacturing system, 287

Markov chain, 56, 74, 97, 111, 118, 135, 146,

152, 194, 203

- a singular perturbation of, 258

Markov operator, 24, 74

membrane, 217, 241

- semi-permeable, 24, 65, 192, 201, 203

method of (invariant) rectangles, 215

mild solution, 210

model

- herding, 133
- Moran-type, 152, 311
- of coagulation and fragmentation, 219

Cambridge University Press

978-1-107-13743-1 - Convergence of One-Parameter Operator Semigroups: In Models of Mathematical Biology and Elsewhere

Adam Bobrowski

Index

[More information](#)

Index

437

- of fish population dynamics, 304, 358
- of gene expression, 283, 303
- of gene regulation, 281, 303
- of interactions between economy and climate, 289
- of kinase activity, 241
- of kinase phosphorylation and dephosphorylation, 233
- of lung cancer, 216
- of manufacturing system, 287
- of neurotransmitters, 189
- of oligopoly, 288
- of recombination, 311, 318
- of spread of an infectious disease, 337
- Rotenberg, 30, 347
- Stein, 166
- Wright–Fisher, 20, 96, 116
- Moran-type model, 152, 312
- multiplicative perturbation theorems, 300
- Neumann Laplace operator, 37
- neuronal variability, 166
- norm
 - Bielecki, 114, 122, 211
 - order continuous, 79
- oligopoly, 288
- once integrated semigroup, 82, 83
- operator
 - core of, 53, 89
 - idempotent, 155
 - Markov, 24, 74
 - of a gene, 281
 - part of, 51
 - relatively bounded, 114
 - sectorial, 87
 - sub-Markov, 75
- order continuous norm, 79
- part of an operator, 51
- permeability coefficient, 26, 66, 192, 196, 202, 203
- polarization principle, 32
- positive cone, 77
- positive maximum principle, 17
- process
 - Bessel, 333
 - piece-wise deterministic, 271
 - pure death/birth, 116
 - projective norm, 334
 - projective tensor product, 153, 334
 - pseudoresolvent, 47
 - pure birth process, 75
 - pure death process, 116
- quadratic form, 32
 - convergence of, 36, 37, 365
- queue, 56
- random evolutions, 271
- range condition, 2, 17, 18, 47, 85
- recombination, 311, 318
- refractory period, 166
- regular convergence, 51, 383, 390
- regularity space, 51
- resolvent, 2
- Riemann Lemma, 386
- Rotenberg model, 30, 347
- Schauder basis, 90, 139, 222
- sectorial form, 33
- semi-permeable membrane, 24, 65, 192, 201, 203
- semigroup, 1
 - bounded, holomorphic, 88
 - boundary value of, 88
 - Feller, 17
 - conservative, 22
 - Markov, 24, 74, 93
 - McKendrick, 310, 349
 - minimal, 75
 - once integrated, 82, 83
 - scalar, 40
 - strongly continuous, 1
 - sub-Markov, 75
- semigroups
 - intertwined, 154
 - isomorphic, 7
 - similar, 7
 - uniformly holomorphic, 171
- sesquilinear form, 32, 363
- shadow system, 236
- simple tensors, 334
- sine function, 383
- solea solea, 304
- space
 - AL, 354
 - Hille–Yosida, 51
 - hydrodynamic, 341
 - Kantorovič–Banach, 76
 - KB, 76

Cambridge University Press

978-1-107-13743-1 - Convergence of One-Parameter Operator Semigroups: In Models of
Mathematical Biology and Elsewhere

Adam Bobrowski

Index

[More information](#)

438

Index

- space (*cont.*)
 - kinetic, 341
 - Kisyński, 5
 - ordered, 76
 - regularity, 51
 - with order continuous norm, 79
- spectral bound, 179
- stability condition, 103, 137
- stabilizing operators, 139
- stopped (absorbing) Brownian motion, 19
- strictly positive, 179
- strong graph limit, 15
- sub-Markov, 75
- subordination principle, 4
- surprise, surprise, 271

- Taylor's Formula, 49
- telegraph equation, 70
- tensor norm, 333
- tensor product
 - injective, 331
 - projective, 153
- Theorem
 - Arendt, 402
 - Bernstein Approximation, 103
 - Chander and Singh, 390
 - Conway–Hoff–Smoller, 228
 - Cox–Wallen, 44
 - Da Prato–Giusti–Sova, 4, 402
 - Dorroh, 299
 - Fattorini, 391
 - Greiner, 345, 348
 - Hennig–Neubrandner, 397
 - Hille–Yosida, 2, 402
 - Kisyński, 5
 - Kisyński Homomorphism, 401
 - Kurtz, 253
 - Pardoux–Veretennikov, 235
 - Pazy, 250
 - Pettis, 160
 - Simon, 365
 - Sova–Kurtz, 15, 52
 - Tikhonov, 267
 - Trotter–Kato, 15, 52
 - Widder, 401
- transmission conditions, 25, 66, 193, 205
 - emergence of, 362, 377
- Trotter's Product Formula, 103

- vector lattice, 76
- vertex, 33
- Volkonskii's Formula, 299
- Volterra Equation, 122

- Weierstrass Formula, 4, 110
- Wright's diffusion, 98, 112
- Wright–Fisher
 - diffusion, 98, 112
 - model, 20, 96, 116
- Yosida approximation, 53, 147, 174, 399