

Table of Contents

Chapter I. Basic Notions of Probability Theory.	1
§ 1. Axioms and Definitions	1
§ 2. Independence	20
§ 3. Conditional Probabilities and Conditional Expectations.	28
§ 4. Random Functions and Random Mappings	41
 Chapter II. Random Sequences.	 50
§ 1. Preliminary Remarks	50
§ 2. Semi-Martingales and Martingales	52
§ 3. Series	65
§ 4. Markov Chains	73
§ 5. Markov Chains with a Countable Number of States	88
§ 6. Random Walks on a Lattice.	116
§ 7. Local Limit Theorems for Lattice Walks.	125
§ 8. Ergodic Theorems.	132
 Chapter III. Random Functions.	 146
§ 1. Some Classes of Random Functions	146
§ 2. Separable Random Functions.	163
§ 3. Measurable Random Functions	170
§ 4. A Criterion for the Absence of Discontinuities of the Second Kind	173
§ 5. Continuous Processes	186
 Chapter IV. Linear Theory of Random Processes.	 195
§ 1. Correlation Functions	195
§ 2. Spectral Representations of Correlation Functions	205
§ 3. A Basic Analysis of Hilbert Random Functions.	218
§ 4. Stochastic Measures and Integrals	230
§ 5. Integral Representation of Random Functions.	241

§ 6. Linear Transformations	247
§ 7. Physically Realizable Filters	257
§ 8. Forecasting and Filtering of Stationary Processes.	271
§ 9. General Theorems on Forecasting Stationary Processes	289
Chapter V. Probability Measures on Functional Spaces.	308
§ 1. Measures Associated with Random Processes	308
§ 2. Measures in Metric Spaces.	314
§ 3. Measures on Linear Spaces. Characteristic Functionals	320
§ 4. Measures in \mathfrak{L}_p Spaces	328
§ 5. Measures in Hilbert Spaces	338
§ 6. Gaussian Measures in a Hilbert Space	348
Chapter VI. Limit Theorems for Random Processes.	362
§ 1. Weak Convergences of Measures in Metric Spaces	362
§ 2. Conditions for Weak Convergence of Measures in Hilbert Spaces.	370
§ 3. Sums of Independent Random Variables with Values in a Hilbert Space.	381
§ 4. Limit Theorems for Continuous Random Processes	405
§ 5. Limit Theorems for Processes without Discontinuities of the Second Kind.	421
Chapter VII. Absolute Continuity of Measures Associated with Random Processes.	440
§ 1. General Theorems on Absolute Continuity.	440
§ 2. Admissible Shifts in Hilbert Spaces	449
§ 3. Absolute Continuity of Measures under Mappings of Spaces	475
§ 4. Absolute Continuity of Gaussian Measures in a Hilbert Space	490
§ 5. Equivalence and Orthogonality of Measures Associated with Stationary Gaussian Processes.	499
§ 6. General Properties of Densities of Measures Associated with Markov Processes.	515
Chapter VIII. Measurable Functions on Hilbert Spaces.	525
§ 1. Measurable Linear Functionals and Operators on Hilbert Spaces.	525
§ 2. Measurable Polynomial Functions. Orthogonal Polynomials	534
§ 3. Measurable Mappings	543

§ 4. Calculation of Certain Characteristics of Transformed Measures.	550
Historical and Bibliographical Remarks.	558
Bibliography.	562
Subject Index.	567