

Contents

<i>Preface</i>	<i>page</i> vii
<i>Acknowledgments</i>	x
<i>Symbols</i>	xi
1 Upper and Lower Bounds	1
1.1 Statement of the Main Results	1
1.2 Some Potential-theoretic Preliminaries	6
1.3 Proof of the Upper and Lower Bounds	12
1.4 Proof of the Sharpness of the Upper and Lower Bounds	22
1.5 Examples	26
2 Zero Distribution of Orthogonal Polynomials	30
2.1 Zeros of Orthogonal Polynomials	30
2.2 Norm Asymptotics and Zero Distribution	42
2.3 Asymptotic Behavior of Zeros when $c_\mu > 0$	51
3 Regular nth-root Asymptotic Behavior of Orthonormal Polynomials	59
3.1 Regular Asymptotic Behavior	59
3.2 Characterization of Regular Asymptotic Behavior	65
3.3 Regular Behavior in the Case of Varying Weights	72
3.4 Characterization of Regular Asymptotic Behavior in $L^p(\mu)$	83
3.5 Examples	92
3.6 Regular Behavior and Monic Polynomials	97
4 Regularity Criteria	100
4.1 Existing Regularity Criteria and Their Generalizations	100
4.2 New Criteria and Their Sharpness	108
4.3 Proof of the Regularity Criteria	111
4.4 Preliminaries for Proving the Sharpness of the Criteria	117
4.5 Proof of the Sharpness of the Regularity Criteria	125
4.6 Summary of Regularity Criteria and Their Relations	131
5 Localization	138
5.1 Global versus Local Behavior	138
5.2 Localization at a Single Point	140
5.3 Localization Theorems	144

vi	Contents	
6	Applications	149
6.1	Rational Interpolants to Markov Functions	149
6.2	Best Rational Approximants to Markov Functions	160
6.3	Nondiagonal Padé Approximants to Markov Functions	189
6.4	Weighted Polynomials in $L^p(\mu)$	204
6.5	Regularity and Weighted Chebyshev Constants	209
6.6	Regularity and Best $L^2(\mu)$ Polynomial Approximation	211
6.7	Determining Sets	216
	Appendix	220
A.I	Energy and Capacity	220
A.II	Potentials, Fine Topology	221
A.III	Principles	222
A.IV	Equilibrium Measures	224
A.V	Green Functions	227
A.VI	Dirichlet's Problem	228
A.VII	Balayage	230
A.VIII	Green Potential and Condenser Capacity	231
A.IX	The Energy Problem in the Presence of an External Field	233
	<i>Notes and Bibliographical References</i>	235
	<i>Bibliography</i>	243
	<i>Index</i>	249