

Preface	p. xiii
Acknowledgments	p. xvii
Introduction	p. xix
Theory	p. 1
Introduction	p. 1
Notation and basic definitions	p. 3
Reproducing kernels and positive type functions	p. 13
Basic properties of reproducing kernels	p. 24
Sum of reproducing kernels	p. 24
Restriction of the index set	p. 25
Support of a reproducing kernel	p. 26
Kernel of an operator	p. 27
Condition for $H[\text{subscript } K]$ [subset or is implied by] $H[\text{subscript } R]$	p. 30
Tensor products of RKHS	p. 30
Separability. Continuity	p. 31
Extensions	p. 37
Schwartz kernels	p. 37
Semi-kernels	p. 40
Positive type operators	p. 42
Continuous functions of positive type	p. 42
Schwartz distributions of positive type or conditionally of positive type	p. 44
Exercises	p. 48
Rkhs and Stochastic Processes	p. 55
Introduction	p. 55
Covariance function of a second order stochastic process	p. 55
Case of ordinary stochastic processes	p. 55
Case of generalized stochastic processes	p. 56
Positivity and covariance	p. 57
Positive type functions and covariance functions	p. 57
Generalized covariances and conditionally of positive type functions	p. 59
Hilbert space generated by a process	p. 62
Representation theorems	p. 64
The Loeve representation theorem	p. 65
The Mercer representation theorem	p. 68
The Karhunen representation theorem	p. 70
Applications	p. 72
Applications to stochastic filtering	p. 75
Best Prediction	p. 76
Best prediction and best linear prediction	p. 76
Best linear unbiased prediction	p. 79
Filtering and spline functions	p. 80

No drift-no noise model and interpolating splines	p. 82
Noise without drift model and smoothing splines	p. 83
Complete model and partial smoothing splines	p. 84
Case of gaussian processes	p. 86
The Kriging models	p. 88
Directions of generalization	p. 94
Uniform Minimum Variance Unbiased Estimation	p. 95
Density functional of a gaussian process and applications to extraction and detection problems	p. 97
Density functional of a gaussian process	p. 97
Minimum variance unbiased estimation of the mean value of a gaussian process with known covariance	p. 100
Applications to extraction problems	p. 102
Applications to detection problems	p. 104
Exercises	p. 105
Nonparametric Curve Estimation	p. 109
Introduction	p. 109
A brief introduction to splines	p. 110
Abstract Interpolating splines	p. 111
Abstract smoothing splines	p. 116
Partial and mixed splines	p. 118
Some concrete splines	p. 121
D^m splines	p. 121
Periodic D^m splines	p. 122
L splines	p. 123
$[\alpha]$ -splines, thin plate splines and Duchon's rotation invariant splines	p. 123
Other splines	p. 124
Random interpolating splines	p. 125
Spline regression estimation	p. 125
Least squares spline estimators	p. 126
Smoothing spline estimators	p. 127
Hybrid splines	p. 128
Bayesian models	p. 129
Spline density estimation	p. 132
Shape restrictions in curve estimation	p. 134
Unbiased density estimation	p. 135
Kernels and higher order kernels	p. 136
Local approximation of functions	p. 143
Local polynomial smoothing of statistical functionals	p. 148
Density estimation in selection bias models	p. 150
Hazard functions	p. 152
Reliability and econometric functions	p. 154

Kernels of order (m, p)	p. 155
Definition of K -based hierarchies	p. 158
Computational aspects	p. 160
Sequences of hierarchies	p. 165
Optimality properties of higher order kernels	p. 167
The multiple kernel method	p. 171
The estimation procedure for the density and its derivatives	p. 172
Exercises	p. 175
Measures and Random Measures	p. 185
Introduction	p. 185
Dirac measures	p. 186
General approach	p. 190
The example of moments	p. 192
Measurability of RKHS-valued variables	p. 194
Gaussian measure on RKHS	p. 196
Gaussian measure and gaussian process	p. 196
Construction of gaussian measures	p. 198
Weak convergence in $\Pr(H)$	p. 199
Weak convergence criterion	p. 202
Integration of H -valued random variables	p. 202
Notation. Definitions	p. 203
Integrability of X and of $\{X^{[t]} : t \in E\}$	p. 205
Inner products on sets of measures	p. 210
Inner product and weak topology	p. 214
Application to normal approximation	p. 218
Random measures	p. 220
The empirical measure as H -valued variable	p. 223
Integrable kernels	p. 224
Estimation of I_{μ}	p. 228
Convergence of random measures	p. 232
Exercises	p. 234
Miscellaneous Applications	p. 241
Introduction	p. 241
Law of Iterated Logarithm	p. 241
Learning and decision theory	p. 245
Binary classification with RKHS	p. 245
Support Vector Machine	p. 248
ANOVA in function spaces	p. 249
ANOVA decomposition of a function on a product domain	p. 249
Tensor product smoothing splines	p. 252
Regression with tensor product splines	p. 254

Strong approximation in RKHS	p. 255
Generalized method of moments	p. 259
Exercises	p. 262
Computational Aspects	p. 265
Kernel of a given normed space	p. 266
Kernel of a finite dimensional space	p. 266
Kernel of some subspaces	p. 266
Decomposition principle	p. 267
Kernel of a class of periodic functions	p. 268
A family of Beppo-Levi spaces	p. 270
Sobolev spaces endowed with a variety of norms	p. 276
First family of norms	p. 277
Second family of norms	p. 285
Norm and space corresponding to a given reproducing kernel	p. 288
Exercises	p. 289
A Collection of Examples	p. 293
Introduction	p. 293
Using the characterization theorem	p. 293
Case of finite X	p. 294
Case of countably infinite X	p. 294
Using any mapping from E into some pre-Hilbert space	p. 295
Factorizable kernels	p. 295
Examples of spaces, norms and kernels	p. 299
Appendix	p. 344
Introduction to Sobolev spaces	p. 345
Schwartz-distributions or generalized functions	p. 345
Spaces and their topology	p. 345
Weak-derivative or derivative in the sense of distributions	p. 346
Facts about Fourier transforms	p. 346
Sobolev spaces	p. 346
Absolute continuity of functions of one variable	p. 346
Sobolev space with non negative integer exponent	p. 347
Sobolev space with real exponent	p. 348
Periodic Sobolev space	p. 349
Beppo-Levi spaces	p. 349
Index	p. 353

Table of Contents provided by Blackwell's Book Services and R.R. Bowker. Used with permission.