
Contents

	<i>Preface</i>	<i>page ix</i>
1	Orthogonal Polynomials	1
1.1	Some Special Functions and the Stieltjes Transform	1
1.2	General Properties of Orthogonal Polynomials	6
1.3	The Spectral Theorem for Orthogonal Polynomials	17
1.4	Classical Orthogonal Polynomials of a Continuous Variable	24
1.5	Classical Orthogonal Polynomials of a Discrete Variable	40
1.6	The Askey Scheme	50
1.7	Exercises	53
2	Spectral Representation of Discrete-Time Birth–Death Chains	57
2.1	Discrete-Time Markov Chains	58
2.2	Karlin–McGregor Representation Formula	63
2.3	Properties of the Birth–Death Polynomials and Other Related Families	71
2.4	Examples	84
2.5	Applications to the Probabilistic Aspects of Discrete-Time Birth–Death Chains	104
2.6	Discrete-Time Birth–Death Chains on the Integers	132
2.7	Exercises	143
3	Spectral Representation of Birth–Death Processes	146
3.1	Continuous-Time Markov Chains	147
3.2	Karlin–McGregor Representation Formula	160
3.3	Properties of the Birth–Death Polynomials and Other Related Families	166
3.4	The Karlin–McGregor Formula as a Transition Probability Function	180
3.5	Birth–Death Processes with Killing	187

3.6	Examples	191
3.7	Applications to the Probabilistic Aspects of Birth–Death Processes	215
3.8	Bilateral Birth–Death Processes	243
3.9	Exercises	249
4	Spectral Representation of Diffusion Processes	254
4.1	Diffusion Processes	255
4.2	Spectral Representation of the Transition Probability Density	262
4.3	Classification of Boundary Points	268
4.4	Diffusion Processes with Killing	276
4.5	Examples	279
4.6	Quasi-Stationary Distributions	312
4.7	Exercises	320
	<i>References</i>	322
	<i>Index</i>	331